

**Factors associated with non-suicidal self-injury (NSSI): An exploration of
rumination and biphobia**

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Word count

(excluding title page, references and appendices but including abstract, tables and figures)

Paper 1: 8,550

Paper 2: 5,340

Paper 3: 4,720

Total: 18,610

Thesis abstract

The aim of this thesis was to explore associations between rumination and biphobia with non-suicidal self-injury (NSSI). The thesis consists of three papers: 1) a systematic review and meta-analysis, 2) an empirical study, and 3) a critical appraisal of the research process.

The review paper (Paper 1) is a meta-analysis and narrative synthesis of the association between rumination and NSSI. Thirty-nine studies were included, with meta-analyses grouped by rumination type (depressive, transdiagnostic, anger, brooding, catastrophising, overall) and NSSI type (history and frequency). Narrative syntheses of adjusted associations and longitudinal studies were also conducted, to allow for a comprehensive review of the literature. Rumination was found to have a small to moderate positive association with NSSI and the narrative syntheses yielded mixed findings. In light of these results, it is suggested that therapies including strategies to manage rumination may be beneficial for NSSI, but other risk factors may be more important. It has been suggested that state rumination may be more associated with NSSI than trait rumination. As the studies included in the review measured trait rumination, more research focused on state rumination is needed.

The empirical paper (Paper 2) is focused on young bisexual people, who are a high risk group for NSSI. The paper uses a micro-longitudinal design to explore the associations between rumination and biphobia with NSSI urges over a six week period. This allowed for associations to be explored at the same time point and with the predictors lagged by one week. A total of 207 participants were recruited to the study. Results suggest that both rumination and biphobia are associated with NSSI urges in young bisexual people, although only rumination remained significant when covariates were included in the lagged model. This suggests that rumination-focused therapies for NSSI may be beneficial for young bisexual people. In addition, it is important for biphobic discrimination to be targeted and for professionals to have an awareness of the unique difficulties faced by bisexual people. Future research including a non-bisexual comparison group is needed to investigate any differences between groups. Furthermore, research should focus on testing a rumination-focused therapy for this population.

Finally, Paper 3 is a critical reflection of the research process. The paper provides further detail on how the studies were developed and designed. In addition, the challenges that were faced and the decision making processes that took place are discussed. Strengths and limitations of the research and personal reflections are included throughout.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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Firstly, I would like to thank the young bisexual people who gave their time to participate in the empirical study. Without you, the study simply would not have been possible. I hope this research helps to increase awareness of the difficulties and discrimination that you face.

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Paper 1:
**The relationship between rumination and NSSI: a systematic review and
meta-analysis**

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figures, and references)*

The following paper is under review for publication in the Journal of Affective Disorders.
Author guidelines can be found in Appendix A.

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Abstract

Background

Rumination is a cognitive process that has been implicated in the onset and maintenance of a variety of psychological difficulties. The purpose of this review and meta-analysis was to examine the nature and strength of the relationship between rumination and non-suicidal self-injury (NSSI).

Methods

The protocol for this review was pre-registered (CRD42019148186). A literature search of electronic databases PsycINFO, CINAHL, MEDLINE, and Web of Science was performed from the earliest date available to March 2020. Thirty-nine eligible papers were identified. Separate meta-analyses were undertaken for NSSI frequency and NSSI history, with studies grouped by rumination type (depressive, transdiagnostic, anger, brooding, catastrophising, overall). Moderator analyses were also conducted along with a narrative synthesis of adjusted associations and longitudinal studies.

Results

Rumination had a positive small association with NSSI frequency and a positive moderate association with NSSI history. The adjusted associations yielded mixed findings and most longitudinal research found rumination to be associated with prospective NSSI.

Limitations

Most included studies had a moderate risk of bias and used a student sample. A limitation of this review was that only English language papers were included.

Conclusions

Findings indicate that rumination is associated with NSSI, but more so the likelihood of engaging in NSSI overall than the frequency. Rumination-focused therapies for NSSI may

therefore be of benefit, although other risk factors may be more important. Further research is needed to understand this association, particularly with longitudinal studies that focus on state rumination rather than stable trait rumination.

Keywords: non-suicidal self-injury, NSSI, self-injury, rumination, brooding

Highlights

- Rumination is positively associated with non-suicidal self-injury.
- Rumination is more associated with the likelihood of engaging in non-suicidal self-injury overall than the frequency.
- A narrative synthesis of adjusted associations highlighted mixed findings.
- A narrative synthesis of longitudinal research showed that studies typically find rumination to be associated with prospective non-suicidal self-injury.
- Most studies included in the review had a moderate risk of bias.

1. Introduction

Non-suicidal self-injury (NSSI) is defined as direct and deliberate damage to one's body, occurring in the absence of suicidal intent and for purposes not socially or culturally sanctioned (Klonsky and Glenn, 2009). This can take the form of a range of behaviours, such as burning, cutting, hitting, and scratching oneself, with most people who engage in NSSI using multiple methods (Klonsky et al., 2014). In community samples, lifetime prevalence of NSSI has been found to be highest among adolescents at 17%, while ranging from 5.5% to 13% in adults (Swannell et al., 2014). In an adolescent psychiatric inpatient sample, prevalence rates of NSSI have been as high as 60% (Kaess et al., 2013). Self-reported NSSI almost tripled in England between 2000 and 2014, increasing from 2.4% to 6.4%. This increase was seen across age groups and gender (McManus et al., 2019).

Although NSSI and suicidal behaviours (such as self-poisoning or the use of firearms) both fall under the umbrella of self-harm, they arguably differ in several ways. NSSI is more prevalent and often results in less severe physical harm (Klonsky et al., 2014). Perhaps most importantly, people who engage in NSSI do not do so with the aim of ending their own life (Klonsky et al., 2014). However, NSSI is associated with a range of psychological difficulties and can have serious physical consequences such as infection or scarring (Bentley et al., 2014; Wilkinson and Goodyer, 2011). NSSI has also been identified as a predictor of future suicidal behaviour (Kiekens et al., 2018; Ribeiro et al., 2016; Whitlock et al., 2013). The high prevalence of NSSI coupled with the increased risk of suicidal behaviour highlights the importance of enhancing our understanding of the processes that lead to and maintain NSSI. Increasing our knowledge is a crucial step in developing effective prevention and treatment initiatives for NSSI (Slabbert et al., 2018).

Rumination has been defined as repetitive and persistent negative thinking about one's distress, personal concerns, and upsetting experiences (Watkins and Roberts, 2020). Emotional Cascade Theory (Selby et al., 2008; Selby et al., 2009) suggests that NSSI

serves as a distraction from intense rumination. In an “emotional cascade”, there is a positive feedback loop between rumination and negative affect; intense rumination increases negative affect, and in turn the heightened negative affect increases rumination. This creates a vicious and repetitive cycle (Selby and Joiner, 2009). Adaptive emotion regulation strategies such as cognitive reappraisal or distracting physical activity such as going for a walk may be insufficient to break this distressing cycle, given the intensity of the rumination. Therefore, people engage in more extreme behaviour to distract them from the rumination, such as NSSI. The physical pain and sight of blood provides alternative stimuli for the individual to focus on. Therefore, engaging in NSSI may be very quickly effective in reducing affect for the individual. However, as this will only last for a short amount of time, NSSI often becomes a habitual coping strategy (Selby et al., 2008).

Multiple different forms and subtypes of rumination have been proposed. Response Styles Theory conceptualises depressive rumination as the tendency to focus one’s attention on the causes, consequences, and meanings of depressed mood (Nolen-Hoeksema, 1991). It has been suggested that depressive rumination consists of two distinctive components, reflection and brooding, with the latter being the most maladaptive (Treyner et al., 2003). Reflection refers to a problem-solving process where one attempts to understand their depression, whereas brooding is the passive comparison of one’s situation with some unachieved standards (e.g., wishing a recent situation had gone better; Treyner et al., 2003). However, rumination can also be conceptualised as a transdiagnostic process, defined in this context as the tendency to repetitively analyse feelings of distress, rather than a focus on depressed mood specifically (Watkins, 2008). Other distinct forms of rumination have also been described, such as anger rumination. This refers to the tendency to focus one’s attention on angry moods and episodes (Sukhodolsky et al., 2001). Some consider catastrophising to be a form of rumination, which is defined as engagement in thoughts which explicitly emphasise the terror of an experience (Garnefski et al. 2001).

Rumination has been implicated in the onset and maintenance of multiple mental health difficulties, such as depression, anxiety, Post-Traumatic Stress Disorder, and eating disorders (Nolen-Hoeksema and Watkins, 2011). There is also substantial research on the association between rumination and NSSI, but to the best of the researchers' knowledge there is no published review investigating this transdiagnostic relationship. Previous reviews have analysed the relationship between rumination and symptoms of Borderline Personality Disorder (BPD), including self-injury. Most recently, Daros and Williams (2019) conducted a meta-analysis which found that higher symptoms of BPD were associated with higher endorsements of rumination ($r = .45$). The present review will focus on the association between rumination and NSSI specifically, regardless of diagnoses. In addition, two reviews have examined the relationship between rumination and suicidality, Morrison and O'Connor (2008) with a systematic review and Rogers and Joiner (2017) with a meta-analysis. Both reviews found that increased rumination was associated with increased suicidal ideation and suicide attempts. Rogers and Joiner (2017) reported moderate to large effects depending on the type of rumination, with the relationship between suicidal ideation and global rumination being the strongest (Hedges' $g = .74$). It is not yet known whether the relationship between NSSI and rumination is comparable to suicidality and rumination. The present review will fill this gap in the literature.

The primary objective of this review was to examine the nature and strength of the relationship between rumination and NSSI. Specifically, NSSI frequency and NSSI history. A pooled effect size was generated for overall rumination, as well as separately for the different types of rumination assessed in the included studies. This allowed for any differences in rumination type to be examined. In addition, a narrative synthesis was undertaken where adjusted effects were reported (association between rumination and NSSI adjusting for other factors). A narrative synthesis was also conducted for longitudinal studies, allowing for an exploration of this relationship over time. The findings from this

review will help to advance understanding of the cognitive processes underlying NSSI and provide an indication of how much importance should be placed on rumination within NSSI treatment initiatives.

2. Method

2.1. Pre-registration of protocol

The protocol for this review was pre-registered with the International Prospective Register of Systematic Reviews (PROSPERO), registration number CRD42019148186. The review adhered to the updated Preferred Reporting Items of Systematic Reviews and Meta-Analyses guidelines (PRISMA; Page et al., 2021), where applicable (Appendix B).

2.2. Eligibility criteria

For inclusion in this review papers must have: (1) included a measure of NSSI behaviour; (2) included a measure of rumination; (3) reported on original data. Papers were excluded if they: (1) were not written in English; (2) employed a purely qualitative methodology. Measures that assess self-injurious behaviours that are not clearly non-suicidal in nature were excluded. Participants were not restricted by age or clinical status.

2.3. Search strategy

Scoping searches were first conducted to aid the identification of relevant search terms. The terms used were also based on previous similar reviews, such as Rogers and Joiner (2017) and Taylor et al. (2018). Subsequently, four databases (PsycINFO, CINAHL, MEDLINE and Web of Science) were searched from the earliest date available to March 2020. The following terms, to be present in the title, abstract or keywords, were used and combined with Boolean operators: (“NSSI” OR “non-suicid*” OR “self injur*” OR “self-injur*” OR “self harm*” OR “self-harm” OR “self-mutilat*” OR “self mutilat*” OR “self-wound*” OR “self wound*” OR “parasuicid*” OR “DSH”) AND (“ruminat*” OR

“brood*”). To enhance search findings, medical subject headings (MeSH) terms were included where available, the details of which can be found in Appendix C.

After papers were identified, they were transferred to EndNote (Clarivate Analytics, 2020) and duplicates were removed. An initial review of titles and abstracts was conducted by first author SEC. Following this, full text screening of articles was completed independently by SEC and BJD. Results were compared and discrepancies resolved through team discussion. Papers that appeared eligible but were excluded from the review are detailed in Appendix D.

To maximise the likelihood of detecting all eligible studies, additional processes were conducted. Firstly, authors of included papers were contacted and asked if they were aware of any published or unpublished research that may be eligible for this review. In addition, the reference lists of each included study were searched for other potentially eligible studies (backwards-tracking) and papers that cited included studies were screened using Scopus (forward-tracking). Finally, reference lists from relevant reviews published in the last 15 years (Andover and Morris, 2014; Baer et al., 2013; Darros and Williams, 2019; Fox et al., 2015) were searched for eligible studies not otherwise detected (see Figure 1).

2.4. Data extraction

Data extraction was undertaken independently by researchers SEC and BJD, followed by comparison. Any discrepancies were resolved through discussion with guidance from PJT and SH. Extracted data included design, participant characteristics, measures, and relevant statistics. Where required information was not reported in a paper, authors were contacted to provide or clarify this.

2.5. Risk of bias assessment

Studies included in the review were independently evaluated for risk of bias by researchers SEC and BJD. Any discrepancies in ratings were discussed and resolved cooperatively,

with guidance from PJT and SH. To assess risk of bias, an adapted version of the Agency for Research and Healthcare Quality (AHRQ; Williams et al., 2010) assessment tool was used (Appendix E). This was chosen as it has been utilised previously in reviews of self-injury (Dunlop et al., 2020; Sheehy et al., 2019). The AHRQ assesses risk of bias over several domains, including unbiased selection of participants and use of validated measures. A rating of 'yes', 'no', 'can't tell' or 'not applicable' was given to each domain. Consistent with the approach used by Dunlop et al. (2020), an overall risk of bias rating was given to each study. A high risk of bias corresponded with 0-2 'yes' ratings, a moderate risk of bias 3-5 'yes' ratings and a low risk of bias 6-9 'yes' ratings. Details of the assessment consensus are provided in Appendix F.

2.6. Calculating and grouping effects

For the meta-analysis of NSSI frequency, the effect size used was Pearson's r . For the meta-analysis of NSSI history, the most common effect size reported was Cohen's d and so this was the effect size used. Bivariate associations between rumination and NSSI were grouped according to rumination type (brooding, reflection, depressive rumination, anger rumination, suicide-related rumination, transdiagnostic rumination, catastrophising, overall rumination) and NSSI type (NSSI history or NSSI frequency). All types of rumination were included in the overall rumination group and therefore values were combined, by averaging r values, for studies that reported more than one type. Where the n varied between different r values in the same study (e.g., due to missing data) the smallest n value was used to determine the variance of the effect size. To combine d values, the equations recommended by Borenstein et al. (2009) were used.

When converting to Cohen's d , the formulas from Borenstein et al. (2009) were used. For the papers that reported d , the standard error was calculated using the means and standard deviations (Borenstein et al., 2009). For some papers, the d calculated was

different to what was reported. As a rule, the d from the current author's calculations have been used for consistency.

Two studies (Barrocas et al., 2014; Hughes et al., 2019) had results that were not applicable to the meta-analysis due to the statistical analysis employed by the researchers. Therefore, these studies are not included in the groupings. These results are instead explored in the narrative synthesis section of this review.

2.7. Meta-analytic calculations

A random-effects meta-analysis was conducted for each grouping where there were three or more studies available. A random-effects model was adopted to accommodate for the expected heterogeneity between studies. For studies with more than one time point, the baseline results were used in the meta-analysis.

Analyses were conducted in *R* (The R Foundation, 2020) with the Meta package (Balduzzi et al., 2019). To provide overall weighted standardised mean difference, the Sidik-Jonkman estimator with Hartung-Knapp adjustment (Hartung and Knapp, 2001; Sidik and Jonkman, 2002) was used. This method has been shown to result in more adequate error rates than the DerSimonian-Laird method (DerSimonian and Laird, 1986), especially when the number of studies is small (IntHout et al., 2014). These analyses were repeated with the DerSimonian-Laird estimator to ascertain how sensitive results were to the estimator employed. To provide overall weighted correlations, the Sidik-Jonkman estimator with Fisher's Z transformation was used. The threshold for small, moderate, and large effect sizes was based on Cohen's (1988) classification.

Inconsistency between studies was estimated by calculating the I^2 statistic (Higgins and Thompson, 2002). An $I^2 > 75\%$ has been considered an indicator of a "high" degree of inconsistency (Higgins et al., 2003).

The Dmetar package (Harrer et al., 2019) was employed to detect any outliers within the meta-analyses. The analyses were then re-run without identified outliers to

allow for an examination of their influence on results. In any meta-analyses with $k \geq 10$, a pre-specified moderator analysis using a random-effects model was conducted on the sample of the studies (adolescent, university student, adult). Finally, funnel plots and Egger's test were used to assess publication bias in the meta-analyses with $k \geq 10$ (Egger et al., 1997).

3. Results

3.1. Study characteristics

Thirty-nine papers were identified as eligible for inclusion in this review, the process of which is detailed in Figure 1. A summary of study characteristics is presented in Table 1. The design of papers was mixed, although the majority were cross-sectional ($k = 25$). Other designs employed were longitudinal ($k = 10$), ecological momentary assessment/experience sampling methodology (ESM; $k = 2$), test-retest ($k = 1$) and matched pairs ($k = 1$). Studies were primarily conducted in North America (United States $k = 20$; Canada $k = 1$), with others in Australia ($k = 8$), China ($k = 2$), Europe (Sweden $k = 2$; Belgium $k = 1$; the United Kingdom $k = 1$; Italy $k = 1$), the Middle East (Turkey $k = 1$; Israel $k = 1$) and Hong Kong ($k = 1$). All but one study used a validated measure of rumination ($k = 38$) and most studies used a validated measure of NSSI ($k = 30$). The most common measures were the Ruminative Responses Scale (RRS; Treynor et al., 2003) and the Inventory of Statements about Self-Injury (ISAS; Klonsky and Glenn, 2009). All but two studies were published ($k = 37$). The most common type of NSSI was NSSI frequency ($k = 22$) and the most common type of rumination was depressive rumination ($k = 14$) and transdiagnostic rumination ($k = 14$).

Figure 1. Data identification and screening process

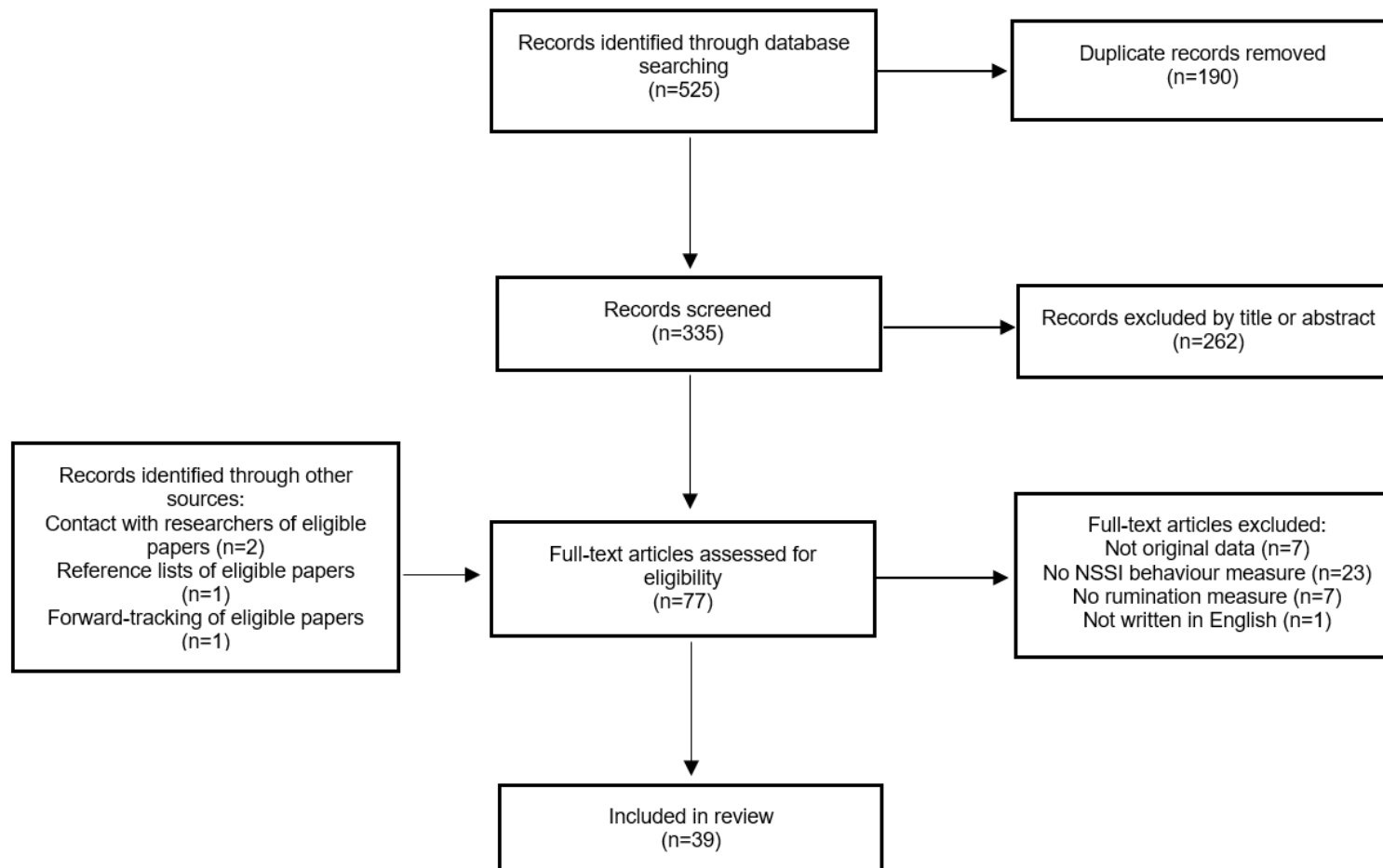


Table 1. Study characteristics

Study author (year) Country	Publication status	Study design	N	Population	Participant characteristics	Control group characteristics	NSSI measure (NSSI type)	Rumination measure (rumination type)
Arney and Crowther (2008) <i>United States</i>	Published	Cross-sectional	225	University students	63.6% female; M age = 19.5y (SD = 3.11)	N/A	The Deliberate Self-Harm Inventory (DSHI; <i>NSSI frequency</i>)	The Ruminative Responses Subscale (RRS; <i>depressive rumination</i>)
Barrocas et al. (2014) ¹ <i>China</i>	Published	Longitudinal	617	Adolescents	51.4% female; M age = 16.02y (SD = 0.61)	N/A	Bespoke measure	Ruminative Responses Subscale (RRS)
Bjarehed and Lundh (2008) <i>Sweden</i>	Published	Test-retest	175 ²	Adolescents	51.43% female; M age = 14.1y ³	N/A	The Deliberate Self-Harm Inventory (DSHI; <i>NSSI frequency</i>)	The Emotional Regulation Questionnaire for Adolescents (ERQA; <i>transdiagnostic rumination</i>)
Buelens et al. (2019) <i>Belgium</i>	Published	Longitudinal	528 ⁴	Adolescents	50.6% female; M age = 15.0y (SD = 1.85)	N/A	Single bespoke item (<i>NSSI history</i>)	Rumination subscale of the Rumination-Reflection Questionnaire (RRQ; <i>transdiagnostic rumination</i>)
Burke et al. (2016) <i>United States</i>	Published	Cross-sectional	231	University students	78% female; M age = 21.24y (SD = 4.02)	N/A	The Deliberate Self-Harm Inventory (DSHI; <i>NSSI frequency</i>)	The Ruminative Responses Subscale (RRS; <i>brooding</i>)

Burke et al. (2018) <i>United States</i>	Published	Longitudinal	590 ⁵	High school students	63% female; M age = 18.73y (SD = 1.40)	N/A	The Form and Function Self-Injury Scale (FAFSI; <i>NSSI frequency</i>)	The Ruminative Responses Subscale (RRS; <i>brooding and reflection</i>)
Dawkins et al. (2019) <i>Australia</i>	Published	Cross-sectional	656	University students	74.10% female; M age = 19.97y (SD = 1.84)	N/A	Inventory of Statements about Self-Injury (ISAS; <i>NSSI history</i>)	Repetitive Negative Thinking short scale (RNT; <i>transdiagnostic rumination</i>)
Duggan et al. (2013) <i>Canada</i>	Published	Matched pairs design	202	University students	N=101; 72.30% female; M age = 19.45y (SD = 1.28)	N=101; 72.30% female; M age = 19.46y (SD = 2.51)	How I Deal with Stress Questionnaire (HIDS, <i>NSSI history</i>)	Body Influence Assessment Inventory (BIAI; <i>suicide-related rumination</i>)
Fadoir et al. (2019) <i>United States</i>	Published	Cross-sectional	228	Adult prisoners	50.88% female; M = 33.73y (SD = 10.88)	N/A	The Deliberate Self-Harm Inventory (DSHI; <i>NSSI frequency</i>)	The Ruminative Responses Subscale (RRS; <i>depressive rumination</i>)
Gardner et al. (2014) <i>United Kingdom</i>	Published	Cross-sectional	179	Adult male prisoners	0% female; M age = 37.70y (SD = 13.53)	N/A	Inventory of Statements about Self-Injury (ISAS; <i>NSSI frequency</i>)	The Cognitive Emotion Regulation Questionnaire (CERQ; <i>transdiagnostic rumination</i>), Anger Rumination Scale (ARS; <i>anger rumination</i>), The Ruminative Responses Subscale (RRS; <i>brooding</i>)

Gong et al. (2019) <i>China</i>	Published	Cross-sectional	915	High school students	44.26% female; M age = 15.85y (SD = 1.47)	N/A	Bespoke measure (<i>NSSI frequency</i>)	The Ruminative Responses Subscale (RRS; <i>depressive rumination</i>)
Gromatsky et al. (2017) <i>United States</i>	Published	Cross-sectional	550	Female adolescents	N=43, 100% female, M age = 13.91y (SD = 0.81)	N=507, 100% female; M age = 13.84y (SD = 0.71)	Inventory of Statements about Self-Injury adapted to interview (ISAS; <i>NSSI history</i>)	The Ruminative Responses Subscale (RRS; <i>depressive rumination</i>)
Gromatsky et al. (2020) ⁶ <i>United States</i>	Published	Longitudinal	462 ⁷	Female adolescents	N=42; 100% female; M age = 14.24y (SD = 0.55)	N=420; 100% female; M age = 14.41y (SD = 0.63)	Inventory of Statements about Self-Injury adapted to interview (ISAS; <i>NSSI history</i>)	The Ruminative Responses Subscale (RRS; <i>depressive rumination</i>)
Hankin and Abela (2011) <i>United States</i>	Published	Longitudinal	103 ⁸	Adolescents	N=8; 61% female; M age = 12.63y (SD = 1.25) ⁹	N=95, 61% female; M age = 12.63y (SD = 1.25)	Functional Assessment of Self-Mutilation (FASM; <i>NSSI history</i>)	Children's Response Style Questionnaire (CRSQ; <i>depressive rumination</i>)
Hasking et al. (2018) <i>Australia</i>	Published	Cross-sectional	393	University students	76% female; M age = 20.01y (SD = 2.58)	N/A	Inventory of Statements about Self-Injury (ISAS; <i>NSSI frequency and NSSI history</i>)	Repetitive Thinking Questionnaire brief (RTQ; <i>transdiagnostic rumination</i>)
Hasking et al. (2019) ¹⁰ <i>Australia</i>	Published	Cross-sectional	415	University students	76.8% female, M age = 20.99y (SD = 5.33)	N/A	Inventory of Statements about Self-Injury (ISAS; <i>NSSI frequency and NSSI history</i>)	Repetitive Thinking Questionnaire brief (RTQ; <i>transdiagnostic rumination</i>)

Hilt et al. (2008) <i>United States</i>	Published	Cross-sectional	94	Female adolescents	100% female; M age = 12.7y ¹¹	N/A	Functional Assessment of Self-Mutilation (FASM, <i>NSSI frequency</i>)	Children's Response Style Questionnaire (CRSQ; <i>brooding</i>)
Hoff and Muehlenkamp (2009) <i>United States</i>	Published	Cross-sectional	165	University students	N=56; 75.3% female; M age = 19.82y (SD = 2.86) ₁₂	N=109; 75.3% female; M age = 19.82y (SD = 2.86)	Deliberate Self-Harm Inventory (DSHI, <i>NSSI history</i>)	The Ruminative Responses Subscale (RRS; <i>brooding and reflection</i>)
Hughes et al. (2019) ¹³ <i>United States</i>	Published	Ecological Momentary Assessment	47	Self-injuring adolescents	68% female; M age = 19.1y (SD = 1.77)	N/A	Bespoke measure	Eight bespoke items
Kelada et al. (2018) <i>Australia</i>	Published	Cross-sectional	272	High school students	N=48; 53.3% female; M age = 15.1y (SD = 2.49) ¹⁴	N=224; 53.3% female; M age = 14.38y (SD = 1.39)	Bespoke measure (<i>NSSI history</i>)	The Cognitive Emotion Regulation Questionnaire short (CERQ; <i>transdiagnostic rumination</i>)
Latina et al. (2021) ¹⁵ <i>Sweden</i>	Published	Longitudinal	1457 ¹⁶	Adolescents	47.3% female; M age = 13.2y (SD = 0.43)	N/A	Deliberate Self-Harm Inventory short (DSHI, <i>NSSI frequency</i>)	Rumination subscale of the Children's Response Styles Scale (CRSS; <i>depressive rumination</i>)
Liu (2017) <i>Hong Kong</i>	Unpublished thesis	Longitudinal	3621 ¹⁷	High school students	52% female; M age = 14.88y (SD = 1.70)	N/A	Bespoke measure (<i>NSSI frequency and NSSI history</i>)	The Cognitive Emotion Regulation Questionnaire (CERQ; <i>catastrophising</i>)

Martino et al. (2017) <i>Italy</i>	Published	Cross-sectional	91	Adults diagnosed with Borderline Personality Disorder	76.9% female; M age = 32.8y (SD = 10)	N/A	The Self-Harm Inventory (SHI; <i>NSSI frequency</i>)	The Ruminative Responses Scale (RRS; <i>depressive rumination</i>) and Anger Rumination Scale (ARS; <i>anger rumination</i>)
Miskey (2013) <i>United States</i>	Unpublished thesis	Cross-sectional	411	University students	N=133; 59% female; M age = 18.98y (SD = 1.64)	N=276; 73% female; M age = 19.1y (SD = 3.29)	The Functional Assessment of Self-Mutilation (FASM; <i>NSSI frequency</i>)	Perseverative Thinking Questionnaire (PTQ; <i>transdiagnostic rumination</i>)
Nicolai et al. (2016) <i>United States</i>	Published	Micro-longitudinal	142 ¹⁸	University students	N=28; 89% female; M age = 19.11y (SD = 1.26)	N=114; 68% female; M age = 19.34y (SD = 1.74)	Inventory of Statements about Self-Injury (ISAS; <i>NSSI frequency</i>)	The Ruminative Responses Subscale (RRS; <i>depressive rumination</i>)
Polanco-Roman et al. (2015) <i>United States</i>	Published	Cross-sectional	290 ¹⁹	University students	N=63; 78% female; M age = 19.08y (SD = 2.22) ²⁰	N=227; 73% female; M age = 19.08y (SD = 2.22)	The Self-Harm Behaviour Questionnaire (SHBQ; <i>NSSI history</i>)	The Ruminative Responses Subscale (RRS; <i>brooding and reflection</i>)
Pollak et al. (2020) <i>United States</i>	Published	Longitudinal	76 ²¹	Adolescents admitted to a psychiatric inpatient unit with a history of NSSI	72.3% female; M age = 15y (SD = 1.42)	N/A	Self-Injuries Thoughts and Behaviours Interview (SITBI, <i>NSSI frequency</i>)	The Ruminative Responses Scale short (RRS; <i>depressive rumination</i>)

Quirk et al. (2015) <i>United States</i>	Published	Cross-sectional	272	University students	75% female; M age = 19.41y (SD = 2.01)	N/A	Bespoke measure (<i>NSSI frequency</i>)	The Ruminative Responses Scale (RRS; <i>depressive rumination</i>)
Richmond et al. (2017) <i>Australia</i>	Published	Cross-sectional	1106	University students	74.27% female; M age = 25.3y (SD = 8.53)	N/A	The Borderline Symptom List Supplement: Items for Assessing Behaviour (BSL-23; <i>NSSI frequency</i>)	The Ruminative Thought Style Questionnaire (RTSQ; <i>transdiagnostic rumination</i>)
Sagiv and Gvion (2020)* <i>Israel</i>	Published	Cross-sectional	93	Adult patients at an eating disorder service	100% female ²² ; M age = 23.98y (SD = 5.46)	N/A	The Deliberate Self-Harm Inventory (DSHI; <i>NSSI frequency</i>)	The Ruminative Response Scale (RRS; <i>brooding, reflection and depressive rumination</i>)
Selby et al. (2009) <i>United States</i>	Published	Cross-sectional	142	University students	76.76% female; M age = 18.75y (SD = 1.05)	N/A	Functional Assessment of Self-Mutilation (FASM; <i>NSSI frequency</i>)	The Cognitive Emotion Regulation Questionnaire (CERQ; <i>catastrophising and transdiagnostic rumination</i>), The Anger Rumination Scale (ARS; <i>anger rumination</i>) and The Ruminative Responses Scale (RRS; <i>brooding</i>)

Selby et al. (2010)* <i>United States</i>	Published	Cross-sectional	94	University students	76% female; M age = 18.71y (SD = 1.09) ²³	N/A	Functional Assessment of Self-Mutilation (FASM; <i>NSSI frequency</i>)	The Ruminative Responses Scale (RRS; <i>brooding, reflection, and depressive rumination</i>)
Selby et al. (2013) <i>United States</i>	Published	Experience Sampling	47	University students and individuals from the community	N=7; 57% female; M age = 35y (SD = 15.87)	N=40; 67.5% female; M age = 22.68y (SD = 7.64)	Bespoke measure for momentary assessment (<i>NSSI frequency</i>)	The Cognitive Emotion Regulation Questionnaire (CERQ; <i>transdiagnostic rumination</i>)
Slabbert et al. (2018) <i>Australia</i>	Published	Cross-sectional	400	University students	78% female; M age = 21.02y (SD = 5.32)	N/A	Inventory of Statements about Self-Injury (ISAS; <i>NSSI frequency and NSSI history</i>)	Repetitive Thinking Questionnaire (RTQ; <i>transdiagnostic rumination</i>)
Stacy et al. (2018) <i>United States</i>	Published	Cross-sectional	80	University students	76.3% female; M age = 19.88y (SD = 1.89)	N/A	Inventory of Statements about Self-Injury (ISAS; <i>NSSI frequency</i>)	The Ruminative Responses Scale (RRS; <i>depressive rumination</i>)
Tanner et al. (2014) <i>Australia</i>	Published	Cross-sectional	2572	Adolescents	69.56% female; M age = 13.93y (SD = 0.99)	N/A	The Self-Harm Behaviour Questionnaire (SHBQ; <i>NSSI frequency</i>)	The Ruminative Thought Style Questionnaire (RTSQ; <i>transdiagnostic rumination</i>)

Tuna and Bozo (2014) <i>Turkey</i>	Published	Cross-sectional	507	University students	72% female; M age = 23.12y (SD = 3.18)	N/A	Bespoke measure – Self-Mutilation Index (<i>NSSI</i> <i>frequency</i>)	The Cognitive Emotion Regulation Questionnaire (<i>CERQ</i> ; <i>catastrophising and</i> <i>transdiagnostic</i> <i>rumination</i>)
Voon et al. (2014) <i>Australia</i>	Published	Longitudinal	2637 ²⁴	Adolescents	N=214; 68% female; M age = 13.9y (SD = .99) ²⁵	N=2423; 68% female; M age = 13.9y (SD = .99)	The Self-Harm Behaviour Questionnaire (<i>SHBQ</i> ; <i>NSSI</i> <i>frequency and NSSI</i> <i>history</i>)	The Ruminative Thought Style Questionnaire (<i>RTSQ</i> ; <i>Problem-</i> <i>focused thoughts,</i> <i>counterfactual</i> <i>thinking, repetitive</i> <i>thoughts, and</i> <i>anticipatory</i> <i>thinking</i>)
Wielgus et al. (2019) <i>United States</i>	Published	Cross-sectional	116	University students	80.2% female; M age = 19.52y (SD = 1.49)	N/A	The Inventory of Statements about Self-Injury (<i>ISAS</i> ; <i>NSSI frequency and</i> <i>NSSI history</i>)	The Ruminative Response Scale (<i>RRS</i> ; <i>brooding</i>)

*Indicates additional study characteristics information was obtained from authors

¹Barrocas et al. (2015) results not eligible for the meta-analysis but are discussed in the narrative synthesis

²Participant characteristics at time 1

³No standard deviation reported in the paper

⁴Participant characteristics at time 1

⁵Participant characteristics at baseline

⁶Data reported in the paper is distinct from Gromatsky et al. (2017) but likely to be from the same participant pool

⁷Participant characteristics at baseline

⁸Participant characteristics at baseline

⁹Paper only reported the overall % female and mean age for both groups

¹⁰Data reported in the paper is distinct from Hasking et al. (2018) but likely to be from the same participant pool

¹¹No standard deviation reported in the paper

- ¹²Paper only reported the overall % female and mean age for both groups
- ¹³Hughes et al. (2019) results not eligible for the meta-analysis but are discussed in the narrative synthesis
- ¹⁴Paper only reported overall % female for both groups
- ¹⁵Paper provided by the authors while under peer review
- ¹⁶Participant characteristics at time 1
- ¹⁷Participant characteristics at wave 1
- ¹⁸Participant characteristics of the final sample (participants who completed baseline and at least four of the seven weekly questionnaires)
- ¹⁹Polanco-Roman et al. (2015) analysed four groups but only participants in groups ‘NSSI only’ and ‘no self-harm history’ are included in the review. The other two groups included suicide attempts
- ²⁰Age reported in the paper is the overall age for the four groups
- ²¹Participant characteristics at baseline
- ²²Female % provided by authors
- ²³Mean age and standard deviation provided by authors
- ²⁴Participant characteristics at time 1
- ²⁵Paper only reported overall % female and mean age for both groups

3.2. Risk of bias

Risk of bias assessments are provided in Table 2; most studies were rated as having a moderate risk ($k = 24$). No studies were rated as being high risk and 15 were rated as low risk. A recurrent issue among studies was the lack of unbiased cohorts due to a reliance on self-selection and use of minimal recruitment sites. Additionally, no study provided explicit sample size calculations. However, statistical power does not appear to be a major concern as 30 studies had moderate to large samples with $n > 100$. Most had a validated method for assessing NSSI and rumination, although some did use a single bespoke item to screen for NSSI history. There are benefits of single-item measures in time-limited situations, such as longitudinal or ESM studies, as they are quick to administer and therefore lead to less burden on participants (Haynos and Fruzzetti, 2015). Given that the outcome was whether the person had engaged in NSSI or not, the use of a single item may be considered valid for some studies. However, there is recent evidence to suggest that when assessing NSSI, single-item measures produce different results to more comprehensive checklists (Robinson and Wilson, 2020).

All longitudinal studies had an adequate follow-up period and almost all studies controlled for confounding variables. Most studies had minimal missing data, although this was unclear for 14 studies. Finally, all studies had appropriate analytic methods.

Table 2. Risk of bias assessment

	Unbiased cohort selection	Sample size calculated	Validated method for ascertaining clinical status or participant group	Validated method for assessing predictor/risk variable	Validated method for assessing outcome variable	Outcome assessments blind to participant status	Adequate follow-up period (longitudinal studies only)	Missing data is minimal	Analysis control for confounds	Analytic methods appropriate	Overall risk of bias
Arney and Crowther (2008)	No	No	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Moderate
Barrocas et al. (2014)	Yes	No	N/A	Yes	Yes	No	Yes	Yes	Yes	Yes	Low
Bjarehed and Lundh (2008)	Partial	No	N/A	Yes	Yes	Yes	Yes	No	Yes	Yes	Low
Buelens et al. (2019)	Yes	No	N/A	Yes	No	Yes	Yes	Yes	Yes	Yes	Low
Burke et al. (2016)	No	No	N/A	Yes	Yes	N/A	N/A	No	Yes	Yes	Moderate
Burke et al. (2018)	Yes	No	N/A	Yes	Yes	No	Yes	Yes	Yes	Yes	Low
Dawkins et al. (2019)	No	No	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Moderate
Duggan et al. (2013)	Yes	No	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Low

Fadoir et al. (2019)	No	No	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Moderate
Gardner et al. (2014)	Can't tell	No	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Moderate
Gong et al. (2019)	Yes	No	N/A	Yes	Partial	N/A	N/A	Can't tell	No	Yes	Moderate
Gromatsky et al. (2017)	Partial	No	N/A	Yes	Yes	No	N/A	Can't tell	No	Yes	Moderate
Gromatsky et al. (2020)	Partial	No	N/A	Yes	Yes	No	Yes	No	Yes	Yes	Moderate
Hankin and Abela (2011)	Partial	No	N/A	Yes	Yes	Can't tell	Yes	Can't tell	Yes	Yes	Moderate
Hasking et al. (2018)	No	No	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Moderate
Hasking et al. (2019)	No	No	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Moderate
Hilt et al. (2008)	Partial	No	N/A	Yes	Yes	No	N/A	Can't tell	No	Yes	Moderate
Hoff and Muehlenkamp (2009)	No	No	N/A	Yes	Yes	N/A	N/A	Can't tell	Yes	Yes	Moderate
Hughes et al. (2019)	Partial	No	N/A	Partial	No	No	Yes	Yes	Yes	Yes	Moderate

Kelada et al. (2018)	Yes	No	N/A	Yes	No	No	N/A	Yes	Yes	Yes	Moderate
Latina et al. (2021)	Yes	No	N/A	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Low
Liu (2017)	Yes	No	N/A	Yes	No	Yes	Yes	Yes	Yes	Yes	Low
Martino et al. (2017)	Yes	No	Yes	Yes	Yes	No	N/A	Can't tell	Yes	Yes	Low
Miskey (2013)	No	No	N/A	Yes	Yes	Yes	N/A	Yes	Can't tell	Yes	Moderate
Nicolai et al. (2015)	Can't tell	No	N/A	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Low
Polanco-Roman et al. (2015)	Yes	No	N/A	Yes	Yes	No	N/A	Can't tell	Yes	Yes	Moderate
Pollak et al. (2020)	Yes	No	Yes	Yes	Yes	No	Yes	Can't tell	Yes	Yes	Low
Quirk et al. (2015)	No	No	Yes	Yes	No	N/A	N/A	Can't tell	Yes	Yes	Moderate
Richmond et al. (2017)	Partial	No	N/A	Yes	No	N/A	N/A	Yes	Yes	Yes	Moderate
Sagiv and Gvion (2020)	Yes	No	Yes	Yes	Yes	No	N/A	Can't tell	Yes	Yes	Low

Selby et al. (2009)	No	No	Yes	Yes	Yes	No	N/A	Yes	Yes	Yes	Low
Selby et al. (2010)	No	No	N/A	Yes	Yes	Yes	N/A	Can't tell	Yes	Yes	Moderate
Selby et al. (2013)	Partial	No	No	Partial	No	N/A	Yes	Can't tell	Yes	Yes	Moderate
Slabbert et al. (2018)	No	No	N/A	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Moderate
Stacy et al. (2018)	No	No	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Low
Tanner et al. (2014)	Yes	No	N/A	Yes	Yes	Yes	N/A	Yes	Yes	Yes	Low
Tuna and Bozo (2014)	No	No	N/A	Yes	No	Yes	N/A	Can't tell	Yes	Yes	Moderate
Voon et al. (2014)	Yes	No	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Low
Wielgus et al. (2019)	No	No	N/A	Yes	Yes	N/A	N/A	Can't tell	Yes	Yes	Moderate

3.3. NSSI frequency meta-analyses

Six NSSI frequency meta-analyses were run, the results of which can be found in Table 3. All pooled r values fell within the range of a positive small effect, although brooding may be considered on the cusp of a moderate effect ($r = .30$). For overall rumination, the effect size was small ($r = .25$), and the inconsistency as judged by the I^2 statistic was moderate ($I^2 = 62.7\%$).

Outliers were identified for two meta-analyses (depressive rumination and overall rumination), however with these outliers removed the overall weighted effect size did not substantially change (see Table 3). Without outliers, the degree of inconsistency changed from moderate to low for both.

3.4. NSSI history meta-analyses

For NSSI history, four meta-analyses were run. Details of these results using the Sidik-Jonkman with Hartung-Knapp adjustment can be found in Table 3. Results were comparable when using the DerSimonian-Laird estimator (see Appendix G). The pooled d values for brooding, transdiagnostic and overall rumination showed positive moderate effects. Depressive rumination had a positive large effect ($d = .80$). However, this result should be taken with caution as only three studies were included and the confidence interval passes 1 [-0.34, 1.93]. For overall rumination, the effect size was moderate ($d = .62$) and the degree of inconsistency between studies high ($I^2 = 78.4\%$).

Outliers were identified only for the overall rumination meta-analysis. With these influential cases removed the pooled effect size did not change, and the confidence interval was minimally impacted (see Table 3). The degree of inconsistency changed from high to low.

Table 3. Results of NSSI frequency and NSSI history meta-analyses

Rumination	<i>k</i> (outliers removed)	Effect size (outliers removed)	Confidence Interval (outliers removed)	<i>I</i> ² (outliers removed)
<i>NSSI frequency</i>				
Anger	3	<i>r</i> = 0.20	0.03-0.35	63.8%
Brooding	7	<i>r</i> = 0.30	0.18-0.41	74.6%
Catastrophising	3	<i>r</i> = 0.22	0.14-0.30	61.4%
Depressive	11 (10)	<i>r</i> = 0.27 (0.25)	0.20-0.34 (0.19-0.30)	61.1% (42.2%)
Transdiagnostic	12	<i>r</i> = 0.18	0.13-0.24	50.3%
Overall	28 (26)	<i>r</i> = 0.25 (0.23)	0.20-0.29 (0.19-0.26)	62.7% (48.5%)
<i>NSSI history</i>				
Brooding	3	<i>d</i> = 0.50	0.38-0.61	0.0%
Depressive	3	<i>d</i> = 0.80	-0.34-1.93	82.7%
Transdiagnostic	6	<i>d</i> = 0.62	0.46-0.78	49.8%
Overall	15 (13)	<i>d</i> = 0.62 (0.62)	0.51-0.74 (0.53-0.70)	78.4% (45.8%)

3.5. Moderator analysis

A moderator analysis was run for the meta-analyses with $k \geq 10$ (NSSI frequency/depressive rumination, NSSI frequency/transdiagnostic rumination, NSSI frequency/overall rumination, NSSI history/overall rumination; see Appendix H). Sample was only a significant moderator for NSSI frequency and depressive rumination ($Q = 7.91$, $p = 0.019$), with university students demonstrating the largest effects ($r = .34$), followed by adults ($r = .27$) and adolescents ($r = .18$).

3.6. Publication bias

The four groupings with $k \geq 10$ were assessed for publication bias through inspection of funnel plots (Appendix I) and Egger's test. Funnel plots emerged as relatively symmetrical, suggesting minimal risk of publication bias. This was confirmed by Egger's test, which was non-significant for all four groupings: NSSI frequency and depressive rumination ($t = 2.207$, $p = 0.054$), NSSI frequency and transdiagnostic rumination ($t = 0.033$, $p = 0.974$), NSSI frequency and overall rumination ($t = 1.089$, $p = 0.286$) and NSSI history and overall rumination ($t = 0.972$, $p = 0.349$).

3.7. Narrative synthesis: adjusted associations

Sixteen studies reported adjusted associations between NSSI and rumination, presented in Table 4. Seven out of the eleven adjusted associations for NSSI frequency were significant. There were a range of control variables used, the most common being gender, age, and psychological distress. Brooding ($\beta = 1.10$) and reflection ($\beta = 1.68$) had the strongest adjusted associations, followed by depressive rumination ($\beta = .25$; $\beta = .60$). The adjusted associations for transdiagnostic rumination were much smaller ($\beta = .01$; $\beta = .03$; $\beta = .08$; $\beta = .21$; $\beta = .23$) and only two of these were significant.

Three out of the ten adjusted associations for NSSI history were significant. There were a range of control variables used, the most common being gender, age, psychological

distress, and mental health diagnoses. Transdiagnostic rumination had the strongest adjusted association ($B = .59$), however did not remain significant in other studies ($B = 21$; $B = 30$). Reflection remained significant in both studies ($B = .217$; $OR = 1.61$). The three studies with an adjusted association for depressive rumination or brooding were not significant. Score ranges for the rumination scales are included in Table 4.

In summary, rumination remained significant in around half of the adjusted associations. Depressive rumination had relatively strong adjusted associations with NSSI frequency but not with NSSI history. This may partially be a result of the NSSI history studies controlling for depression, which is likely to overlap considerably with depressive rumination. The results for transdiagnostic rumination were mostly small and non-significant, with the exception of Slabbert et al. (2018).

Table 4. Adjusted associations

Study	Rumination type	Adjusted association	P value	Control variables
<i>NSSI frequency</i>				
Bjarehed and Lundh (2008)	Transdiagnostic	$\beta = .21$	$p = .017$	General psychopathology and positive/negative relation to parents
Hasking et al. (2018)	Transdiagnostic	$\beta = .03$	$p = .77$	Positive affect, negative affect, psychological distress, affect intensity, use of imagery and vividness of imagery
Martino et al. (2017)	Depressive	$\beta = .25$	$p = .05$	Emotional regulation and general rumination/anger rumination
	Anger	$\beta = .58$	$p = .62$	
Miskey (2013)	Transdiagnostic	$\beta = .08$	Not significant, exact p value not reported	Neuroticism, cognitive content 1 (self-injury is necessary/acceptable) and cognitive content 2 (body and self are disgusting and deserve punishment)
Nicolai et al. (2016)	Depressive	$\beta = .60$	$p = .03$	Sex, NSSI history and trait negative affectivity
Selby et al. (2010)	Brooding	$\beta = 1.10$	$p < .05$	Brooding and reflection – age, gender, sensation seeking, past painful experiences
	Reflection	$\beta = 1.68$	$p < .05$	

	Depressive	$\beta = .22$	$p < .05$	General rumination – past painful experiences
Slabbert et al. (2018)	Transdiagnostic	$\beta = .23$	$p = .03$	Mental illness, gender, affect intensity and distress tolerance
Tanner et al. (2014)	Transdiagnostic	$\beta = .01$	Not significant, exact p value not reported	State, urbanicity, school, age, prior diagnosis, psychological distress and optimism

NSSI history

Gromatsky et al. (2020)	Depressive	Rumination not significant so not reported	N/A	Age, income, parental substance abuse, conscientiousness, avoidance and adolescent behavioural disorder diagnosis
Hasking et al. (2018)	Transdiagnostic <i>Score range = 10-50</i>	$B = .30$	$p = .07$	Positive affect, negative affect, psychological distress, affect intensity, use of imagery and vividness of imagery
Hoff and Muehlenkamp (2009)	Brooding <i>Score range = 5-20</i> Reflection <i>Score range = 5-20</i>	$B = .022$ $B = .217$	$p = .827$ $p = .011$	Gender, depression, anxiety, perfectionism, reflection/brooding
Kelada et al. (2018)	Transdiagnostic <i>Score range = 2-10</i>	$B = .21$	Not significant, exact p value not reported	Age, gender, psychological distress, family functioning, acceptance, positive reappraisal, self-blame, positive refocusing, refocus on planning, putting into perspective, blaming others and catastrophising

Liu (2017)	Catastrophising <i>Score range = 4-20</i>	B = .11	Not significant, exact p value not reported	Age, gender, dissociation and thought suppression
Polanco-Roman et al. (2015)	Brooding <i>Score range = 5-20</i>	OR = 1.29	Not significant, exact p value not reported	Gender, major depressive disorder, diagnosis in previous year, cognitive inflexibility, distraction, reflection/brooding
	Reflection <i>Score range = 5-20</i>	OR = 1.61	p < .05	
Slabbert et al. (2018)	Transdiagnostic <i>Score range = 10-50</i>	B = .59	p < .001	Mental illness, gender, affect intensity and distress tolerance
Voon et al. (2014)	Problem-focused thoughts, counterfactual thinking, repetitive thoughts, and anticipatory thinking	Rumination not significant so not reported	N/A	Gender, age, suicide history, psychological distress, and adverse life events

Significant values are in bold

OR = Odds Ratio

3.8. Narrative synthesis: longitudinal studies

Twelve studies included in the review used a longitudinal or ESM design, examining the relationship between rumination and NSSI over time. The results from some studies suggest that higher levels of rumination may predict engagement in and frequency of NSSI (Barrocas et al., 2015; Gromatsky et al., 2020; Hughes et al., 2019; Selby et al., 2013). However, although Barrocas et al. (2015) reported that rumination is associated with generally greater frequency of NSSI during the follow-up period, the authors found no association between rumination and how NSSI changed over time. In the Hughes et al. (2019) study, the analysis may be flawed as the researchers examine lagged associations within a mixed-model regression (rumination at previous time point on NSSI), but also control for NSSI at the previous time point. Carter and Emsley (2019) discuss how this is not recommended when looking at a lagged association. Including the time-lagged outcome breaks one of the assumptions of multilevel models that the covariates are independent of the random effects.

Buelens et al. (2019) report a unidirectional association between rumination and NSSI longitudinally, in that recent NSSI at time two predicted later rumination at time 3 ($\beta = .25$). This is a unique finding as longitudinal research typically reports that rumination predicts later NSSI, rather than vice versa. The authors suggest several potential reasons for this, such as that attempting to suppress thoughts with NSSI may result in more rumination.

Three studies found that rumination was positively associated with NSSI over time, when interacting with or mediated by other variables (Burke et al., 2018; Liu, 2017; Nicolai et al., 2016). Burke et al. (2018) found that participants in the moderate negative coping and severe negative coping classes (e.g., high rumination, high dampening, high negative affect) evidenced greater last year frequency of NSSI than the disengaged and positive coping classes (Partial $\eta^2 = 0.04$). Similarly, Nicolai et al. (2016) discovered that

participants with high negative affect and high rumination at baseline were more than twice as likely to engage in NSSI during the eight-week study. In Liu's (2017) study, psychache mediated the relationship between rumination and NSSI, suggesting that rumination leads to mental distress and subsequently NSSI. These results indicate that rumination may lead to negative affect or psychological distress (and vice versa), which increases the likelihood of NSSI. However, these studies used high school or university students and therefore the results may not be applicable to the wider population.

Finally, two longitudinal studies found no prospective association between rumination and NSSI (Hankin and Abela, 2011; Voon et al., 2014). Voon et al. (2014) discuss how this may be a result of using The Ruminative Thought Style Questionnaire (RTSQ; Brinker and Dozois, 2009), as it assesses positive as well as negative rumination. In addition, rumination was not found to interact with the reported function of NSSI to predict later self-injury (Pollak et al., 2020).

In summary, most longitudinal studies did find rumination to be prospectively predictive of NSSI. There was also some evidence for an interaction between negative affect and rumination in predicting NSSI. However, there are methodological or analytical weaknesses that should be considered when interpreting these results.

4. Discussion

This review aimed to examine the nature and strength of the relationship between rumination and NSSI. Thirty-nine papers were included in the meta-analyses and narrative syntheses. Overall, rumination had a positive small effect on the frequency of NSSI ($r = .25$) and a positive moderate effect on the likelihood of engaging in NSSI ($d = .62$). Compared to the other rumination types, brooding had a slightly larger effect on the frequency of NSSI ($r = .30$) as did depressive rumination on NSSI history ($d = .80$), although the latter should be interpreted with caution as the confidence interval passed one. Narratively, there were mixed findings for the adjusted associations, with rumination

remaining significantly associated with NSSI in around half of the studies. Longitudinally, although there were some contradictory findings, most papers did find rumination to be prospectively predictive of NSSI. However, there were limitations to many of the studies, including the use of students as participants, which may limit generalisability.

The results suggest that rumination is positively associated with NSSI, although this effect appears to be greater for NSSI history (binary outcome) than NSSI frequency. It was found that those with a history of NSSI had moderately greater levels of rumination. This is consistent with the Emotional Cascade Theory which states that NSSI serves as a distraction from intense rumination (Selby et al., 2008; Selby et al., 2009). However, there was only a positive small effect of rumination on the frequency of NSSI. The Experiential Avoidance Model (Chapman et al., 2006) states that engaging in NSSI leads to a short-term reduction in unwanted emotional states, maintaining NSSI through negative reinforcement. Therefore, to some extent, those with higher frequencies of NSSI may be successfully distracting themselves from rumination, resulting in lower rumination scores. When adjusting for other factors (e.g., age, gender, negative affect, psychological distress), the association between rumination and NSSI became non-significant in around half of studies. This suggests that other variables may better account for or potentially mediate this association, such as emotional distress or depressive symptoms. The Emotional Cascade Theory states that rumination and negative affect interact in a dynamic way over time to predict NSSI (Selby and Joiner, 2009). Therefore, adjusting for negative affect or psychological distress may have led to non-significant associations.

The strength of the relationship between rumination and NSSI is smaller than might have been expected, given the moderate to large effects observed by Rogers and Joiner (2017) in their meta-analysis on the relationship between rumination and suicidality. Selby et al. (2013) discuss how it is the instability of rumination, rather than stable trait rumination, which has the most impact on NSSI. They suggest that research should

therefore move away from relying solely on measures of trait rumination. The research included in the meta-analysis focused on stable, trait rumination, such as with the use of the Ruminative Response Scale (Treynor et al., 2003). This may partially explain the small to moderate effect sizes observed. Further research is needed to explore the relationship between NSSI and dynamic or state rumination. Longitudinal or ESM studies, such as the methodology employed by Hughes et al. (2019), would be best placed to examine this relationship further.

The longitudinal results mostly showed a positive effect of rumination on prospective NSSI, although there were some mixed findings. There was support for the Emotional Cascade Theory, whereby two studies found that rumination was positively associated with NSSI over time, when interacting with negative affect (Burke et al., 2018; Nicolai et al., 2016). These results suggest that increases in both rumination and negative affect predict the likelihood of engaging in NSSI. This is the process that is described as an emotional cascade. There is a positive feedback loop between rumination and negative affect, creating a vicious and distressing cycle that leads to NSSI (Selby and Joiner, 2009). The differences found in the longitudinal results may partially be explained by the use of different rumination measures, although the results from the meta-analyses showed little difference between rumination types.

Sample emerged as a significant moderator for the NSSI frequency and depressive rumination grouping. University students demonstrated the largest effects and adolescents the smallest. As sample was not a significant moderator for transdiagnostic or overall rumination, depressive rumination may be more associated with the frequency of NSSI in university students than adolescents.

4.1. Limitations

Most of the 39 studies included in the review had a moderate risk of bias ($k = 24$) with the other 15 having a low risk. Methodological issues identified in the literature included self-

selection bias, which may have created issues regarding the representativeness of samples and increase the risk of skewed results. In addition, most samples were formed of students, most often psychology undergraduates. This creates a variety of issues, such as students not being representative of the general population and potentially having insight into their professors' theories (Hanel and Vione, 2016). The NSSI measures varied considerably across studies, an issue also identified in a review of NSSI risk factors (Fox et al., 2015). The types of questions (e.g., binary, continuous, checklist) and types of behaviours included differed across the measures. For example, the Functional Assessment of Self-Mutilation (FASM; Lloyd et al., 1997) includes self-tattooing whereas the Inventory of Statements About Self-injury (ISAS; Klonsky and Glenn, 2009) does not.

A notable limitation of this review is that studies were only included if they were written in English and therefore relevant research in other languages may have been excluded. However, although most of the research came from English-speaking countries (e.g., USA, Australia), the review did include several studies from non-English speaking countries (e.g., China, Turkey, Sweden). In addition, this review focused solely on quantitative data. A review of the qualitative research concerning rumination and NSSI may help to further the understanding of this relationship.

4.2. Implications and conclusions

Rumination was found to have a small to moderate positive effect on NSSI, with a greater effect being found for the likelihood of engaging in NSSI rather than the frequency. There was longitudinal evidence to support the association between rumination and prospective NSSI, including the interaction between rumination and negative affect. Some individuals may therefore benefit from psychological therapies that target rumination, such as rumination-focused Cognitive Behavioural Therapy (Watkins, 2016) or mindfulness (Deyo et al., 2009). In addition, individuals may benefit from Dialectical Behaviour Therapy (Linehan, 1993) as this would help to reduce NSSI with coping techniques that distract

from rumination. However, other risk factors may be of greater importance in the onset and maintenance of NSSI and therefore individuals may benefit from therapies that do not focus solely on rumination. The smaller than expected pooled effect sizes may reflect the research studying trait rumination rather than unstable state rumination. Future research should therefore focus on unstable rumination using longitudinal designs, to allow for lagged associations to be investigated.

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Paper 2:
Self-Injury in young Bisexual people: a Longitudinal investigation (SIBL)
of rumination and biphobia on NSSI urges

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figures, and references)*

The following paper has been prepared for submission to Psychological Medicine. Author guidelines can be found in Appendix J. Please note, there are slight deviations from these guidelines for the purpose of the thesis, such as the number of included tables and figures.

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Abstract

Background

Bisexual people have been found to have a higher risk of non-suicidal self-injury (NSSI) than other sexualities. Theories suggest that rumination and discrimination may contribute to the increased risk. Therefore, the purpose of this study was to examine the association between state rumination and biphobia with NSSI urges in young bisexual people.

Methods

The study was part of a larger research project, the Self-Injury in young Bisexual people: a Longitudinal investigation (SIBL) study. The research utilised a micro-longitudinal, single group design to assess rumination, biphobia and NSSI urges every week for a six-week period. Multi-level linear regression was used to examine the association between study variables and NSSI urges at the same time point and with the predictors lagged by one week.

Results

A total of 207 bisexual young people were recruited to the study. Rumination and biphobia were found to be associated with NSSI urges, although rumination had a consistently stronger association. Only rumination was associated with NSSI urges when covariates were included in the lagged model.

Conclusions

Results indicate that rumination-focused therapies for NSSI may be beneficial for young bisexual people. Rumination may mediate the relationship between biphobia and NSSI, which could explain the weaker association with biphobia. Therefore, it is important that biphobic discrimination is targeted. Professionals should consider the unique difficulties faced by bisexual people in a way that cultivates safety, connection, and compassion.

Future research should focus on testing a rumination-focused therapy with this population or investigating additional factors with a non-bisexual comparison group.

1. Introduction

Non-suicidal self-injury (NSSI) is defined as deliberate and self-inflicted damage of body tissue that is not sanctioned by society (i.e., in contrast to tattoos, for example) and occurs without suicidal intent (Klonsky and Glenn, 2009; International Society for the Study of Self-Injury, 2018). Methods include cutting, burning, hitting, and scratching oneself (Klonsky et al., 2014). Research suggests that NSSI is a common behaviour, particularly among adolescents and young adults (Jacobson and Gould, 2007; Swannell et al., 2014). Swannell and colleagues (2014) reported a lifetime prevalence of 17.2% among adolescents and 13.4% among young adults.

Engagement in NSSI has been associated with functions such as emotion-regulation, self-punishment, and expression of distress (Edmondson et al., 2016; Taylor et al., 2018a). Additionally, NSSI has been associated with a range of psychological difficulties including depression and anxiety (Bentley et al., 2014) and was included as its own distinct diagnostic category in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders; the American Psychiatric Association, 2013). NSSI can also have serious physical consequences such as infection or scarring (Wilkinson and Goodyer, 2011), and has been shown to be a predictor of future suicidal behaviour (Kiekens et al., 2018; Ribeiro et al., 2016; Whitlock et al., 2013).

Studies have shown that people who engage in NSSI often report urges to do so, which are distressing and difficult to resist (Turner et al., 2019; Washburn et al., 2010). Moreover, treatments for NSSI such as Dialectical Behaviour Therapy have recognised a need to teach strategies to cope with NSSI urges (Linehan et al., 2015). Despite this, there is a lack of longitudinal research examining the predictors of NSSI urges (Turner et al., 2019). Increasing understanding of the psychological factors associated with NSSI urges is therefore an important focus for research, as this would help to inform and improve treatments for NSSI.

Evidence suggests that people who identify as lesbian, gay, or bisexual (LGB) have consistently worse mental health outcomes than heterosexual people (Chakraborty et al., 2011; King et al., 2008), including a higher prevalence of NSSI (Batejan et al., 2015). LGB young people appear particularly at risk of NSSI (Batejan et al., 2015; Fraser et al. 2017; Taylor et al., 2018b).

It has recently been highlighted that within the LGB population, bisexual individuals are at a significantly higher risk of poor mental health (Ross et al., 2018; Salway et al., 2019). A recent review revealed that bisexual people were 3.5 times more likely to engage in NSSI than other sexualities and over 4 times more likely than gay men specifically (Dunlop et al., 2020). Research often combines LGB people together, rather than conducting analyses for bisexual people independent of lesbian and gay identities (Kaestle and Ivory, 2012; Persson and Pfaus, 2015). This has been problematic, as grouping in this way obscures the unique NSSI risk for bisexual people (Dunlop et al., 2020; Kaestle and Ivory, 2012). Studies have emphasised the importance of future research uncovering psychological factors associated with the increased risk of NSSI for bisexual people (Batejan et al., 2015; Fraser et al., 2018; Jackman et al., 2016; Swanell et al., 2016).

Although there is strong evidence that bisexual individuals are at a higher risk of engaging in NSSI, the mechanisms underlying this relationship are not well understood. Researchers often suggest that Minority Stress Theory may help to explain the heightened risk of NSSI in LGB people (Meyer, 2003). It is suggested that increased mental health difficulties in LGB people are a result of a hostile and stressful environment caused by stigma, prejudice, and discrimination. Bisexual people face additional stressors, such as the validity of bisexuality being questioned and the assumption that bisexuality is associated with deviant sexuality (Israel and Mohr, 2004). Batejan et al. (2015) discuss the experience of biphobia (prejudice towards bisexual individuals) which can have a detrimental effect on an individual's mental health. Bisexual individuals may experience biphobia from either

heterosexual or gay/lesbian communities, which was described as a “doubly stigmatised identity”. Biphobia can therefore result in feeling isolated and ostracised from both communities (Israel and Mohr, 2004).

Hatzenbuehler’s (2009) Psychological Mediation Framework expanded on Minority Stress Theory to recognise the importance of psychological mediating factors in the mental health of LGB people. Hatzenbuehler describes rumination as a central process which has been found to mediate the relationship between stigma and psychological distress (Hatzenbuehler, 2009; Timmins et al., 2018). Rumination is defined as a maladaptive coping strategy in which an individual engages in repetitive and prolonged negative thinking about distressing feelings or experiences (Watkins and Roberts, 2020). It is argued that stigma-related stress is likely to result in rumination, partly due to the impact of chronic discrimination and rejection, as well as the stress of managing a concealed identity, such as bisexuality (Hatzenbuehler, 2009).

Emotional Cascade Theory (Selby et al., 2009) suggests that people self-injure as a distraction from intense rumination and associated negative affect, which is supported by several empirical studies (Borrill et al., 2009; Nicolai et al., 2016; Slabbert et al., 2018). A recent review discovered that trait rumination had a small to moderate positive association with NSSI (See Paper 1). However, Selby (2013) argues that it is unstable and volatile rumination, rather than stable trait rumination, that has a greater association with NSSI. It is therefore suggested that future NSSI research should focus on state rumination (see Paper 1).

To the best of the researcher’s knowledge, there is no published study that has investigated the association between state rumination and biphobia with NSSI in bisexual people. The current literature examining psychological factors associated with NSSI in LGB people relies on cross-sectional data (Taylor et al., 2018b; Fraser et al., 2018; Swanell et al., 2016), which has limited the ability to understand the temporal characteristics of

these associations. More research examining the relationships between NSSI and clinical correlates over time is needed for this population.

The principal aim of the study was to examine associations between rumination and biphobia with NSSI urges in young bisexual people. These associations would be investigated both cross-sectionally and longitudinally. A subsidiary aim of the research was to examine how stable rumination, biphobia and NSSI urges were over time.

Hypothesis 1 was that rumination scores would be positively associated with NSSI urges at the same time point. Hypothesis 2 was that higher rumination scores would predict greater NSSI urges over the following week. Hypothesis 3 was that biphobia scores would be positively associated with NSSI urges at the same time point. Finally, hypothesis 4 was that higher biphobia scores would predict greater NSSI urges over the following week.

2. Methods

2.1. Study design

The study is part of a larger research project, the Self-Injury in young Bisexual people: a Longitudinal investigation (SIBL) study. The SIBL study was pre-registered: www.osf.io/skrq8. The research utilised a micro-longitudinal, single group design to assess rumination, biphobia and NSSI urges every week for a six-week period. Interval-contingent sampling was used whereby participants were required to complete the self-report measures when prompted by a text message or email. Patient and public involvement (PPI) was utilised in the designing stage of the study, such as bisexual people being consulted when developing study materials. Full ethical approval was granted by the University of Manchester Research Ethics Committee (Reference 2019-7445-11947; Appendix K).

2.2. Participants

Participants met the following criteria: aged 16-25 years old, identified as bisexual and/or as attracted to more than one gender, had experienced NSSI thoughts, urges, or behaviour in the last six months, had access to a smartphone and internet, understood the English language and completed the consent form.

Participants were recruited in several ways. Firstly, posters were placed around the University of Manchester campus (Appendix L). In addition, researchers attended (remotely or physically) LGBT support groups run by Manchester based youth support organisations. As a result of the COVID-19 pandemic, most recruitment took place online. The researchers posted the recruitment video (Appendix M) and information from a dedicated '*SIBL study*' page on Facebook, Instagram, Twitter, and Reddit. Additionally, the study was promoted in media platforms and online articles (Appendix N).

2.3. Procedure

Interested individuals would firstly complete an electronic Consent to Contact Form (Appendix O) which included a link to the Participant Information Sheet (Appendix P). The researcher, either by telephone or email, explained to the potential participant what taking part would involve, discussed potential risks (see Appendix Q for the risk protocol), confirmed eligibility and answered any questions. Individuals who did not provide a UK phone number were contacted by email.

If the individual was happy with the information provided, they were emailed a link to the Consent Form (Appendix R). Following completion of this, participants were emailed their unique PIN and password, along with a link to the baseline survey. Participants from the UK were sent subsequent weekly surveys by text, whereas international participants were sent weekly surveys by email.

After survey three and survey five, participants were contacted by email or telephone (based on their preference) and asked how they were finding the study and if they had any questions or concerns. Once the six weeks had passed, the participant was

sent a thank you email. A detailed description of the study procedure is provided in Appendix S.

2.4. Measures

2.4.1. Demographic information

Demographic data was collected at baseline with a brief measure asking participants to report their age, gender, sexuality, ethnicity, employment status, and relationship status (Appendix T; see Table 5). A country of residence question was added to the electronic Consent Form.

2.4.2. The Self-Injurious Thoughts and Behaviours Inventory short form (SITBI; Nock et al., 2007)

Five NSSI questions from the SITBI were used at baseline to assess historical NSSI behaviour, including NSSI methods used and how often the individual had self-injured over the last year, month, and week (Appendix U). At weekly intervals, only the question regarding the past week was used ('How many times in the past week have you purposefully hurt yourself without wanting to die?'). The SITBI was found to have strong inter-rater reliability and test-retest reliability (Nock et al., 2007).

2.4.3. The Alexian Brothers Urge to Self-Injure Scale (ABUSI; Washburn et al., 2010)

The ABUSI was used at baseline and weekly intervals to measure NSSI urges over the last week (Appendix V). The ABUSI has been found to have excellent internal consistency and test-retest reliability (Washburn et al., 2010), whilst only consisting of five questions. The ABUSI demonstrated excellent internal consistency in the current study as well ($\alpha = .92$).

2.4.4. The Brief State Rumination Inventory (BSRI; Marchetti et al., 2018)

The BSRI was used at baseline and weekly intervals to measure state rumination (Appendix W). The BSRI assesses momentary rumination whereas other, more common

measures of rumination assess trait rumination, which is stable over time. The BSRI was adapted to cover the last week ('Over the last week, I have wondered why things happen to me the way they do'). The BSRI is quick to administer and was found to have good construct and criterion validity (Marchetti et al., 2018). As the measures were completed online, the BSRI was adapted to a Likert-type response format, rather than a visual-analogue scale. The BSRI demonstrated very good internal consistency in this sample ($\alpha = .77$).

2.4.5. The Brief Anti-Bisexual Experiences Scale (Brief ABES; Dyar et al., 2019)

The Brief ABES, adapted from the Anti-Bisexual Experiences Scale (ABES; Brewster and Moradi, 2010), was used at baseline and weekly intervals to measure perceived biphobia (Appendix X). The ABES is a 17-item scale shown to have very good internal consistency and test-retest reliability (Brewster and Moradi, 2010). The Brief ABES is a validated, shortened version of the ABES (8 questions) which maintains the original factor structure. The Brief ABES was found to account for 88-96% of the variance in the scores on the ABES and functions similarly across diverse genders and sexual orientations (Dyar et al., 2019). Participants were asked to complete the Brief ABES in relation to the previous week. The Brief ABES demonstrated excellent internal consistency in this study ($\alpha = .91$).

2.4.6. Bisexual community

Through PPI, it was suggested that the study included questions on perceived inclusion and support from the bisexual community ('I have felt part of a wider community of bisexual people' and 'I have been able to seek advice or support from bisexual people'). These questions were incorporated into the biphobia measure at baseline and weekly intervals (Appendix Y). Therefore, bisexual community was measured over the last week on a 6-point Likert scale, with higher scores indicating greater perceived inclusion and support

from the bisexual community. These questions demonstrated very good internal consistency in this sample ($\alpha = .80$).

2.5. Data analytic plan

A simulated power analysis found that to detect a small effect size of 0.3 across different conditions, 100 participants would result in 100% empirical power. Additionally, similar studies have used between 60 and 120 total participants for their multi-level analyses (Turner et al., 2016; Turner et al., 2017; Victor et al., 2019). Therefore, 200 participants were required for sufficient power, whilst also allowing for 50% attrition. This attrition rate of 50% reflects a previous Trainee Clinical Psychologist project using a similar design (an online, longitudinal survey with individuals who self-injure).

Analyses were conducted in *R* (The R Foundation, 2020). Multi-level linear regression was used to examine the association between rumination, biphobia, or bisexual community and NSSI urges. This model allowed for nested data (different time points within each participant). The analysis of associations was done at the same time point for the contemporaneous analyses, whereas for the lagged association the predictor was lagged by one week. For the average level of NSSI urges to vary across participants, a random-intercept model was used to allow for different intercepts for different participants. Random slopes were also added to allow for effects of the predictor and NSSI urges to vary between participants. Where the random slopes models converged and were an improvement (based on a significant log-likelihood test and smaller Akaike Information Criterion), these have been reported rather than the random-intercept only models.

3. Results

3.1. Participant characteristics

A total of 207 people were recruited to the study, with 204 completing a baseline survey. Three people completed a follow-up survey without a baseline and are therefore not

included in the demographic data. Of the 204 people who completed the baseline, 181 completed at least one follow-up survey. Most participants were cisgender women and identified as White British or White Other. The demographic characteristics of the sample are presented in Table 5.

Table 5. Demographic characteristics of the baseline sample

		Mean (SD), range
Age (years)		20.29 (2.92), 16-26 ¹
		N (%)
Gender		
	Female	135 (66.18)
	Male	25 (12.25)
	Non-binary	28 (13.73)
	Transgender	16 (7.84)
Sexuality		
	Bisexual	123 (60.29)
	Pansexual	52 (25.49)
	Mostly homosexual	8 (3.92)
	Mostly heterosexual	5 (2.45)
	Other ²	16 (7.84)
Ethnicity		
	White British	94 (46.08)
	White Other	69 (33.82)
	Asian or Asian Mixed	14 (6.86)
	Black or Black Mixed	9 (4.41)
	Arab	2 (0.98)
	Other Mixed	16 (7.84)
Country of residence		
	United Kingdom	103 (50.49)
	North America	56 (27.45)
	Europe	26 (12.75)
	South America	6 (2.94)
	Australasia	5 (2.45)
	Africa	4 (1.96)
	South Asia	4 (1.96)
Employment		
	Student	131 (64.22)
	Full-time employed	34 (16.67)
	Part-time employed	18 (8.82)
	Unemployed	18 (8.82)
	Volunteer	3 (1.47)
Marital status		
	Single	125 (61.27)
	Partnered	70 (34.31)
	Polyamorous	5 (2.45)
	Married	2 (0.98)
	Open relationship	2 (0.98)
Engaged in NSSI		
	Yes	189 (92.65)
	No	15 (7.35)

NSSI method	
Cut or carved skin	152 (74.51)
Hit self on purpose	104 (50.98)
Picked skin until bled	81 (39.72)
Scraped skin until bled	78 (38.24)
Burned skin	74 (36.27)
Inserted objects into skin	32 (15.69)
Self-tattooed	18 (8.82)
Other ³	53 (25.98)

¹One participant turned 26 between completing the consent form and the baseline

²Other sexuality responses included attracted to two or more genders, queer and asexual

³Other NSSI methods included scratching, pulling hair, biting, and banging head

Almost all participants had self-injured at some point in their life (93%), with the average frequency of NSSI being 35.46 in the last year, 5.18 in the last month, and 1.51 in the last week. The most common reported methods of NSSI were cutting or carving the skin (75%) and hitting oneself on purpose (51%).

Descriptive statistics for study variables across time points are presented in Table 6. There was no missing data as all participants responded to each question for the measures they completed.

Table 6. Descriptive statistics for study variables

	NSSI urges (range = 0-30) Mean (SD)	Rumination (range = 8-40) Mean (SD)	Biphobia (range = 8-48) Mean (SD)	Bisexual community (range = 2-12) Mean (SD)
Week 1	13.31 (7.10) N = 198	34.49 (4.30) N = 198	20.17 (8.90) N = 198	5.62 (2.82) N = 198
Week 2	12.12 (7.72) N = 162	32.81 (4.67) N = 153	15.41 (8.16) N = 153	5.27 (2.77) N = 153
Week 3	11.96 (8.06) N = 135	32.14 (4.90) N = 133	14.58 (7.89) N = 135	4.97 (2.77) N = 135
Week 4	11.04 (8.19) N = 122	31.74 (6.25) N = 119	15.26 (7.85) N = 121	4.95 (2.81) N = 121
Week 5	10.75 (7.90) N = 109	31.6 (5.64) N = 107	13.86 (7.27) N = 107	4.90 (2.89) N = 107
Week 6	11.07 (8.04) N = 96	31.55 (6.26) N = 92	14.34 (7.67) N = 92	4.78 (2.82) N = 92

3.2. Stability of variables

The intra-class correlation coefficient (ICC) was used to measure the stability of rumination, biphobia and NSSI urges over time. Biphobia (ICC = 0.66) and NSSI urges (ICC = 0.62) demonstrated greater stability than rumination (ICC = 0.48). This indicates that there was more within-person variance for rumination.

3.3. Assumptions

The assumptions of multi-level linear regression were met, including normal distribution of residuals, no statistical multicollinearity, and linearity. Inspection of histograms revealed that model residuals were normally distributed both at level 1 and level 2 (random effects) residuals. There was no indication of multicollinearity in the data, evidenced by the lack of high correlations ($r > .7$) between predictors (Tabachnick and Fidell, 2001). In fact, biphobia and rumination correlated quite weakly (concurrent model $r = .05$, lagged model $r = .06$). Finally, the Figures support the assumption of linearity as there is no indication of a curvilinear pattern (see Figures 2-6).

3.4. Concurrent associations between study variables and NSSI urges

The relationship between rumination, biphobia, or bisexual community and NSSI urges are presented graphically in Figures 2-4. Multi-level regression was used to investigate these relationships. Age, gender identity (0 = transgender/non-binary; 1 = cisgender), ethnicity (0 = any ethnicity but White; 1 = White), employment status (0 = any employment but student; 1 = student), relationship status (0 = in a relationship; 1 = single), and NSSI history (0 = no history; 1 = history) were included as covariates.

Figure 2. Rumination scores on NSSI urges

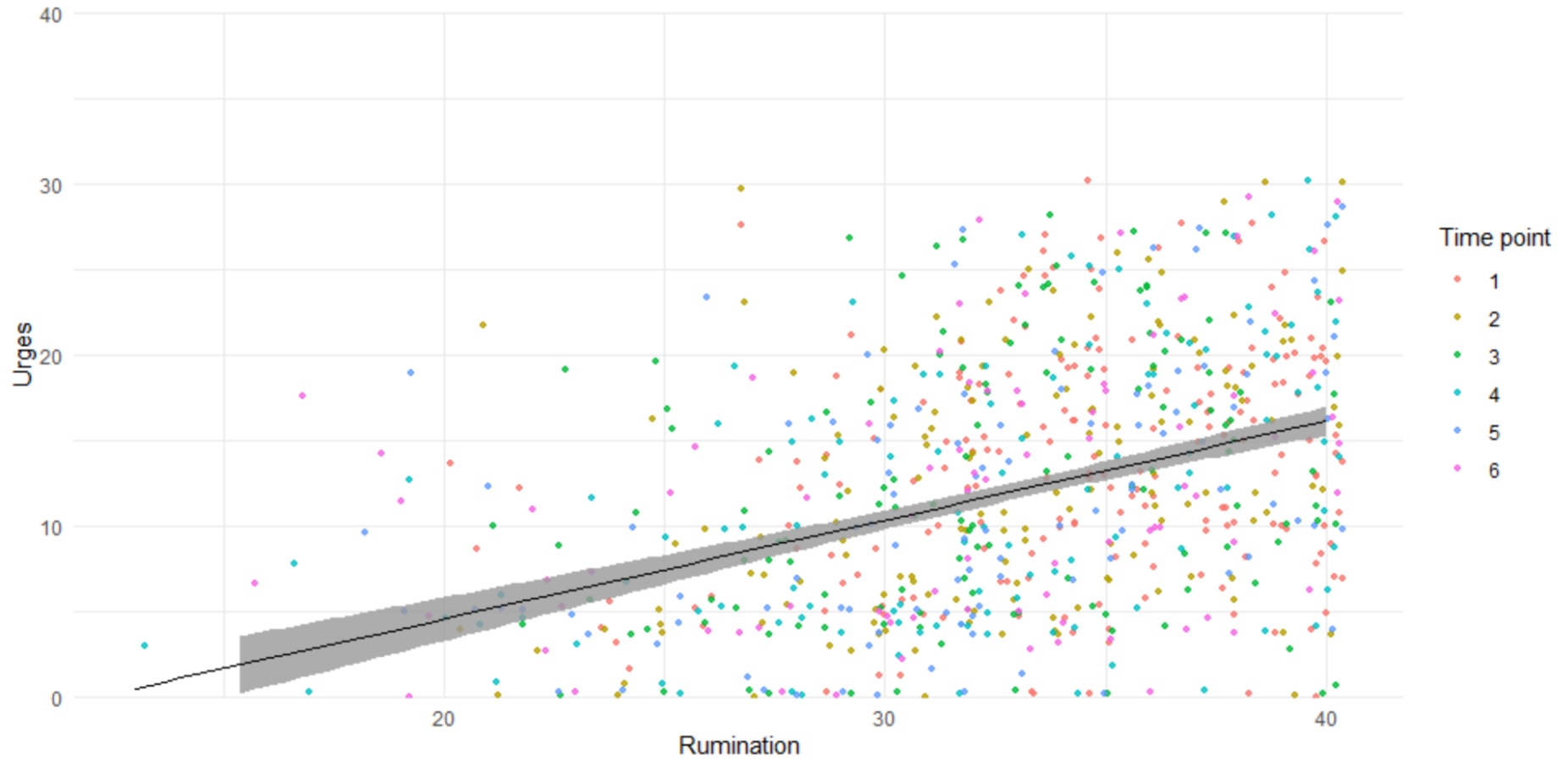


Figure 3. Biphobia scores on NSSI urges

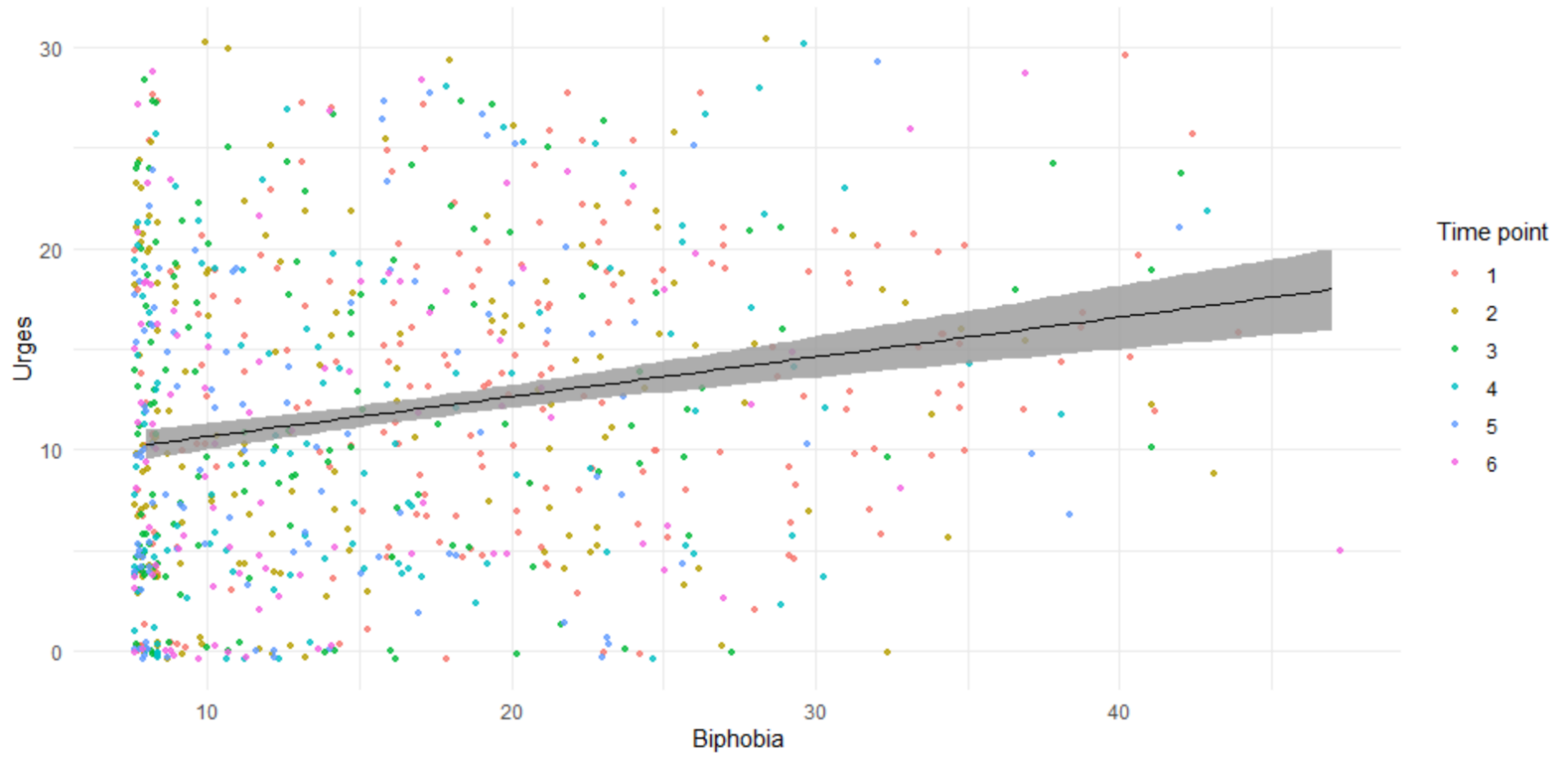
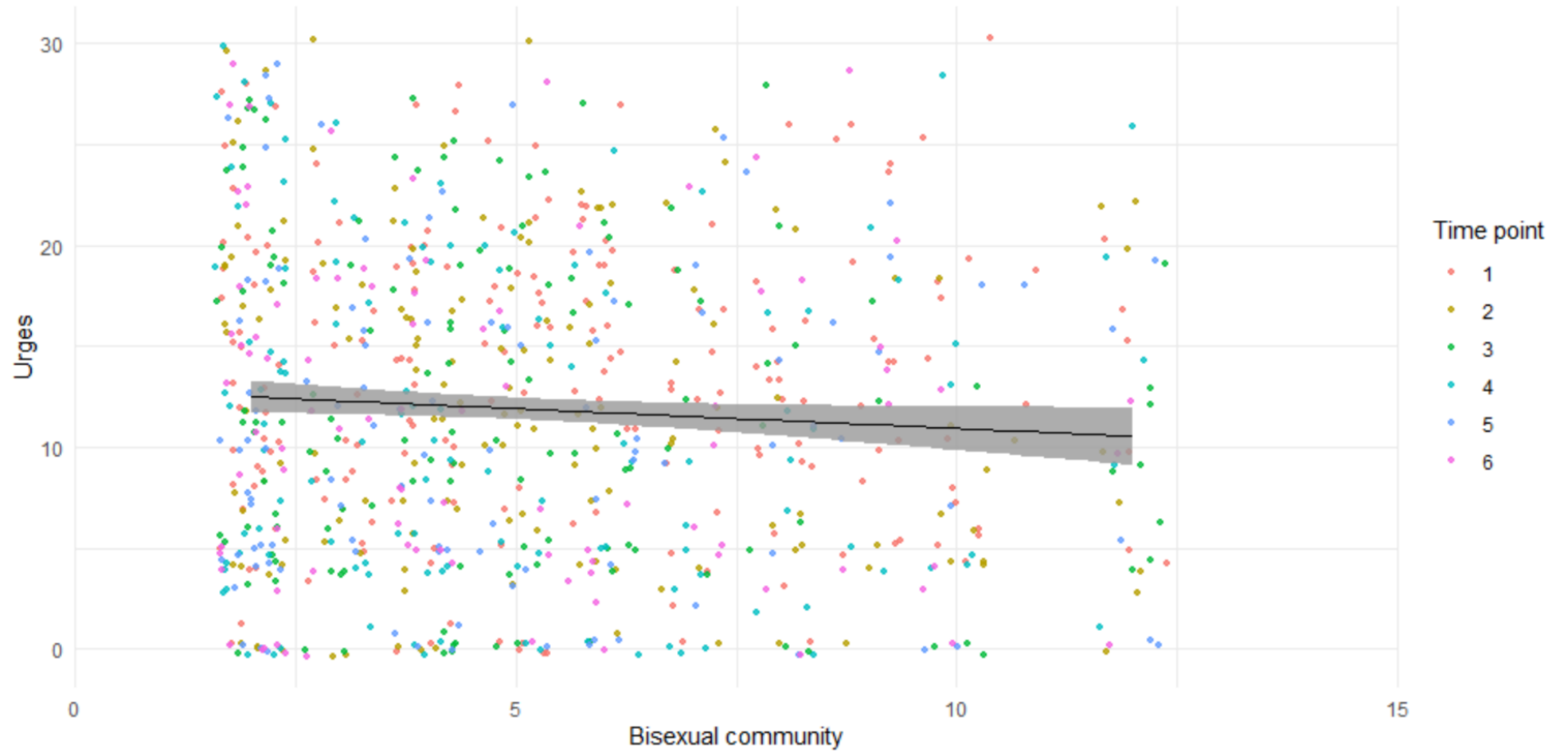


Figure 4. Bisexual community scores on NSSI urges



Both rumination and biphobia were positively associated with increased NSSI urges at the same time point. For rumination, a one-point increase on the measure (range 8-40) resulted in a 0.58 increase on the ABUSI (range 0-30). For biphobia, a one-point increase on the measure (range 8-48) resulted in a 0.21 increase on the ABUSI. For reference, a one-point increase on the ABUSI is the difference between “sometimes” having urges and “often” having urges, or from having a mild urge to having a moderate urge. These associations remained when covariates were included in the regression model, however the effect for biphobia reduced (0.21 to 0.12). Bisexual community (perceived inclusion and support from the bisexual community) was not associated with NSSI urges at the same time point and was therefore not included in the covariate model. The model residuals were inspected and were normally distributed. See Table 7 for detailed results.

Table 7. Concurrent associations between study variables and NSSI urges

Model	Predictor(s)	Regression coefficient (95% confidence interval)	N observations (N participants)	t-value	p-value	Model ICC
Model 1	Rumination	0.58 (0.48, 0.68)	801 (203)	11.28	p<.001*	0.68
Model 2	Biphobia	0.21 (0.15, 0.27)	804 (203)	6.66	p<.001*	0.63
Model 3	Bisexual community	-0.04 (-0.23, 0.16)	804 (203)	-0.38	p= .707	0.63
Model 4	Rumination	0.54 (0.43, 0.64)	794 (200)	10.30	p<.001*	0.68
	Biphobia	0.12 (0.06, 0.18)		4.02	p<.001*	
	Age	-0.18 (-0.54, 0.18)		-0.95	p=.343	
	Cisgender participants	-0.92 (-2.97, 1.11)		-0.88	p=.382	
	White participants	0.90 (-1.31, 3.09)		0.80	p=.426	
	Student participants	0.12 (-2.08, 2.27)		0.10	p=.923	
	Single participants	0.54 (-1.27, 2.37)		0.58	p=.561	
History of NSSI	-2.21 (-5.57, 1.17)	-1.26	p=.209			

*Significant results

ICC = Intra-class Correlation Coefficient

Model 1 had a random slope for rumination

Model 2 did not include random slopes

Model 3 did not include random slopes

Model 4 had a random slope for rumination

3.5. Lagged associations between study variables and NSSI urges

As bisexual community was an exploratory variable and did not emerge as significant in the concurrent association, it was not included as a variable in the lagged models. Lagged associations between rumination or biphobia and NSSI urges are presented in Figures 5-6. Multi-level regression was used to investigate these relationships, with inclusion of the same covariates as in the concurrent associations.

Figure 5. Lagged rumination scores on NSSI urges

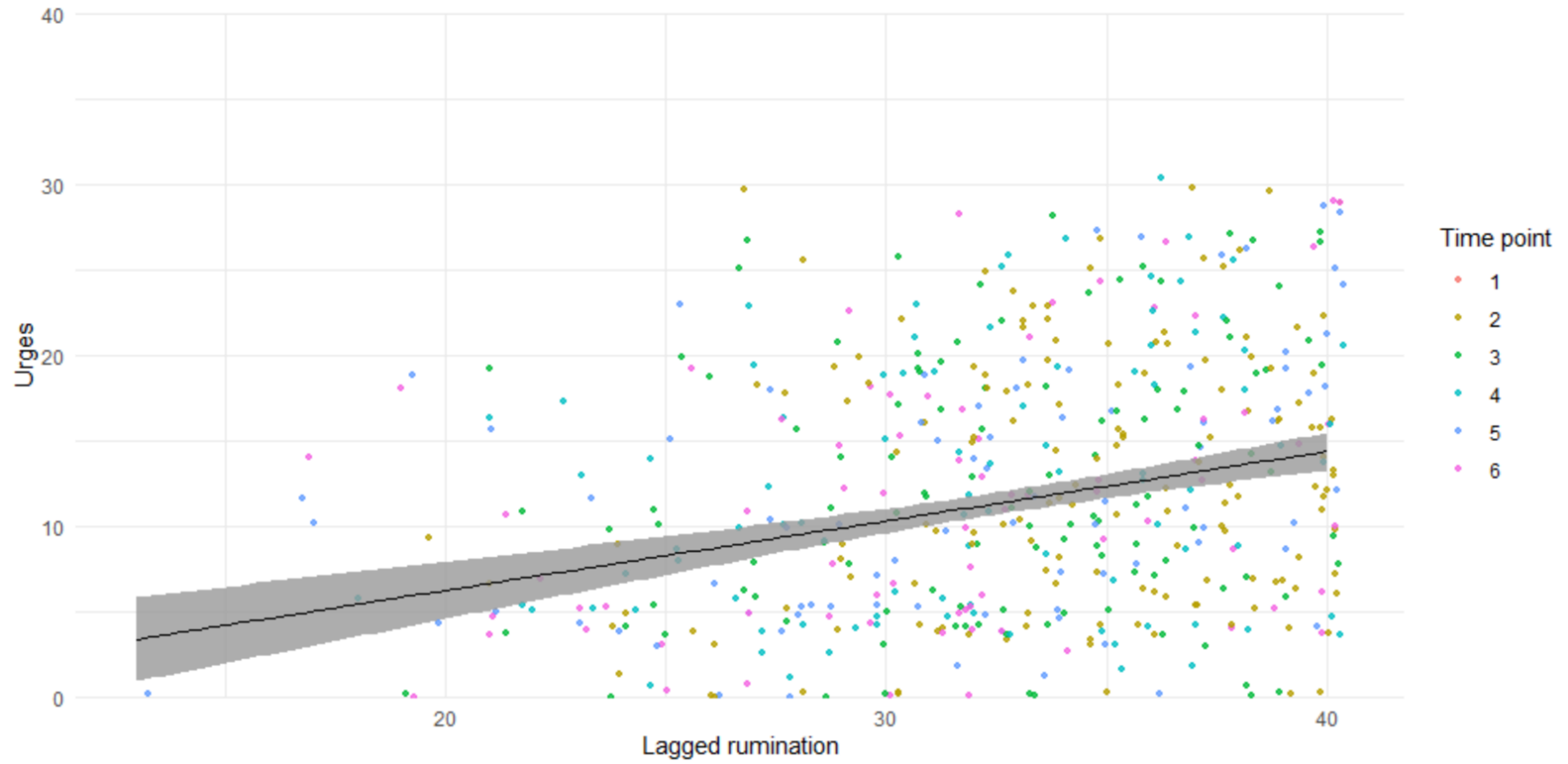
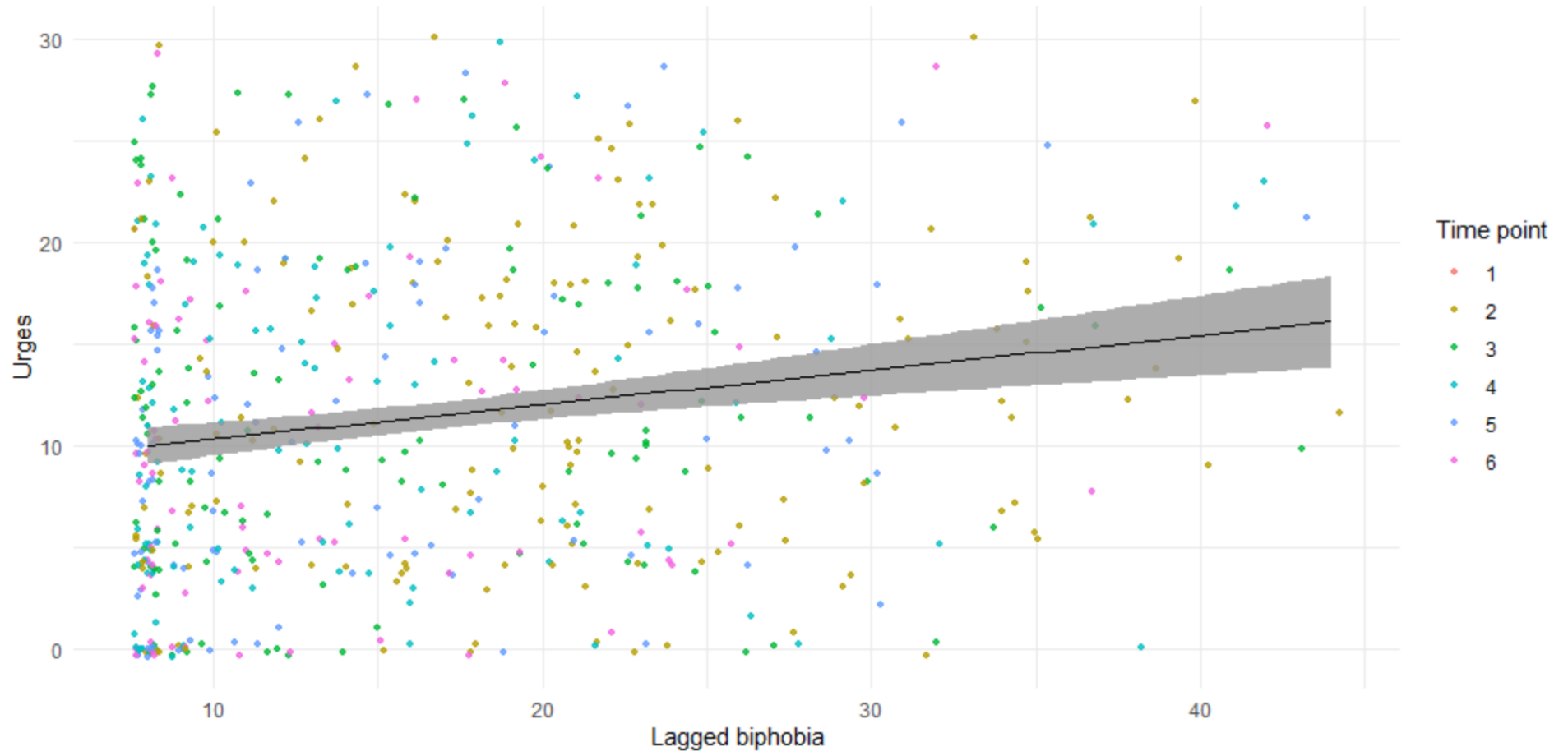


Figure 6. Lagged biphobia scores on NSSI urges



Both rumination and biphobia were positively associated with NSSI urges for the following week. However, these associations were notably smaller than in the concurrent associations. A one-point increase in rumination (range 8-40) resulted in a 0.20 increase on the ABUSI (range 0-30) the following week. For biphobia, a one-point increase (range 8-48) resulted in a 0.11 increase on the ABUSI the following week. When controlling for covariates, only rumination remained significantly associated with NSSI urges over the following week. Model residuals were normally distributed. See Table 8 for detailed results of the lagged associations.

Table 8. Lagged associations between study variables and NSSI urges

Model	Predictor(s)	Regression coefficient (95% confidence interval)	N observations (N participants)	t-value	p-value	Model ICC
Model 5	Rumination	0.20 (0.08, 0.33)	548 (170)	3.31	p=.002*	0.66
Model 6	Biphobia	0.11 (0.03, 0.18)	549 (170)	2.76	p=.006*	0.65
Model 7	Rumination	0.17 (0.04, 0.30)	545 (168)	2.65	p=.009*	0.67
	Biphobia	0.08 (0.00, 0.16)		1.90	p=.059	
	Age	-0.32 (-0.77, 0.13)		-1.39	p=.167	
	Cisgender participants	-1.09 (-3.51, 1.31)		-0.89	p=.376	
	White participants	0.64 (-1.98, 3.26)		0.47	p=.639	
	Student participants	-0.47 (-3.12, 2.21)		-0.34	p=.736	
	Single participants	-0.17 (-2.33, 2.00)	-0.16	p=.876		
	History of NSSI	0.23 (-3.89, 4.32)	0.11	p=.913		

*Significant results

ICC = Intra-class Correlation Coefficient

Model 5 had a random slope for lagged rumination

Model 6 did not include random slopes

Model 7 had a random slope for lagged rumination

4. Discussion

This was the first study to investigate psychological and social factors associated with NSSI in young bisexual people. The aim of the research was to examine the relationship between rumination or biphobia with NSSI urges, both contemporaneously and with the predictor lagged by one week. As there was no non-bisexual comparison group, the study does not inform whether these factors operate differently in bisexual individuals compared to non-bisexual individuals. However, by characterising this relationship within bisexual individuals, these findings can be contrasted with those from other populations.

In support of study hypotheses, both rumination and biphobia were found to be associated with NSSI urges, although rumination had a consistently stronger association. In addition, only rumination remained significant when covariates were included in the lagged model. As rumination remained associated with NSSI urges when lagged, this shows that where rumination precedes NSSI it still predicts this variable, which further increases the plausibility of a causal relationship. These results are compatible with Hatzenbuehler's (2009) Psychological Mediation Framework, which states that rumination is a central process in the mental health of LGB people. This framework also suggests that rumination mediates the relationship between stigma and psychological distress. This could help to explain the weaker relationship between biphobia and NSSI in the current study, as rumination may mediate this relationship.

The association between rumination and NSSI provides evidence for The Emotional Cascade Theory, which suggests that NSSI serves as a distraction from intense rumination (Selby et al., 2009). Studies using measures of trait rumination were found to have a small to moderate positive effect on NSSI behaviour (see Paper 1), however it has been suggested that it is unstable, state rumination that has a greater association with NSSI (Selby, 2013). This is supported by the findings of this study, as a measure of state

rumination covering the previous week was used. Moreover, rumination demonstrated less stability within-person than biphobia or NSSI urges.

Rumination scores were very high across time points, suggesting that high levels of rumination are common in young bisexual people. In comparison, scores for biphobia were generally low, which may be partially explained by the COVID-19 pandemic. With lockdowns and the huge increase of working from home in the UK and internationally (Office for National Statistics, 2020), participants may have had fewer biphobic interactions. This was described by SIBL study participants in a qualitative paper conducted by the SIBL research team (Dunlop et al., 2021), *“now I don’t have to do that many social interactions, [lockdown] helped me a little bit, having to not like, like to deal with random people at school...”*. Therefore, it would be beneficial for future research to replicate this study with a sample facing more active discrimination. In addition, the biphobia scale was developed to measure all perceived anti-bisexual experiences, as opposed to experiences over the previous week, as in the current study. This could also help to explain the low scores.

4.1. Clinical implications

The results from this study indicate that rumination and biphobia contribute to the NSSI risk in young bisexual people. Rumination was found to have a consistent association with NSSI urges, suggesting that rumination may be an important focus for psychological therapy. This may include techniques from rumination-focused Cognitive Behavioural Therapy (Watkins, 2016), mindfulness (Deyo et al., 2009), or Dialectical Behaviour Therapy (Linehan, 1993). Specifically, therapists should consider how the unique difficulties faced by bisexual people, such as the “doubly stigmatised identity” (Batejan et al., 2015), may contribute to ruminative thinking and subsequent self-injury.

Previous research has highlighted the discrimination that bisexual individuals face (Israel and Mohr, 2004; Batejan et al., 2015) and it is suggested that rumination may

mediate the relationship between stigma and psychological distress (Hatzenbuehler, 2009). Therefore, reducing biphobic discrimination and supporting individuals to develop a positive bisexual identity is crucial to the overall wellbeing of bisexual young people. Mental health professionals have an important role to play in helping young bisexual people to feel safe and understood. Asking thoughtful questions regarding their sexuality, and any other identities that are important to them, will help to cultivate a sense of connection and compassion within the therapeutic relationship. Furthermore, psychologists and other mental health clinicians have a professional power that should be utilised to tackle discrimination and injustice when seen within services and in wider society.

4.2. Limitations

The study relied on self-selection and self-report data, which may have resulted in biased results and inflated relationships. In addition, the sample were 80% White with 77% of people residing in the UK or the USA. Future studies should aim to test these relationships within different subgroups, to uncover whether there are differences.

The study used an amended version of the BSRI, with the wording of the items adapted from 'Right now' to 'Over the last week'. As state rumination is a measure of momentary and fluctuating rumination, this may have measured a slightly different construct. The study captured rumination over a short period of time, but different results may have occurred with the original wording. Future research should consider using Ecological Momentary Assessment (EMA), which would measure state rumination as it occurs.

Additionally, the study did not include a measure of depression. Rumination has been found to be closely associated with depression, with the effects of rumination on NSSI often reducing when depression is accounted for (See Paper 1). Therefore, it would have been beneficial to include depression in the regression models to explore any impact this may have had on the results.

Finally, the study did not incorporate a qualitative element. Allowing young bisexual people to share their views and experiences is crucial in developing a deeper understanding of NSSI in this group. Moreover, qualitative analysis would provide further insight into the factors associated with NSSI in young bisexual people. Because of this, the SIBL research team conducted an additional qualitative study with SIBL study participants (Dunlop et al., 2021).

4.3. Conclusions

Rumination and biphobia were found to be associated with NSSI urges in young bisexual people. Rumination was significantly associated with NSSI at the same time point and the following week. Biphobia did not remain significantly associated with NSSI when covariates were included into the lagged models. The weaker association between biphobia and NSSI may be a result of rumination mediating this relationship. In addition, data collection was carried out in the context of the COVID-19 pandemic. Due to reduced social contact, there may have been less biphobia during this time.

These findings suggest that rumination-focused therapies may be of benefit to young bisexual people struggling with NSSI. Furthermore, it is important to increase awareness of the mental health difficulties and discrimination bisexual people face, as well as promoting positive representations of bisexuality in the media. If bisexual young people feel supported and understood, they may be more likely to develop a positive bisexual identity and less likely to ruminate or engage in NSSI. Future research should focus on testing whether a rumination-focused therapy reduces NSSI in young bisexual people, such as through an interventionist-causal approach. In addition, studies should investigate additional factors that may be associated with NSSI in bisexual people and include a non-bisexual comparison group to allow for an exploration of any differences. Including the views of bisexual people, such as through qualitative data, should be an important focus for this research moving forward.

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Paper 3: Critical Appraisal

Word count: 4720 (excluding references)

1. Introduction

This paper provides a critical and reflective appraisal of the process of conducting the systematic review and empirical study. The challenges faced and the decisions made throughout are discussed. Additionally, the wider research and practice implications of the papers are explored, along with the researcher's personal reflections on the process.

2. Paper 1: The relationship between rumination and NSSI: a systematic review and meta-analysis

2.1. Development of review topic and protocol

As discussed in Paper 1, NSSI is an important focus for research as it is a common and concerning behaviour, associated with a range of psychological difficulties and future suicidal behaviour. Furthermore, advancing our understanding of the predictors of NSSI could help to inform psychological assessment and treatment within the NHS. Considering that self-reported NSSI in England has almost tripled in recent years (McManus et al., 2014), ensuring that people receive effective interventions within the NHS is a priority. To develop effective interventions, we need to know which factors are associated with NSSI. There are many theories of NSSI, including the Emotional Cascade Model which suggests that NSSI serves as a distraction from intense rumination (Selby et al., 2009).

Initial scoping exercises confirmed that there was a substantial body of research on the association between rumination and NSSI. However, the only reviews I found were focused on Borderline Personality Disorder (BPD). For example, Daros and Williams (2019) reviewed the association between BPD symptoms and emotional regulation strategies (including rumination). BPD symptoms included NSSI, but the review did not separate this from other symptoms. To the best of my knowledge, there was no published or registered (e.g., PROSPERO) systematic review or meta-analysis that specifically

investigated the relationship between rumination and NSSI. As previous reviews had found a moderate to strong positive relationship between rumination and suicidality (Morrison and O'Connor, 2008; Rogers and Joiner, 2017), I was interested to uncover whether there was a similar relationship with NSSI. Therefore, we decided that that the review would focus on the association between rumination and NSSI.

It was observed that various types of rumination were being measured in the studies. Moreover, some used a dichotomous NSSI history variable, and some used a continuous NSSI frequency variable. It was proposed that the review grouped studies based on the type of rumination and type of NSSI, thus revealing any differences in effect size. In addition, it was agreed that additional narrative syntheses of longitudinal results and adjusted associations would be conducted alongside the meta-analyses. I was initially apprehensive at the scale of the review and the work that would be involved. However, I knew that this would result in a comprehensive review that could hopefully inform treatment initiatives.

A protocol for the review was developed and uploaded onto PROSPERO, ensuring that the review would not be undertaken elsewhere. While developing the protocol, inclusion and exclusion decisions needed to be made. To keep the review focused, it was agreed to only include papers that had a measure of NSSI behaviour. In addition, given that meta-analyses and narrative syntheses were already planned, it was decided that including qualitative data was beyond the scope of the review. However, unpublished findings such as theses were included, to mitigate against potential publication bias (Higgins et al., 2021).

2.2. Search strategy

Developing an appropriate search strategy was a reasonably straightforward process. As members of the research team had undertaken previous NSSI reviews (e.g., Taylor et al., 2018), there was an understanding of the terms needed for this section of the search. In

addition, ruminat* OR brood* was believed to capture the variances of rumination within the literature. To maximise search results, MeSH terms were included where available (Appendix C).

Undertaking the search across four databases resulted in a relatively small number of results (525 before removing duplicates), but this was not believed to reflect an issue with the search. Additional search processes were undertaken such as checking reference lists of included studies and relevant reviews, contacting authors, backwards-tracking, and forward-tracking. Therefore, it was deemed unlikely that relevant studies were missed.

2.3. Screening, data extraction and risk of bias

Following the title and abstract screening, full-text screening of 77 studies was undertaken by two independent researchers, which is recommended when conducting a systematic review (Dundar and Fleeman, 2014). We screened the papers based on the inclusion and exclusion criteria, resolving any discrepancies through discussion with the wider research team. There were several papers that initially appeared to meet criteria but were eventually excluded from the review. The updated PRISMA guidelines (Page et al., 2021) recommend including a list of ‘near-misses’ with the reasons for exclusion, which I have included in the appendices (Appendix D). The main reason for the ‘near-misses’ was that several papers reported on the same data as other included studies.

Data extraction was also conducted independently by the two researchers. This was a huge task as there were 39 studies to extract data from, with some requiring additional information to be requested from the authors (e.g., correlation coefficients, descriptive statistics). In addition, extracting the relevant statistical data was not always straightforward, with some papers reporting very complex statistical analyses. This was primarily the case for longitudinal studies, so guidance was sought from the research supervisor as to how to approach this. Two studies (Barrocas et al., 2014; Hughes et al., 2019) employed complex longitudinal analysis such as latent growth curve modelling, the

results of which were deemed not eligible for the meta-analysis. As meta-analysis is best suited to aggregating simple bivariate associations, this is not so helpful for complex idiosyncratic models. Therefore, these results were discussed solely in the narrative synthesis. Despite the data extraction process being quite an arduous task, it really helped me to understand the data and subsequently conduct the analyses.

Assessing risk of bias is important as the credibility of a review can be compromised by biases present in the included research (Page et al., 2018). Therefore, the current review used an adapted version of the Agency for Research and Healthcare Quality (AHRQ; Williams et al., 2010) assessment tool. This was chosen as it had been used in a previous review of self-injury that the research supervisor had been involved in (Sheehy et al., 2019). As with the screening and data extraction process, the risk of bias assessment was completed separately by two researchers before agreeing on the final ratings. This was crucial as subjective ratings were inevitable, particularly for criteria that were partially met or difficult to assess in certain papers. One limitation of the review was that I did not assess inter-rater reliability, which would have been useful to the reader. However, I am confident in our approach as any discrepancies were discussed and resolved, with both researchers agreeing on all the final ratings.

The risk of bias process helped me to understand the methodological quality of the included papers, although I was surprised that so many were being rated as having a moderate risk of bias. However, this may somewhat be a result of ‘partial’ and ‘can’t tell’ ratings, which were regarded as a ‘no’ in the overall risk of bias rating system (i.e., 6-10 ‘yes’ ratings corresponded to a low risk of bias). Although certain criteria may have been met, this could not be reflected in the assessment if not clearly reported in the paper. Furthermore, this process highlighted the importance of being as clear and transparent as possible when reporting on study findings.

2.4. Analysis

Studies were grouped into separate meta-analyses based on NSSI type and rumination type. Distinguishing rumination type was difficult at times, as papers used various measures and often described rumination differently (e.g., use of ‘repetitive negative thinking’ rather than rumination). I needed to understand the development of each measure to fully appreciate the construct they were intended to assess. For example, the Ruminative Response Scale is widely recognised as a measure of depressive rumination (Treynor et al., 2003). Other measures were developed to be more transdiagnostic in nature (such as the Repetitive Thinking Questionnaire, McEvoy et al., 2010) which resulted in the ‘transdiagnostic rumination’ grouping. In addition, studies would often separate brooding and reflection in their analysis, with brooding generally considered to be the more maladaptive of the two (Treynor et al., 2003). The separate groups allowed for any differences between rumination types to be examined, which is a notable strength of the review.

The meta-analyses were conducted in *R*, a programme I had no experience of using and initially found quite intimidating. Use of online tutorials, such as Harrer et al. (2019) and guidance in research supervision were instrumental in helping me to understand this stage of the analysis. I felt it was important to understand the analysis so that I could be confident in my ability to explain the results.

2.5. Implications and future directions

The literature review is the first comprehensive review of the relationship between rumination and NSSI. Therefore, the paper enhances the current knowledge regarding the importance of rumination in psychological treatment for NSSI. As explored in the Discussion of Paper 1, the results indicate that rumination-focused therapies may be beneficial for individuals struggling with NSSI. However, the small to moderate effect sizes and mixed narrative synthesis results suggest that other factors may be of greater significance. For example, it has been suggested that emotion-regulation may be an

important focus for NSSI interventions (Taylor et al., 2018). It may be most beneficial for interventions to include rumination, but not have this as the sole focus. However, the studies included in the current review focused on trait rumination which remains stable over time. Dynamic state rumination may have a greater association with NSSI (Selby et al., 2013) and therefore more longitudinal research assessing state rumination is needed to test this theory. This would allow for a future review to assess the relationship between state rumination and NSSI.

3. Paper 2: Self-Injury in young Bisexual people: a Longitudinal investigation (SIBL) of rumination and biphobia on NSSI urges

3.1. Background context

It is well established that LGB (lesbian, gay, bisexual) people have consistently worse mental health outcomes (Chakraborty et al., 2011; King et al., 2008), including NSSI (Batejan et al., 2015). Bisexual people were chosen for the empirical study as recent research had highlighted an increased risk for NSSI in this group (Batejan et al., 2015; Fraser et al., 2018). However, the mechanisms behind this were not well researched or understood. Theories that may help to explain the increased risk of NSSI in LGB people generally, such as Minority Stress Theory (Meyer, 2003) and the Psychological Mediation Framework (Hatzenbuehler, 2009), were often cited in research. The choice to include rumination and biphobia as potential predictors in the empirical study was informed by these theories. I thought it was important to focus on bisexual-specific discrimination, as this was an area often neglected by the LGB research. In addition, rumination had been described as a central process in LGB mental health. As this was the first research project to examine potential factors associated with NSSI in bisexual people, it seemed appropriate to include a social and a psychological variable.

3.2. Developing the study

The study was part of a joint project with another trainee, which I considered to be positive as this meant there was someone to share recruitment with and to problem-solve any issues with. Once we had determined our individual research questions, the research team collaboratively decided how the study would be conducted.

As described in Paper 2, a notable limitation of LGB research is that it is mostly cross-sectional. This informed our decision to conduct a longitudinal project as this would add to the novelty of the research. Furthermore, an online project felt most appropriate, as this would maximise participation. Early in the study development process we attended a meeting with a statistician who advised that we required 100 participants to attain adequate power. However, due to the longitudinal nature of the study, we would need to account for 50% attrition. Recruiting 200 young bisexual people who had recent experience of NSSI to a longitudinal project seemed a huge task for a ClinPsyD thesis. Despite this, we felt that with a strong recruitment strategy it would be possible for two trainees to recruit the required participants, particularly as we agreed for the study to be online.

As we were mindful of attrition, we included multiple steps in the procedure which we hoped would minimise this. For example, we planned to have a phone call to explain the study and answer questions with interested individuals, conduct check-in phone calls/emails with participants, and create a recruitment video. We also aimed to receive ethical approval as soon as we could so that we could focus on recruitment. I felt very grateful to be working collaboratively with another trainee throughout the ethics process, as we were able to get through this process quite quickly. In addition, we were lucky that we did not have to re-design the study or revisit ethics like many others did because of the impact of the pandemic.

3.3. Patient and Public Involvement (PPI)

The contributions of members of the public and patients is crucial in research, as their knowledge and experience offers an alternative perspective to researchers and

professionals. These perspectives can greatly improve study designs and procedures. In addition, it is extremely important to ensure that people are represented in research, rather than research being done to and for them (INVOLVE, 2012). Furthermore, as I do not identify as bisexual, I thought that it was essential to have the views of LGBTQ+ members of the public, specifically bisexual people, when designing this research.

Early consultations with the Community Liaison Group (CLG) at the University reinforced our views that we needed to engage with participants. They supported our idea to create a recruitment video and check-in with participants over phone/video call. The CLG were concerned that otherwise we would be faceless researchers asking participants to disclose online very distressing experiences regarding their self-injury and discrimination. To maximise participation, they suggested that we increase inclusion criteria to people who have had self-injury urges/behaviour over the last 6 months, rather than 3 months. We agreed with this and revised our criteria. Following the initial CLG consultation, a young bisexual member of the group agreed to meet with us for a second time to look over our study materials. This helped to ensure that the study information was accessible and used appropriate wording.

In addition to the CLG, we met with a senior director of an LGBTQ+ charity in Manchester to seek advice about the study plan and ask for support with recruitment. One of the issues we battled with in the early stages of the research was the inclusion criteria. We were mindful of the various identities within the spectrum of bisexuality, such as pansexuality, and wanted to be as inclusive as possible. Therefore, we were unsure whether we should say “people who are attracted to two or more genders” or “people who are bisexual”. We discussed this issue with the director, who highlighted the importance of us avoiding bisexual erasure in our study. Bisexual erasure is defined as the tendency to question the legitimacy of bisexuality, which is a huge issue within LGBTQ+ and straight communities (Murphy, 2021). Bisexuality is a valid identity which we should not exclude

from our research. Therefore, to ensure we did not contribute to bisexual erasure and were as inclusive as possible, we agreed on the inclusion criteria as “people who are bisexual and/or are attracted to two or more genders”. Moreover, the director was happy to assist with recruitment through posting on social media and inviting us to various events.

3.4. Recruitment

We were aware that it was a long process from recruitment to completing the study (complete consent to contact form, receive contact from researchers, complete consent form, complete six weekly surveys) with lots of opportunity for drop-out. Therefore, we were committed to ensuring our recruitment strategy was strong, with the aim of keeping people engaged in the study. In addition, as discussed by the CLG, we did not want to be faceless researchers asking people to share very personal and distressing experiences. We filmed the recruitment video to show potential participants who we were, what the study was about, and how they could take part. By presenting this information in video format, we hoped to catch people’s attention and attract those who may not normally read a poster. We believed this would be especially effective in engaging young people, who were the target of this research. We shared the recruitment video on social media platforms, alongside written information.

Social media offers researchers an excellent way to promote their research to a wide audience and is increasingly used as a platform for recruiting and interacting with participants. The use of social media was our main recruitment strategy before the pandemic, then even more so following the lockdowns which left us unable to attend physical groups or events. We created a dedicated ‘SIBL study’ page on Facebook, Twitter, YouTube, Reddit, and Instagram. The social media pages were used throughout recruitment (and beyond) to engage with potential participants, bisexual/LGBTQ+ activists, relevant organisations, and other researchers. We aimed to keep our posts fresh, with the use of the recruitment video, written tweets, pictures, and video updates (recorded

using Zoom, due to the pandemic). In addition, we used our platform to speak out about important and relevant issues, such as Pride, LGBTQ+ visibility days, and Black Lives Matter. The ‘SIBL study’ Twitter page (@siblstudy) currently has over 320 followers, which highlights the extremely positive and engaged response the research has received from people online. In hindsight, it would have been useful to ask participants where they heard about the study so we could analyse the most effective methods and specific social media platforms. We adhered to the British Psychological Society (BPS) Guidance on the use of Social Media (BPS, 2018) and Ethics Guidance for Internet-mediated Research (BPS, 2017) throughout the study.

Before the pandemic we were able to attend several physical groups organised by LGBTQ+ charities and youth organisations. This allowed us to meet potential participants and answer any questions, as well as encourage individuals to share posters and follow us on social media. In addition, we approached self-harm support groups on Facebook and were given permission to share study information within some groups.

Other recruitment strategies used included university announcements, blog posts by Bisexual activists and contacting LGBTQ+ university societies across the UK. I was very pleased that we exceeded our recruitment target, which I think reflects our strong recruitment strategy. In addition, it is important to recognise that our recruitment was not affected by the pandemic as it was for many other researchers. Although we acknowledged that the surveys may have been too overwhelming for people during the pandemic, we received feedback from participants that they enjoyed having something worthwhile to do during the lockdowns.

3.5. Feedback from participants

We received positive and constructive feedback from participants throughout the study by email and when conducting the check-ins. Constructive feedback mainly focused on the functionality of the surveys, such as issues with word limits in open questions and being

unable to check multiple answers to some questions. Unfortunately, the surveys could not be adjusted as they were active, but extra text was added to troubleshoot issues (e.g., participants asked to check one answer and write others in the ‘other’ box). In addition, some participants provided feedback on the definitions we used in the demographic questionnaire. It was felt by some that we could have been more transgender and non-binary inclusive, such as by using ‘transgender male’ rather than ‘female to male transgender’ and changing our definition of bisexuality (‘attracted to those who identify as male and female’) to include non-binary/third gender people. Future research would benefit from PPI consultation in the development of demographic questionnaires, to ensure that the options are as inclusive and diverse as possible.

Positive feedback included participants who thanked us for conducting this research and allowing bisexual voices to be heard. Some participants explained how too often LGBTQ+ people are grouped together despite the experiences being very different. In addition, some people described the surveys as being helpful to track their mood and reflect on factors that may be influencing their urges to self-injure.

When we received feedback, we responded with our gratitude and with any changes that were made as a result. I was very appreciative of the feedback as this helped to improve the study and will inform decisions I make in future research (e.g., inclusivity in demographic questionnaires).

3.6. Analysis and results

Once the data was exported, it became clear that it would be a very long process to prepare for analysis. For each questionnaire, all responses across the six weeks were included in a single spreadsheet. Using participant numbers and dates of completion, we worked out which responses reflected which week’s survey and inputted each response into a new master spreadsheet. This also involved the adoption of a 3-day rule, whereby if a person completed a survey within 3 days of the text/email reminder, it was included in the

analysis. As this was such a tedious process with many opportunities for human error, we decided to bring somebody on board for independent data-checking. A master's student who was supervised by one of the SIBL research supervisors was interested in gaining additional research experience. After explaining what the data-checking would involve, they agreed to organise 20% of the data. I then cross-checked this against the data I had organised. This was extremely useful in ensuring the data was accurate. Once the data was organised and checked, the analysis was conducted in *R* with the support of the research supervisors and statistician.

Although the hypotheses were supported, the association for biphobia was weaker than what was expected. Biphobia scores were generally very low, with an overall mean score of 15.60 for a scale that ranged from 8-48. As explored in the Discussion section of Paper 2, this may partly be a result of fewer social interactions during the pandemic. Some participants emailed to tell us that their scores were not representative of what they experience usually. Also, one participant told us that they had not 'come out' as bisexual, so had not experienced the biphobia measured by the scale. As many young people would be exploring their sexual identity, this may have been the case for other participants. Therefore, it may have been useful to ask whether participants were 'out' as bisexual and explore the experiences of those who were not in a different way (with questions regarding internalised biphobia, for example). In addition, the scale was adapted to cover only the previous week, which would understandably result in lower scores. This could be considered a limitation of the study, as the measure was not developed to be used in this way.

The findings suggested a strong association between state rumination and NSSI in young bisexual people. In contrast to biphobia, rumination scores were very high, with an overall mean score of 32.39 for a scale that ranged from 8-40. As the scale was adapted to a Likert-type response format for the online survey, this cannot be accurately compared to

other populations. However, what can be interpreted from this is that high levels of rumination are common within young bisexual people. The association between state rumination and NSSI is consistent with the conclusions drawn in Paper 1, as it was theorised that state rumination may have more impact on NSSI than trait rumination.

3.7. Qualitative paper

The high level of engagement and positive feedback received from participants reflected that we had participants who were keen to share their views. Therefore, alongside the main SIBL project the research team conducted an additional qualitative study with 15 SIBL study participants, which was led by my co-researcher Brendan (Dunlop et al, 2021). I was keen to be involved with a paper that focused on the views and experiences of bisexual people while enhancing my qualitative research skills. Connecting with and learning from participants in this additional study was an extremely valuable part of the research process for me.

4. Wider implications and reflections

The findings of this body of work, including the review and empirical study, advance our understanding into the factors that are associated with NSSI. Both papers indicate the importance of rumination, although results suggest that state rumination may be more associated with NSSI than trait rumination. This has implications for future research as most studies use measures of trait rumination, such as the Ruminative Responses Scale. Bisexual young people are a high-risk group for NSSI, and the empirical study was the first to investigate why this may be. More research is needed in this area, particularly regarding NSSI interventions and how they may be best adapted for bisexual people. The SIBL research team plan to continue this research moving forward, which is an exciting prospect as I have come to feel very passionately about this area of research. For example, our future studies could focus on adapting and testing interventions for NSSI such as

Dialectical Behavioural Therapy (DBT) for bisexual people. Additionally, replicating the SIBL study with a non-bisexual comparison group would uncover any differences between the groups. Finally, it would be interesting to explore NSSI and intersectionality within this population, thus introducing other key aspects of an individual's identity into the research such as race, gender, or social class.

Conducting the SIBL study has been eye-opening for me, as biphobia and bisexual erasure were not issues that I had much knowledge about previously. I think my ignorance reflects the wider lack of awareness regarding the discrimination towards bisexual people. Recent years have seen an increase in awareness of LGBTQ+ issues and discrimination, but much more needs to be done to ensure people are listened to and supported. It is important to consider the experiences of individuals within the LGBTQ+ community and not simply group identities together, assuming that the experiences are the same.

For Clinical Psychologists (and other professionals), it is crucial to understand the unique difficulties faced by bisexual people and the increased risk for mental health difficulties, including NSSI. The results of Paper 2 suggest that thoughtful questions regarding engagement in NSSI, experience of biphobia, and ruminative thinking should be included in any mental health assessment with bisexual people. As discussed in Paper 2, rumination-focused therapies may be beneficial for young bisexual people, but more research is needed to determine whether a specific therapy reduces NSSI in this population.

It is widely recognised that the interpersonal process of therapy is the foundation of our work, with the therapeutic relationship often correlating more highly with outcomes than specialised interventions (Lambert and Barley, 2001). Therefore, for now therapists should focus on ensuring bisexual people feel understood and supported in therapy. To do this effectively, therapists should have knowledge of the unique issues that bisexual people face and a commitment to tackle discrimination when they see it.

5. Dissemination plan

I and the rest of the research team have been committed to disseminate the findings presented in this thesis to participants, academic communities, supporting organisations, and the wider population. Regarding journal publications, Paper 1 is under review for publication in the *Journal of Affective Disorders*, and I plan to submit Paper 2 to *Psychological Medicine*.

We have emailed a lay summary to all SIBL study participants who requested this on the consent form (see Appendix Z for the lay summary poster) and created a thread discussing our results on Twitter. In the coming weeks, we will record a lay summary video to share on social media, highlighting key findings and implications. We also plan to email a lay summary to the organisations that supported recruitment and are happy attend groups to present our findings. I will contact relevant media outlets such as Pink News once Paper 2 has been published.

SIBL study results will be presented as part of a symposia submission with other researchers at the International Society for the Study of Self-Injury online conference in June 2021. This symposia submission has also been submitted to the International Association for Suicide Prevention online conference in September 2021. Finally, I have submitted an abstract for Paper 2 to PsyPAG for their postgraduate conference due to take place online in July 2021.

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- Williams, J. W., Plassman, B. L., Burke, J., & Benjamin, S. (2010). Preventing Alzheimer's disease and cognitive decline. *Evidence report/technology assessment, 193*, 1-727. <http://europepmc.org/abstract/MED/21500874>

Appendix A: Author guidelines for Journal of Affective Disorders

Types of Papers

The Journal primarily publishes:

Full-Length Research Papers (up to 5000 words, excluding references and up to 6 tables/figures)

Review Articles and Meta-analyses (up to 8000 words, excluding references and up to 10 tables/figures)

Short Communications (up to 2000 words, 20 references, 2 tables/figures)

Correspondence (up to 1000 words, 10 references, 1 table/figure).

At the discretion of the accepting Editor-in-Chief, and/or based on reviewer feedback, authors may be allowed fewer or more than these guidelines.

Preparation of Manuscripts

Articles should be in English. The title page should appear as a separate sheet bearing title (without article type), author names and affiliations, and a footnote with the corresponding author's full contact information, including address, telephone and fax numbers, and e-mail address (failure to include an e-mail address can delay processing of the manuscript).

Papers should be divided into sections headed by a caption (e.g., Introduction, Methods, Results, Discussion). A structured abstract of no more than 250 words should appear on a separate page with the following headings and order: Background, Methods, Results, Limitations, Conclusions (which should contain a statement about the clinical relevance of the research). A list of three to six key words should appear under the abstract. **Authors should note that the 'limitations' section both in the discussion of the paper AND IN A STRUCTURED ABSTRACT are essential. Failure to include it may delay in processing the paper, decision making and final publication.**

Figures and Photographs

Figures and Photographs of good quality should be submitted online as a separate file. Please use a lettering that remains clearly readable even after reduction to about 66%. For every figure or photograph, a legend should be provided. All authors wishing to use illustrations already published must first obtain the permission of the author and publisher and/or copyright holders and give precise reference to the original work. This permission must include the right to publish in electronic media.

Tables

Tables should be numbered consecutively with Arabic numerals and must be cited in the text in sequence. Each table, with an appropriate brief legend, comprehensible without reference to the text, should be typed on a separate page and uploaded online. Tables should be kept as simple as possible and wherever possible a graphical representation used instead. Table titles should be complete but brief. Information other than that defining the data should be presented as footnotes. Please refer to the generic Elsevier artwork instructions: <http://authors.elsevier.com/artwork/jad>.

Preparation of supplementary data

Elsevier accepts electronic supplementary material to support and enhance your scientific research. Supplementary files offer the author additional possibilities to publish supporting applications, movies, animation sequences, high-resolution images, background datasets, sound clips and more.

Supplementary files supplied will be published online alongside the electronic version of your article in Elsevier web products, including ScienceDirect: <http://www.sciencedirect.com>. In order to ensure that your submitted material is directly usable, please ensure that data is provided in one of our recommended file formats. Authors should submit the material in electronic format together with the article and supply a concise and descriptive caption for each file. For more detailed instructions please visit our Author Gateway at: <https://www.elsevier.com/authors>.

Highlights

Highlights are mandatory for this journal as they help increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the examples here: [example Highlights](#). Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

Abstract

A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

Tables

Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

References

Citation in text

Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

Reference style

Text: All citations in the text should refer to:

1. *Single author:* the author's name (without initials, unless there is ambiguity) and the year of publication;
2. *Two authors:* both authors' names and the year of publication;
3. *Three or more authors:* first author's name followed by 'et al.' and the year of publication.

Citations may be made directly (or parenthetically). Groups of references can be listed either first alphabetically, then chronologically, or vice versa.

Examples: 'as demonstrated (Allan, 2000a, 2000b, 1999; Allan and Jones, 1999)....
Or, as demonstrated (Jones, 1999; Allan, 2000)... Kramer et al. (2010) have recently shown...'

List: References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters 'a', 'b', 'c', etc., placed after the year of publication.

Appendix B: PRISMA 2020 checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	x
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	x
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	x
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	x
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	x
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	x
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	x
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	x
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	x
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	x
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	x
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	x
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	x
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	x

Section and Topic	Item #	Checklist item	Location where item is reported
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	x
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	x
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	x
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	x
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	x
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	x
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	x
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	x
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	x
Study characteristics	17	Cite each included study and present its characteristics.	x
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	x
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	x
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	x
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	x
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	x
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	x
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	x

Section and Topic	Item #	Checklist item	Location where item is reported
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	x
	23b	Discuss any limitations of the evidence included in the review.	x
	23c	Discuss any limitations of the review processes used.	x
	23d	Discuss implications of the results for practice, policy, and future research.	x
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	x
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	x
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	x
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	To be included in journal submission
Competing interests	26	Declare any competing interests of review authors.	To be included in journal submission
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	To be included in journal submission

Appendix C: MeSH terms

CINAHL

Injuries, self-inflicted
Self-injurious behaviour
Rumination (Cognition)

PsycInfo

Rumination (Cognitive Process)
Self-injurious behaviour

Medline

Self-injurious behaviour
Rumination, Cognitive

Appendix D: Papers excluded from the review

Burke et al. (2015) – reports on the same data as Burke et al. (2018). Burke et al. (2018) chosen for the review as more participant data was included.

Cohen et al. (2015) – reports on the same data as Burke et al. (2018). Burke et al. (2018) chosen for the review as more participant data was included.

Hilt (2009) – unpublished thesis version of Hilt, Cha and Nolen-Hoeksema (2008).

Selby (2012) – unpublished thesis version of Selby et al. (2013).

Selby and Joiner (2013) – reports on the same data as Selby et al. (2013). Selby et al. (2013) chosen for this review as data more applicable to meta-analyses (correlations between NSSI and rumination provided).

Short et al. (2015) – the question used to screen for NSSI, “Have you ever cut, burned, or scratched yourself on purpose?”, does not specify that this needed to be non-suicidal.

Tilton-Weaver et al. (2019) – statistics needed for the meta-analyses (association between NSSI and rumination) not reported.

Voon et al. (2014)b – reports on the same data as Voon et al. (2014)a. Voon et al. (2014)a chosen for the review as data more applicable to meta-analyses (group differences and correlations between NSSI and no-NSSI provided).

Voon et al. (2014)c – reports on the same data as Voon et al. (2014)a. Voon et al. (2014)a chosen for the review as more participant data was included.

Zaki et al. (2013) – the outcome variable used was combined NSSI acts and urges. This was not applicable to the current review as the outcome was NSSI behaviour only.

References

- Burke, T.A., Stange, J.P., Hamilton, J.L., Cohen, J.N., O'Garro-Moore, J., Daryanani, I., Abramson, L.Y., Alloy, L.B., 2015. Cognitive and emotion-regulatory mediators of the relationship between behavioral approach system sensitivity and nonsuicidal self-injury frequency. *Suicide Life Threatening Behav.* 45, 495-504. <https://doi.org/10.1111/sltb.12145>
- Cohen, J.N., Stange, J.P., Hamilton, J.L., Burke, T.A., Jenkins, A., Ong, M.-L., Heimberg, R.G., Abramson, L.Y., Alloy, L.B., 2015. The interaction of affective states and cognitive vulnerabilities in the prediction of non-suicidal self-injury. *Cogn. Emot.* 29, 539-547. <https://doi.org/10.1080/02699931.2014.918872>
- Hilt, L.M., unpublished. A biopsychosocial approach to rumination in young adolescent girls. *Diss. Abstr. Int.* 70, 3783.
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- Selby, E.A., Joiner, T.E., Jr., 2013. Emotional cascades as prospective predictors of dysregulated behaviors in borderline personality disorder. *Personal. Disord.* 4, 168-174. <https://doi.org/10.1037/a0029933>
- Short, N.A., Ennis, C.R., Oglesby, M.E., Boffa, J.W., Joiner, T.E., Schmidt, N.B., 2015. The mediating role of sleep disturbances in the relationship between posttraumatic

- stress disorder and self-injurious behavior. *J. Anxiety Disord.* 35, 68-74.
<https://doi.org/10.1016/j.janxdis.2015.09.004>
- Tilton-Weaver, L., Marshall, S.K., Svensson, Y., 2019. Depressive symptoms and non-suicidal self-injury during adolescence: Latent patterns of short-term stability and change. *J. Adolesc.* 75, 163-174. <https://doi.org/10.1016/j.adolescence.2019.07.013>
- Voon, D., Hasking, P., Martin, G., 2014b. Emotion regulation in first episode adolescent non-suicidal self-injury: What difference does a year make? *J. Adolesc.* 37, 1077-1087. <https://doi.org/10.1016/j.adolescence.2014.07.020>
- Voon, D., Hasking, P., Martin, G., 2014c. The roles of emotion regulation and ruminative thoughts in non-suicidal self-injury. *Br. J. Clin. Psychol.* 53, 95-113. <https://doi.org/10.1111/bjc.12030>
- Zaki, L.F., Coifman, K.G., Rafaeli, E., Berenson, K.R., Downey, G., 2013. Emotion differentiation as a protective factor against nonsuicidal self-injury in borderline personality disorder. *Behav. Ther.* 44, 529-540.
<https://doi.org/10.1016/j.beth.2013.04.008>

Appendix E: Risk of bias assessment tool

Risk of Bias of observational studies

General instructions: Grade each criterion as “Yes,” “No,” “Partially,” or “Can’t tell.” Factors to consider when making an assessment are listed under each criterion. Note that some criteria will only apply to specific types of study. For example, power calculations are relevant for studies aiming to compare suicide risk between two groups, or studies that look at correlates of study outcomes. Where a criterion only applies to a specific design, it is in italics. The examples given for studies meeting, or not meeting, criterion may not apply in every instance. The review team should carefully consider any adaptations needed to this tool and ensure these are implemented prior to starting the Risk of Bias assessment.

Criteria	Yes - criteria met	No - criteria not met
<p>Unbiased selection of the cohort?</p> <p>To consider: is the sample representative of the population of interest?</p> <p>What is the risk of self-selection bias?</p>	<ul style="list-style-type: none"> • True random sample or method that approximates this (e.g. stratified cluster sampling). • All potentially eligible consecutive referrals at a service or clinic are invited to take part in the study • All patients at a service or students within a University are invited - In this case potential participants still have the option to say no and not participate, and so self-selection bias is introduced, but the means of identifying and approaching potential participants does not impose further risk of self-selection. 	<ul style="list-style-type: none"> • Method of sampling liable to introduce substantive self-selection bias • Snowball sampling • Advertising placed in selected locations (e.g. waiting rooms, around University campus) • Advertising via social media <p>CONSIDER PARTIAL RATING IF:</p> <p>Recruitment methods above are used, where self-selection bias likely, but a wider range of recruitment sites or sources are used (e.g. social media and clinical services and community groups) so that the impact of self-selection might be limited.</p>
<p><i>Selection minimizes baseline differences in demographic factors (For controlled studies only)?</i></p> <p>To Consider: Are the groups being compared likely to differ on</p>	<ul style="list-style-type: none"> • Groups matched on key demographics (age, gender) • Recruitment procedure otherwise ensures 	<ul style="list-style-type: none"> • Groups not matched • Notable differences between groups on relevant demographics

<p>important demographic factors (e.g. age, ethnicity, socio-economic status)</p>	<p>groups are highly similar on relevant demographic variables</p>	<ul style="list-style-type: none"> Note that even where significant differences on demographic variables between groups are not present this does not rule out the possibility of meaningful differences being present, especially in studies with small samples where power is likely lacking to detect such group differences
<p><i>Sample size calculated (for controlled studies and where studies test for predictors/correlates of outcome)?</i></p>	<ul style="list-style-type: none"> Sample size is justified with power calculation, simulation or other appropriate method Eventual sample size does not deviate by $\geq 10\%$ from the sample size suggested 	<ul style="list-style-type: none"> No justification of sample size is given
<p>Adequate description of the cohort?</p>	<ul style="list-style-type: none"> Age and gender are reported Ethnicity reported (may be partial rating if this is missing) Other information concerning participants' demographic background such as education, employment or socio-economic status is given (may be partial rating if this is missing). 	<ul style="list-style-type: none"> Sample age and gender not reported
<p>Validated method for ascertaining clinical status or participant group</p> <p>Note: this also includes samples with a common, clinically relevant, status, such as survivors of sexual abuse</p>	<ul style="list-style-type: none"> Validated instrument used to determine relevant clinical status Valid method of ascertaining diagnosis or clinical 'caseness' (e.g., clinical interview) 	<ul style="list-style-type: none"> This will depend on researchers' discretion over what constitutes a valid method of ascertaining this information, but non-valid methods may include:

<p>To consider: What is the risk of individuals being incorrectly identified (false positives and negatives)</p>		<ul style="list-style-type: none"> • Self-report (or self-report when not obtained through a validated assessment tool) • Chart diagnoses or reliance on medical notes not otherwise confirmed by researchers
<p>Validated methods for assessing predictor or risk variables</p>	<ul style="list-style-type: none"> • Measures used have been previously validated in other research with evidence of acceptable reliability and validity <p>CONSIDER PARTIAL RATING IF:</p> <p>The measure has previously been validated but in the current study sample has poorer psychometric properties such as an internal reliability below .6</p>	<ul style="list-style-type: none"> • Tool or measure developed specifically for the study • No psychometric evaluation undertaken, or very minimal evaluation (e.g. internal consistency only) <p>CONSIDER PARTIAL RATING IF:</p> <p>The measure has not previously been validated but in the current study sample good evidence of psychometric properties is shown, such as good reliability or results of factor analysis.</p>
<p>Validated methods for assessing outcome or criterion variable</p>	<ul style="list-style-type: none"> • Measures used that has been previously validated in other research with evidence of acceptable reliability and validity • Other valid process for determining outcome may include clinical diagnosis or coroner reports (e.g. if outcome is suicide) <p>CONSIDER PARTIAL RATING IF:</p> <p>The measure has previously been validated but in the</p>	<ul style="list-style-type: none"> • Tool or measure developed specifically for the study • No psychometric evaluation undertaken, or very minimal evaluation (e.g. internal consistency only) <p>CONSIDER PARTIAL RATING IF:</p> <p>The measure has not previously been validated but in the current study</p>

	current study sample has poorer psychometric properties such as an internal reliability below .6	sample good evidence of psychometric properties is shown, such as good reliability or results of factor analysis.
<p>Outcome assessments blind to diagnostic/clinical/participant status</p> <p>To consider: What is the risk that researchers awareness of a participant's background or scoring on a particular study variables informs other assessments they conduct or facilitate</p>	<ul style="list-style-type: none"> • Researchers undertaking assessments are blind to the status of the participant (i.e. their scoring on relevant risk, predictor or outcome variables) • For online studies or other methodologies where participants complete assessments without any direct contact with a researcher this item is not applicable (may also include secondary analysis of records collected for other purposes, such as coroner or hospital records) 	<ul style="list-style-type: none"> • Data collection involves face-to-face contact with a researcher and no attempt at blinding or masking is made. • If blinding or masking is not mentioned the assumption is made that this did not take place
<p><i>Adequate follow-up period (longitudinal studies only)</i></p>	<ul style="list-style-type: none"> • Follow-up period is of adequate length to allow fluctuations in outcome. This might need to be longer for outcomes with low base rate, like suicide attempts (e.g., 1 year) but could be shorter for more common outcomes like suicidal ideation (e.g. 6 months). A reasonable period should be agreed a priori by research team for each outcome • If uncertainty about follow-up period, this is adequately justified in the paper 	<ul style="list-style-type: none"> • Follow-up period is too short to realistically capture fluctuations in outcome.
<p>Missing data is minimal</p>	<ul style="list-style-type: none"> • Missing data from any group does not exceed 20% 	<ul style="list-style-type: none"> • Missing data exceed 20% and is not suitably managed.

	<ul style="list-style-type: none"> • Missing data is present but suitable steps are taken to minimize bias (e.g. sensitivity analysis or imputation). • In longitudinal studies consider attrition over time as a form of missing data. Note that the criteria of < 20% missing data may be unrealistic over longer follow-up periods. 	
Analysis controls for confounding	<ul style="list-style-type: none"> • A set of key confounds should be identified <i>a priori</i> (it is not realistic for study to control for all potential confounders, but aim is to identify probable confounders where there is evidence these could bias findings if not adjusted for) • At least one of these confounders is accounted for. 	<ul style="list-style-type: none"> • None of the pre-established confounders are adjusted for within analyses.
Analytic methods appropriate	<ul style="list-style-type: none"> • Analysis was appropriate given the type of data (categorical, continuous, etc.), and type of association being tested. • Analysis takes into account issues such as clustering, rare outcomes, multiple comparisons, etc. 	<ul style="list-style-type: none"> • Analysis was not suitable given the type of data or type of associations being tested

Appendix F: Risk of bias assessment consensus

Unbiased selection of the cohort: As described in tool.

Selection minimises baseline differences in demographic factors: This criterion was not used as separate groups were not recruited. Where there was a no-NSSI control group, differences in characteristics (e.g., age, gender) were deemed to be of clinical importance rather than bias in selection.

Sample size calculated: As described in tool.

Adequate description of the cohort: This criterion was not used as (non-) reporting of the description of the study cohort was deemed to reflect reporting quality rather than inherent bias.

Validating method for ascertaining clinical status or participant group: As described in tool.

Validated methods for assessing predictor or risk variables: As described in tool.

Validated methods for assessing outcome or criterion variable: As described in tool.

Outcome assessments blind to diagnostic/clinical/participant status: As described in tool.

Adequate follow-up period (longitudinal studies only): As described in tool.

Missing data is minimal: As described in tool.

Analysis controls for confounding: As described in tool.

Analytic methods appropriate: As described in tool.

Appendix G: DerSimonian-Laird results

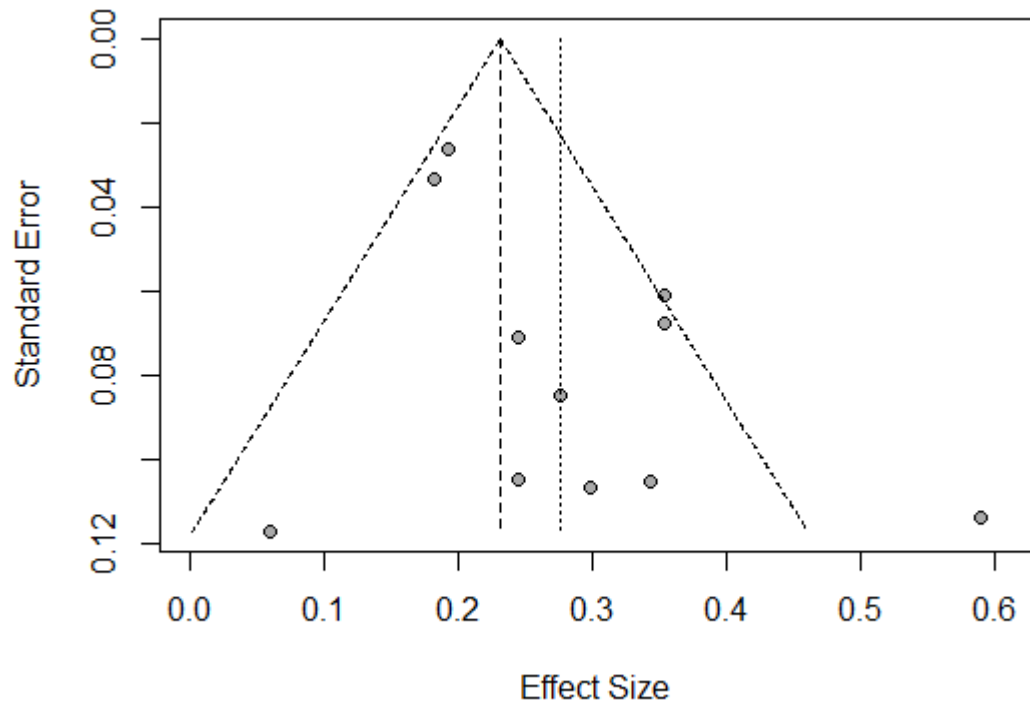
Rumination	<i>k (outliers removed)</i>	<i>d (outliers removed)</i>	Confidence Interval (<i>outliers removed</i>)	<i>I² (outliers removed)</i>
Brooding	3	0.50	0.32-0.67	0.0%
Depressive	3	0.79	0.22-1.36	82.7%
Transdiagnostic	6	0.62	0.51-0.74	49.8%
Overall	15 (13)	0.62 (0.62)	0.52-0.73 (0.54-0.70)	78.4% (45.8%)

Appendix H: Moderator analysis results

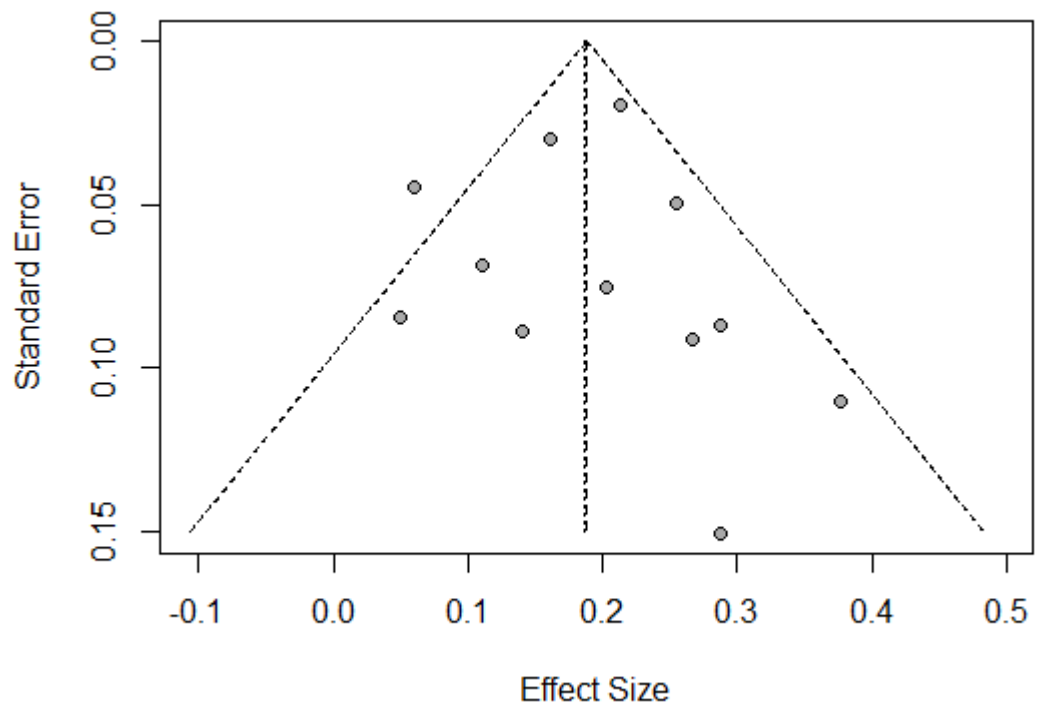
Predictor and outcome	Adolescent sample	University student sample	Adult sample	Q	p-value
Depressive rumination and NSSI frequency	k = 3; r = 0.18 (CI = 0.11 - 0.24)	k = 5; r = 0.34 (CI = 0.24 - 0.44)	k = 3; r = 0.27 (CI = 0.18 - 0.37)	7.91	0.019*
Transdiagnostic rumination and NSSI frequency	k = 3; r = 0.21 (CI = 0.08 - 0.34)	k = 7; r = 0.17 (CI = 0.09 - 0.24)	k = 2; r = 0.22 (CI = 0.08 - 0.34)	0.62	0.732
Overall rumination and NSSI frequency	k = 9; r = 0.23 (CI = 0.13 - 0.32)	k = 14; r = 0.26 (CI = 0.20 - 0.32)	k = 5; r = 0.25 (CI = 0.17 - 0.33)	0.27	0.874
Overall rumination and NSSI history	k = 7; d = 0.67 (CI = 0.38 - 0.96)	k = 8; d = 0.59 (CI = 0.51 - 0.66)	N/A	0.45	0.504

Appendix I: Funnel plots

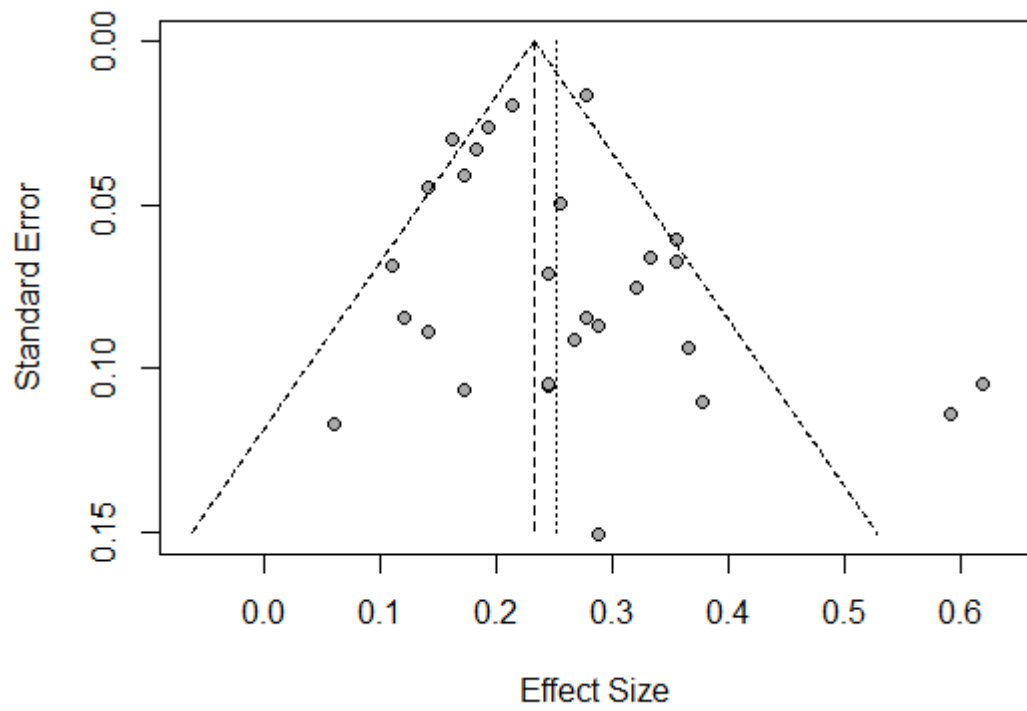
NSSI frequency and depressive rumination



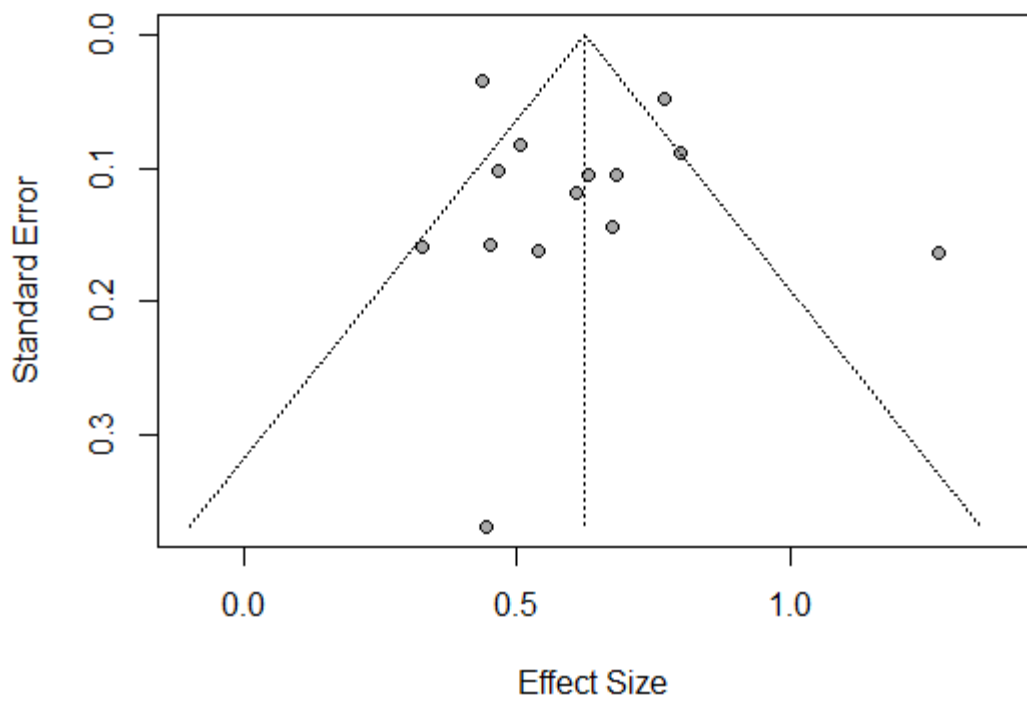
NSSI frequency and transdiagnostic rumination



NSSI frequency and overall rumination



NSSI history and overall rumination



Appendix J: Author guidelines for Psychological Medicine

Submission of manuscripts

Manuscripts should be submitted online via our manuscript submission and tracking site, <http://www.editorialmanager.com/psm/>. Full instructions for electronic submission are available directly from this site. To facilitate rapid reviewing, communications for peer review will be electronic and authors will need to supply a current e-mail address when registering to use the system.

Papers for publication from Europe, (except those on genetic topics, irrespective of country), and all papers on imaging topics, should submitted to the UK Office.

Papers from the Americas, Asia, Africa, Australasia and the Middle East, (except those dealing with imaging topics), and all papers dealing with genetic topics, irrespective of country, should be sent to US Office.

Please see the below table for the types of papers accepted:

Article Type	Usual Max Word count*	Abstract	References	Tables/figures**	Supplementary material online only
Original article	4500	250 words, structured, using subheadings Background, Methods, Results, Conclusions	APA style – see elsewhere in this document for full details	Usually up to 5 total	Yes
Review article	4500	250 words, not structured	APA style	Usually up to 5 total	Yes
Editorial	3500	No	APA style	Usually up to 5 total	Yes
Correspondence***	1500	No	max 20 APA style	Max 1	No
Commentary	2000 By invitation of editor	No	max 20 APA style	Not usually	Yes

*** Editors may request shortening or permit additional length at their discretion in individual cases**

**** May be adjusted in individual cases at Editors' discretion**

***** Please note, Correspondence papers must be in response to content published in *PSM***

NOTE:

1. 1. Figures should be submitted as discrete files, not embedded in the text of the main document.
2. 2. Supplementary material for online only should be submitted as discrete files, not as part of the main text.

Generally papers should not have text more than 4500 words in length (excluding abstract, tables/figures and references) and should not have more than a combined total of 5 tables and/or figures. Papers shorter than these limits are encouraged. For papers of unusual importance the editors may waive these requirements. Articles require a structured abstract of no more than 250 words including the headings: Background; Methods; Results; Conclusions. Review Articles require an unstructured abstract of no more than 250 words. The name of an author to whom correspondence should be sent must be indicated and a full postal address given in the footnote. Any acknowledgements should be placed at the end of the text (before the References section).

Contributors should also note the following:

1. 1. S.I. units should be used throughout in text, figures and tables.
2. 2. Authors should spell out in full any abbreviations used in their manuscripts.
3. 3. Foreign quotations and phrases should be followed by a translation.
4. 4. If necessary, guidelines for statistical presentation may be found in: **Altman DG., Gore SM, Gardner, MJ. Pocock SJ.** (1983). Statistical guidelines for contributors to medical journals. *British Medical Journal* **286**, 1489-1493.

Appendix K: Ethical approval letter



Research Governance, Ethics and Integrity
 2nd Floor Christie Building
 The University of Manchester
 Oxford Road
 Manchester
 M13 9PL
 Tel: 0161 275 2206/2674
 Email: research.ethics@manchester.ac.uk

Ref: 2019-7445-11947

14/10/2019

Dear Mr Brendan Dunlop, Dr Peter Taylor, Dr Samantha Hartley

Study Title: Self-Injury in young Bisexual people: a Longitudinal investigation (SIBL)

University Research Ethics Committee 3

I write to thank you for submitting the final version of your documents for your project to the Committee on 01/10/2019 13:10 . I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form and supporting documentation as submitted and approved by the Committee.

Please see below for a table of the title, version numbers and dates of all the final approved documents for your project:

Document Type	File Name	Date	Version
Statistical Review	Simulated Power Analysis	05/07/2019	1
Data Management Plan	Data Management Plan	12/07/2019	1
Default	INQ measure	14/07/2019	1
Default	SRI measure	14/07/2019	1
Additional docs	Face to face and skype email 16.07.19	16/07/2019	1
Additional docs	Debrief email - entered 16.07.19	16/07/2019	1
Additional docs	Debrief email - not entered 16.07.19	16/07/2019	1
Default	BSRI measure	17/07/2019	1
Distress Protocol/Debrief Sheet	SIBL risk protocol 17.07.19	17/07/2019	1
Default	Demographics measure	23/07/2019	1
Additional docs	Research Sub-Committee Approval	02/08/2019	1
Default	SITBI-SF v2 measure 27.09.19	27/09/2019	2
Default	Brief ABES v2 27.09.19	27/09/2019	2
Default	Self Compassion Scale v2 27.09.19	27/09/2019	2
Advertisement	Recruitment poster v2 27.09.19	27/09/2019	2
Additional docs	Message to be circulated on social media pages v2 27.09.19	27/09/2019	2
Additional docs	Letters of support for study 27.09.19	27/09/2019	2
Additional docs	Twitter social media message v1 27.09.19	27/09/2019	2
Participant Information Sheet	Participant Info Sheet v2 30.09.19	30/09/2019	2
Consent Form	Consent form v2 30.09.19	30/09/2019	2
Additional docs	Consent to Contact Form v2 30.09.19	30/09/2019	2
Additional docs	Response to UREC 30.09.19	30/09/2019	1
Default	ABUSI v2 30.09.19	30/09/2019	2

This approval is effective for a period of five years however please note that it is only valid for the specifications of the research project as outlined in the approved documentation set. If the project continues beyond the 5 year period or if you wish to propose any changes to the methodology or any other specifics within the project, an application to seek an amendment must be submitted for review. Failure to do so could invalidate the insurance and constitute research misconduct.

You are reminded that, in accordance with University policy, any data carrying personal identifiers must be encrypted when not held on a secure university computer or kept securely as a hard copy in a location which is accessible only to those involved with the research.

Reporting Requirements:

You are required to report to us the following:

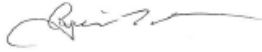
1. [Amendments](#): Guidance on what constitutes an amendment
2. [Amendments](#): How to submit an amendment in the ERM system
3. [Ethics Breaches and adverse events](#)
4. [Data breaches](#)
5. [Notification of progress/end of the study](#)

Feedback

It is our aim to provide a timely and efficient service that ensures transparent, professional and proportionate ethical review of research with consistent outcomes, which is supported by clear, accessible guidance and training for applicants and committees. In order to assist us with our aim, we would be grateful if you would give your view of the service that you have received from us by completing a **UREC Feedback Form**. Instructions for completing this can be found in your approval email.

We wish you every success with the research.

Yours sincerely,





Mrs Genevieve Pridham

Secretary to University Research Ethics Committee 3

Appendix L: Recruitment poster

Version 2, 27/09/19



Warning: discussion of difficult and potentially triggering subjects of sexuality and self-injury

Self-Injury in young Bisexual people: A Longitudinal investigation (SIBL)

The SIBL research project (based in the Division of Psychology and Mental health) aims to investigate the **psychological experiences** that are associated with **non suicidal self-injury** amongst **young bisexual people**

We aim to investigate this relationship by asking participants to complete an online survey once a week for 6 weeks

If you are...

- ✓ Aged 16 – 25 years old

And...

- ✓ Have experienced non-suicidal thoughts or urges to self-injure and/or have self-injured with no suicidal intent within the last six months

And...

- ✓ Identify as bisexual or as attracted to more than one gender

Scan me!



Visit the website on the tear off strips below if you would like to be contacted by a researcher to find out more information. Alternatively, email SIBL@manchester.ac.uk or search SIBL on Instagram, Facebook or Twitter! If you wish to take part you will first be invited to a phone conversation (or meeting if preferred). Participants will be entered into 6 prize draws with an Amazon voucher available for each draw.

SIBL research study http://man.ac.uk/9y19jl
SIBL research study http://man.ac.uk/9y19jl
SIBL research study http://man.ac.uk/9y19jl
SIBL research study http://man.ac.uk/9y19jl
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SIBL research study http://man.ac.uk/9y19jl
SIBL research study http://man.ac.uk/9y19jl

Appendix M: Recruitment video

Available to view on YouTube - <https://youtu.be/Xgha8pznyI8>

Appendix N: Article by bisexual activist in Gay Star News

It's time to lift the lid on what's really happening in bisexual people's lives

19 May 2020

- We must all pull together and help the cause – by taking part

Research is the roadmap that can lead us all to equality.

It highlights how the experience of different people compare to 'the average person.' It lets us know when certain sexualities, races or genders are more at risk of health problems, discrimination or poverty. Only then can we hope to solve those problems.

Sadly for bisexual people, research in to their lived experience is limited. That means the problems they face are less likely to improve.

There has always been a lack of research specifically about bisexual issues. Indeed, researchers often seem unable to identify unique issues impacting bisexuals to explore.

For example, there has been no research that has looked at condom use by bisexuals. As a result, we currently have no idea if bi people are more or less likely to use a condom with a man or a woman.

Bisexuals aren't exactly like other LGBT+ people

Because we don't explore those issues, it has a knock-on effect. In health, if we don't know bisexual people are more at risk of certain things, we can't hope to correct the problem.

We can't educate bi people or even warn health workers what they need to be on the lookout for. We also risk bisexuals not taking part in health conversations.

Meanwhile another factor is often uncomfortable to talk about. Looking at bisexuals only under the LGBT+ umbrella is, for all intents and purposes, pointless.

This is particularly true for research. For example, when we see reports that show LGBT+ people are more at risk of self-harm, it really does not tell us much about bi people in particular.

The reasons a trans woman may self-harm are often far removed from the reasons a bi man may do so.

Of course, we want to keep a community spirit. However, it's important we understand the unique factors and solutions for each subgroup of the LGBT+ community.

But the tide is turning. Increasingly researchers are becoming aware of the unique differences faced by bisexuals. They are making efforts to bridge the gaps in knowledge. And we need all bisexuals to support them.

Taking part in research means 100% more than your angry tweet

One of the hurdles researchers usually face is getting enough bisexuals to take part for their findings to have weight.

Bisexuals are the least likely of every subgroup of the LGBT+ community to be out of the closet. That makes it harder to find them and even harder to study them.

One group trying to bridge the gap in knowledge is a team of researchers at The University of Manchester in northwest England. They are seeking bisexual people to help them understand Non-suicidal Self-Injury (NSSI).

In particular, they want to examine the psychological factors or processes associated with NSSI in young bisexual people.

They are [looking for people aged 16 to 25](#), who are attracted to more than one gender and who have had non-suicidal self-injury thoughts, urges or behaviour in the previous six months.

As Brendan Dunlop, one of the team, says: ‘If we can find out which psychological factors seem to be linked to NSSI, then we can begin to plan how to address this. This is vitally important because there are some difficulties that bisexual people face, that other sexualities don’t.’

Taking part in research like this means 100% more than your angry tweet, the fact that you happen to be comfortable with your sexuality or that you don’t feel comfortable with the word bisexual being used to describing you.

We must all pull together and help the cause. That starts by being open to research so that we can highlight the issues we face.

Only then can we make a plan for correcting inequalities and ensure that future generations of bisexuals have just as much chance in the world as everyone else.

Lewis Oakley campaigns for bisexual visibility.

Appendix O: Consent to Contact Form

Version 2

30/09/19

Consent to contact form



The University of Manchester

Self-Injury in young Bisexual people, a Longitudinal investigation (SIBL)

If you are interested in taking part or finding out more about the SIBL study, then please let us know whether it's OK for a member of the research team to contact you. This is so a researcher can explain more about the study and what it involves. Any data you provide will be held securely and kept completely confidential at the University of Manchester, in accordance with the Data Protection Act (2018).

- I am aged between 16 and 25 years old
- I am attracted to individuals of more than one gender and/or identify as bisexual
- I have had urges to injure myself (without wanting to die) or have injured myself (without wanting to die) in the last 6 months
- I give permission for my personal details to be shared with the research team, so a member of the research team can contact me to discuss the study further.

First name: _____

Last Name: _____

Mobile number: _____

Email address: _____

Do you have a preference about the gender of the person you speak to?

- Male Female No preference

Appendix P: Participation Information Sheet



The University of Manchester

Self-Injury in young Bisexual people: A Longitudinal investigation (SIBL)

Participant Information Sheet (PIS)

You are being invited to take part in a research study looking at the relationship between different social and psychological experiences (rumination, belonging, self-esteem and biphobia) and non-suicidal self-injury (NSSI) urges in young bisexual people. NSSI refers to when someone intentionally hurts themselves without wishing to end their life. This can include a wide range of experience such as cutting oneself or ingesting a toxic substance. Before you decide whether to take part, it is important for you to understand why the research is being conducted and what it will involve. Please take time to read the following information carefully before deciding whether to take part and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Thank you for taking the time to read this.

About the research

➤ Who will conduct the research?

The research is being carried out by a research team in the Department of Clinical Psychology at the University of Manchester. The researchers who you will be in contact with are Brendan and Sophie. They are Trainee Clinical Psychologists at the university. This research is being overseen by senior researchers called Dr Peter Taylor and Dr Sam Hartley.

➤ What is the purpose of the research?

Research has shown that young people who identify as lesbian, gay or bisexual are at a much higher risk of NSSI than people who identify as straight. It is thought that this may be due to experiences of discrimination and stigma. Recently, it has been found that bisexual people are at a higher risk of NSSI than lesbian or gay people. At the moment, we are not sure why this is and the purpose of this research is to find out if different psychological factors link to NSSI for young bisexual people.

You have been chosen to take part in this study because you:

- Are aged between 16-25.
- Are attracted to individuals of more than one gender and/or identify as bisexual.
- Have had non-suicidal urges/thoughts to self-injure or have self-injured in the last six months.
- Own a mobile phone/computer and have access to email.
- Feel comfortable in your ability to use the internet.
- Understand and speak English.

We are expecting to recruit 200 participants in total to take part in this research.

➤ **Will the outcomes of the research be published?**

This research study will be written up as two doctoral theses and submitted for publication in academic journals. This research may also be discussed in conference presentations. You will not be identified in any reports, publications or presentations. You will be given the chance to request the results of the study.

All answers you give will be treated in the **strictest of confidence** and will be handled **securely** throughout the study. All data will be kept confidential in accordance with the Data Protection Act (2018).

➤ **Who has reviewed the research project?**

This project has been independently reviewed by the University of Manchester Research Ethics Review Committee 3 (Approval reference: 2019-7445-11947).

What would my involvement be?

➤ **What would I be asked to do if I took part?**

If you agree to be contacted, a researcher will phone you to discuss the study further and answer any questions you may have. If preferred, you will have the option to meet the researchers face-to-face at the University of Manchester or via Skype.

If you confirm that you would like to take part, you will be sent a link to a consent form to read and sign. **If you consent to take part, you can still withdraw from the research at any time without any negative consequences, and for any reason at all.**

Following this, you will be sent a link via text and email which will take you to an online survey to complete. This will first require you to answer questions about yourself (such as sexuality and ethnicity) and some questions about your wellbeing. Other parts of the questionnaire include questions on self-esteem, experiences of biphobia and self-injury over the last week. An example of one of these questions is “in the last week, how often have you thought about injuring yourself or how you want to injure yourself?” This will take approximately 20-30 minutes to complete.

Once a week for the next five weeks you will be asked to complete a shorter version of this survey. This will be focused on your experiences over the last week and will take approximately 10-15 minutes to complete each time. You will receive a text message and email when it is time to complete the survey, which will include a link that will take you straight to the survey. In weeks 3 and 6 of the study, the researcher will contact you either by phone or email (whichever you prefer) to answer any questions you have and see how you are finding the study.

➤ **Will I be compensated for taking part?**

You will not be compensated for taking part in this study. However, each participant will be entered into a prize draw for each weekly survey they complete. There are 6 prize draws each with a £50 Amazon voucher prize.

➤ **What happens if I do not want to take part or if I change my mind?**

It is up to you to decide whether or not to take part. If you wish to hear more about the study you can consent to be contacted by one of the researchers, who will be able to explain more about the study and answer any questions you may have. Even if you consent to be contacted you don't have to go ahead and take part. If you do decide to take part you will be given this information sheet to keep and will be asked to complete an online consent form. If you decide to take part you are still free to withdraw at any time without giving a

reason and without any negative consequences. To withdraw, you just need to contact the research team (SIBL@manchester.ac.uk) and let them know that you no longer wish to take part. You can also request that your study data is destroyed by informing the research team. However, it will not be possible to remove your data from the project once it has been anonymised (April 2021) as we will not be able to identify your specific data. This does not affect your data protection rights. If you decide not to take part you do not need to do anything further.

➤ **What are the risks of taking part?**

This study is about potentially difficult subjects, including non-suicidal self-injury and sexuality. There is a risk that you may become upset by the content of this research. You may be asked questions in the surveys which are difficult and sensitive. You have the right to choose not to answer any questions that you do not feel comfortable answering. You also have the right to withdraw from this study at any time, for any reason.

Data Protection and Confidentiality

➤ **What information will you collect about me?**

In order to participate in this research project we will need to collect information that could identify you, called “personal identifiable information”. Specifically we will need to collect:

- Demographic information such as your age, gender, sexuality, ethnicity, marital status, employment status
- Information about psychological experiences (e.g. self-esteem, belonging, rumination – a type of thinking style when we go over things again and again)
- Information about experiences of biphobia
- Information about non-suicidal self-injury and wellbeing

➤ **Under what legal basis are you collecting this information?**

We are collecting and storing this personal identifiable information in accordance with data protection law which protect your rights. These state that we must have a legal basis (specific reason) for collecting your data. For this study, the specific reason is that it is “a public interest task” and “a process necessary for research purposes”.

➤ **What are my rights in relation to the information you will collect about me?**

You have a number of rights under data protection law regarding your personal information. For example you can request a copy of the information we hold about you.

If you would like to know more about your different rights or the way we use your personal information to ensure we follow the law, please consult our [Privacy Notice for Research](#).

A summary of the study, including the results, will be emailed to everyone who requested this on their consent form. This summary will also be circulated on social media. No participants will be identifiable from this summary.

➤ **Will my participation in the study be confidential and my personal identifiable information be protected?**

In accordance with data protection law, The University of Manchester is the Data Controller for this project. This means that we are responsible for making sure your personal information is kept secure, confidential and used only in the way you have been told it will be used. All researchers are trained with this in mind, and your data will be looked after in the following way:

All responses will be kept confidential. We will do this by assigning you a participant number when you begin the study, and keeping any identifiable information separate to the other answers you give us. This means that no one will know your identity or which answers are yours. Your contact details will be kept for the duration of the project. All your responses will only be viewed by the researchers involved in the study. Upon completion of the study (April 2021), we will make all your data anonymous, by deleting all the personal, identifiable information we have about you. Information collected for this research project will be kept safely and securely on a University of Manchester password-protected computer. Anonymous data will be kept for 10 years after the study, in line with the University of Manchester policy for the storage of research data. If you agree, then your anonymous data could be used in other research projects.

➤ **Under what circumstances would my confidentiality be breached?**

As indicated on the consent form, if during the course of your participation in this study we have concerns about your immediate safety or the safety of others, we may have to speak to another healthcare professional. We will speak to you before we do this to ask you if there is a particular professional you would prefer us to speak to. This could be your GP, a social worker or any other healthcare professional that you identify. Alternatively, we will contact emergency services and direct them to your last known location.

Please also note that individuals from The University of Manchester or regulatory authorities may need to look at the data collected for this study to make sure the project is being carried out as planned. This may involve looking at identifiable data. All individuals involved in auditing and monitoring the study will have a strict duty of confidentiality to you as a research participant.

What if I have a complaint?

If you wish to complain or have any concerns about any aspect of the way you have been treated during this study, you can approach the research team.

➤ **Contact details for complaints**

If you have a complaint that you wish to direct to members of the research team, please contact the primary research supervisor **DR PETER TAYLOR** on peter.taylor-2@manchester.ac.uk or 0161 306 0425.

If you wish to make a formal complaint to someone independent of the research team or if you are not satisfied with the response you have gained from the researchers in the first instance then please contact:

The Research Governance and Integrity Officer, Research Office, Christie Building, The University of Manchester, Oxford Road, Manchester, M13 9PL, by emailing: research.complaints@manchester.ac.uk or by telephoning 0161 275 2674.

If you wish to contact us about your data protection rights, please email dataprotection@manchester.ac.uk or write to The Information Governance Office, Christie Building, The University of Manchester, Oxford Road, M13 9PL at the University and we will guide you through the process of exercising your rights.

You also have a right to complain to the [Information Commissioner's Office about complaints relating to your personal identifiable information](#) Tel 0303 123 1113.

Contact Details

If you have any queries about the study or if you are interested in taking part then please contact the researcher(s) **BRENDAN DUNLOP** or **SOPHIE COLEMAN** by emailing SIBL@manchester.ac.uk or by calling [insert project phone numbers].

Support organisations

If you would like to speak to someone about any issues raised by reading this participant information sheet, or need support for mental health/sexuality concerns/self-injury, below are four organisations you can contact:

Samaritans (emotional/self-harm/sexuality support): 116 123

Papyrus (suicide prevention): 0800 068 4141

YoungMinds (emotional/self-harm/sexuality support): Text YM to 85258

LGBT Foundation (sexuality support): 0345 330 3030

Appendix Q: Risk protocol

Self-Injury in Bisexual People: a Longitudinal Investigation (SIBL) Risk Protocol

The SIBL study involves limited direct contact between participants and researchers. This includes an initial pre-consent telephone conversation (or face to face/Skype conversation, if this is preferable to the individual), and one or two “check-in” telephone calls during the study follow-up period. This risk protocol outlines a) general principles for mitigating risk and distress during the study, b) specific procedures to follow where risk is or distress is communicated by an individual, either during telephone contacts or via email.

General principles

A realistic and genuine discussion should be had with all potential participants during the first contact (prior to consent being taken) about the possibility of distress/risk during the study, and what might be a helpful response if this were to happen for them.

This discussion should cover helpful contacts or available sources of support (both formal such as NHS services, and informal, such as family and friends), any current risk management planning and other strategies they find helpful at times of distress. All potential participants will be supplied by email with contact details of support organisations (e.g. Samaritans/ Papyrus/YoungMinds/LGBT Foundation). This signposting information will also be available as part of the automatic reply to any emails sent to the project email address.

Another goal of this discussion is to explain the limits of confidentiality and discuss how to manage this should issues arise. Furthermore, during this discussion it should be agreed what actions will be taken by both potential participant and researcher if risk becomes apparent, with the emphasis (where possible given the context and level of risk) upon the researcher and potential participant building understanding and trust. Just as the researcher can be trusted to follow ethical and research standards, the potential participant should also be ‘trusted’ to know how to manage their emotions and feelings.

The researcher should also explain to the potential participant that the study email account will not be checked consistently throughout each day, or overnight. The researcher will not be available outside of telephone contacts (as specified in project procedure), and it will also be sensitively explained to potential participants that the researcher cannot act as a crisis or clinical service. It will be made clear to potential participants that where they are struggling with distress or difficulties with their mental health they should access support through NHS and 3rd sector services, alongside any informal support available to them (e.g. friends and families).

Distress or risk expressed during phone contact, face-to-face meeting or Skype video call

To be enacted if a participant or the researcher is concerned about the participant's current and subsequent welfare during contact with the researcher (e.g. phone/face to face/ Skype video call):

- Reports or displays notable distress
- Reports thoughts or feelings related to suicide
- Reports current urges to harm themselves

If participants reports or shows signs of low or moderate distress

- Pause the phone call/meeting (with the participant's agreement) and allow time to talk about other topics including how the participant feels, and then carefully observe levels of distress.
- Reiterate signposting information (e.g. Samaritans/Papyrus/Mind/LGBT Foundation).
- Encourage the participant to contact a clinician if distressed or in need of help in future.
- If distress seems to have lessened, discuss with participant whether or not they wish to continue with the study/the current phone call or session.
- If distress remains prominent or worsens, follow steps below.

If participants report more severe distress or thoughts/feelings related to current urge to self-injure

- Halt or pause the phone call/meeting.
- Try to validate the participant's feelings by reflecting back to them that you have heard and understood that they are feeling distressed.
- Allow the participant time to say more about how they are feeling and allow time to listen to them.
- Ask specifically about any thoughts of suicide, if not already mentioned.
- Where these are present, assess level of immediate risk (this should be done as part of a calm, collaborative conversation, avoiding appearing panicked).
 - Do you feel that taking part in this telephone conversation is affecting how you feel? If so, in what way?
 - Currently, how would you rate your desire to live, with "10" being you really want to be alive and "0" being you very much want to be dead?
 - Do you have any plan or intent to kill yourself at this time?
 - Have you ever tried to attempt suicide in the past? (if not already known).
- Ask about current urges to harm themselves (which may be non-suicidal, or for which the intent may be unclear to them) if not already mentioned.
- Where these are currently present, assess level of immediate risk (questions below may help)
 - Do you feel that taking part in this study is affecting how you feel?
 - Do you currently have a specific plan to harm yourself?

- What are you thinking of doing (ascertain level of possible physical injury - is this likely to require medical intervention)?
- How able to resist these feelings do you currently feel, with “1” being able to resist them with little or no effort and “10” being impossible to resist these feelings?
- In judging the level of risk associated with urges to self-injure it is important to involve the participant themselves in thinking about this. In doing this you can check with the participant about the usual severity of their self-injury and aftercare (including any aftercare they provide themselves such as wound cleaning and also any health services they routinely attend). You can then check if current urges to self-injure feel typical for them, or different (more intense, or urge towards different kind of behaviour).

Where taking part in the study is having an adverse effect on the participant the study should be immediately halted (i.e. no further links or prompts to complete the survey should be sent). If the participant is keen to remain involved in the research, this could be discussed with them at a later date, once they have had a break from the study, and once the issue has been reviewed by the study supervisors.

Dependent on level of risk identified, the associated steps listed at the end of this document should be followed

Action plan for managing risk

LOW RISK = No current thoughts of suicide or urges to self-injure, or mild urges to self-harm that feel easy to resist or ignore (e.g. $\leq 3/10$).

- Acknowledge the difficult feelings the individual is experiencing (important that this feels genuine)
- Spend some time talking with the individual on a neutral subject matter and check in periodically on level distress to see if reducing (How are you feeling now?)
- Signpost the individual to the various support organisations that are available (Samaritans/Papyrus/Mind/LGBT Foundation)
- Encourage the individual to contact a clinician if distressed or in need of help in future

MODERATE RISK = thoughts of suicide but intent $\leq 6/10$, or urges to engage self-harm that could be medically severe, but which the individual feels able to resist (e.g. $\leq 5/10$).

- (check all completed above)
- Discuss safety plan with the individual (i.e., what to do if thoughts/urges increase). This could include ways to distract themselves, important people to contact and harm minimisation strategies.

HIGH RISK = Current suicidal ideation present, and intent 7-8/10, but no plan or access to lethal means. Urges to self-harm that are hard to resist ($> 5/10$) and could result in severe injury (e.g. planned overdose or hanging).

- (check all completed above)

- Ask individual for the number of somebody that the researcher can contact (could be family member/friend/GP). If this is not provided then the researcher shall ask where the individual is and arrange for emergency services to attend.
- Call Peter Taylor/Samantha Hartley (**must do**)

IMMINENT RISK = Current suicidal intent (7-8/10 with specific plan/access or 9-10/10 regardless of plan).

- (check all completed above)
- Call Peter Taylor/Samantha Hartley (**must do**)
- If an ambulance is being sent, stay on the phone/video call/sit with the individual until the ambulance arrives.
- If the individual refuses to do the above: call 999 and inform them of individual's last known location and level of risk.

If individual has already engaged recently in self-injury or reports recent self-injury that could be medically serious over the phone/face to face/on Skype video call:

- Try to gain information on how physically severe the self-injury is (if in doubt, err on the side of caution). Involve the individual in this discussion in a collaborative way where possible. They will have an idea of what kind of self-injury is typical for them and also the potential physical consequences of different levels of self-injury based on their own experiences.
- Follow steps below, accordingly.

LOW RISK = Superficial injuries (e.g. shallow cuts, scratches, bruises) requiring no medical attention or very minimal medical intervention (e.g., plasters).

- Signpost the individual to the various support organisations that are available (Samaritans/Papyrus/Mind/LGBT Foundation)
- Discuss with the individual whether they would like to continue participating in the research.

MODERATE RISK = Moderate injuries that may have required minor medical attention (e.g., bandages, may have been put on by individual). These may have some lasting effects (such as scarring, pain, or noticeable discomfort).

- (check all completed above)
- Encourage the individual to seek medical help for physical injuries (e.g. walk-in centre, GP) if not already sought.
- Discuss safety plan with the individual (i.e., what to do if thoughts/urges increase). This could include ways to distract themselves, important people to contact and harm minimisation strategies.

HIGH RISK = Serious injuries that either required medical attentions to prevent death or long-term disability.

- (check all completed above)
- Call Peter Taylor/Samantha Hartley (**must do**)
- The researcher will call an ambulance and provide the ambulance service with the last known location. Whilst the ambulance is being

sent stay on the phone/video call/sit with the individual until the ambulance arrives.

Distress or risk expressed via email

The study email account will have an automatic reply set that a) reiterates that the research team is not able to provide crisis support and b) provides signposting information to relevant support services.

Further steps should be taken if the participant sends an email that indicates the following:

- Reports or displays notable distress
- Reports thoughts or feelings related to suicide
- Reports current urges to harm themselves

If participant indicates any of the above in an email to the research team's email account then the researcher will:

- Include the following standard email reply (minor changes are permitted to tailor the reply to the individual participant):

“Hi [participant], thanks for reaching out to the research team. It sounds like you are experiencing some thoughts/feelings that are quite upsetting for you. As a research team we have a duty of care to protect participants, but we are not in a position to offer support ourselves. Therefore, we would strongly recommend that you contact one or more of the below organisations to ask for emotional support. If you would like us to contact a healthcare professional on your behalf then please email us their details.

Please be aware that you are in no way obliged to continue with this research and you are welcome to withdraw at any point if you wish. Please get in touch with us if you would like to be removed from the study.

Samaritans (emotional/self-harm/sexuality support): 116 123

Papyrus (suicide prevention): 0800 068 4141

YoungMinds (emotional/self-harm/sexuality support): Text YM to 85258

LGBT Foundation (sexuality support): 0345 330 3030

With best wishes,
SIBL research team”

If participant has already engaged recently in life-threatening self-injury, reports recent self-injury that could be medically serious, or expresses imminent and severe risk to self (i.e. indicates imminence of engaging in life-threatening/medically serious self-injury, or other suicidal behaviour) in an email to the research team's email account then the researcher will:

- Include the following standard email reply (minor changes are permitted to tailor the reply to the individual participant):

“Hi [participant], thanks for reaching out to the research team. It sounds like you are experiencing some thoughts/feelings that are quite upsetting for you. As a research team we have a duty of care to protect participants, but we are not in a position to offer support ourselves. Because of this, and as

indicated at the beginning of the study and on your consent form, in this instance we need to contact a healthcare professional, because you have [told us you have engaged in life-threatening self-injury/medically serious self-injury/thoughts to end your life – DELETE/EXPAND ON AS APPROPRIATE]. Please can you provide us with details of the most appropriate healthcare professional for us to contact. This could be your GP, other doctor, or community nurse. If we feel your safety is immediately at risk we may shortly call you to ask where you are so we can arrange for emergency services to be sent.

Please be aware that you are in no way obliged to continue with this research and you are welcome to withdraw at any point if you wish. Please get in touch with us if you would like to be removed from the study.

Samaritans (emotional/self-harm/sexuality support): 116 123

Papyrus (suicide prevention): 0800 068 4141

YoungMinds (emotional/self-harm/sexuality support): Text YM to 85258

LGBT Foundation (sexuality support): 0345 330 3030

With best wishes,
SIBL research team"

Personal Safety and Well-being

Where any of the above incidents take place the researcher should inform Dr Peter Taylor/Dr Samantha Hartley and arrange a time to debrief with regards to the situation, including a focus on how they have been personally affected.

Appendix R: Consent Form



Participant Identification Number:

Self-Injury in young Bisexual people: a Longitudinal investigation (SIBL)

Consent Form

Name of Researchers: Sophie Coleman and Brendan Dunlop

Email: SIBL@manchester.ac.uk

Please type initials

1	I confirm that I have read the information sheet (Version 2, Date 30/09/2019) for the above study and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.	
2	I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason and without detriment to myself. I understand that it will not be possible to remove my data from the project once it has been anonymised and forms part of the data set. I agree to take part on this basis.	
3	I agree that any data collected may be published in an anonymous form in academic books, reports or journals.	
4	I understand that if I need support with self-injury or with issues related to sexuality/sexual orientation during this study I can contact the support numbers provided at the end of online surveys.	
5	I understand that if I disclose details that the researchers believe affects my immediate safety, or the safety of someone else, the researchers may have to tell another healthcare professional, such as my GP. I agree to provide details of the most appropriate healthcare professional to the research team if they request them for reasons of safety/risk. In this instance, I understand that the researchers will ask me who I want them to contact. If I don't tell them anyone in particular, or refuse to, the researchers may need to contact emergency services instead and provide my last known location.	
6	I agree that my anonymous data can be used for other research projects and that if I agree to this I cannot be identified from any of the data.	

Version 2

30/09/2019

7	I agree to take part in this study.	
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Optional:

1	I agree that the researchers may retain my contact details in order to provide me with a summary of the findings for this study.	
2	I agree to be entered into a prize draw for each weekly survey I complete. I understand that the researchers will contact me via telephone or email if I win one of these prizes.	

Data Protection

The personal information we collect and use to conduct this research will be processed in accordance with data protection law as explained in the Participant Information Sheet and the [Privacy Notice for Research Participants](#).

Name (please type):

Date:

[Consent forms will be stored electronically at the University of Manchester in accordance with Data Protection regulations; you may request an electronic copy of this consent form if you wish]

Appendix S: Detailed study procedure

Interested individuals would firstly complete an electronic Consent to Contact form which had a link to the Participation Information Sheet. On this form they were required to state that they met the inclusion criteria and were happy for a researcher to contact them to discuss the study further. Individuals who provided a UK phone number were sent a text message asking if they would prefer a phone call or an email. The researcher, either by telephone or email, explained to the potential participant what taking part would involve, discussed potential risks, confirmed eligibility and answered any questions. Individuals who did not provide a UK phone number were contacted by email.

If the individual was happy with the information provided, they were emailed a link to the Consent Form. They were asked whether they would prefer email or telephone check-ins from the researchers (only UK participants eligible for a telephone check-in). They were also asked whether they consented to being entered into the prize draws (six £50 vouchers, one for each survey) and being sent a summary of the results.

Following completion of the consent form, individuals were emailed a link to the baseline survey which included their unique PIN and password. Participants were asked to complete each survey within 48 hours of the email/text alert if possible. They were told that it was fine if they miss a survey and asked not to complete multiple surveys on the same day. Participants from the UK had their phone numbers inputted into *'Meerkat'*, a University of Manchester regulated automatic text messaging service. They would receive a text message with the link to the weekly survey, every week for the next five weeks. Participants from outside of the UK were sent an email with the weekly survey link.

After survey three and survey five, participants were contacted by email or telephone (based on their preference) and asked how they were finding the study and if they had any questions or concerns. Once the six weeks had passed, the participant was sent a thank you email that included details of support services.

Following the thank you email, participants were only contacted if they won one of the six prize draws or requested a summary of the results.

Appendix T: Demographic questionnaire

Age:

Gender:

- Female
- Male
- Non-binary/third gender
- Female to male transgender
- Male to female transgender

Sexuality:

- Bisexual (attracted to both those who identify as male and female)
- Pansexual (attracted to ‘humans’; those who identify as male and female, as well as other genders such as non-binary)
- Mostly heterosexual (mostly attracted to the opposite gender, with some attraction to the same gender)
- Mostly homosexual (most attracted to the same gender, with some attraction to the opposite gender)
- Other

Ethnicity:

- Arab
- Asian/Asian British
 - Indian
 - Pakistani
 - Bangladeshi
 - Chinese
 - Other Asian Background
- Black African
- Black Caribbean
- Black British
- Irish Gypsy or Traveller
- White British
- White and Black Caribbean
- White and Black African
- White and Asian
- White other
- Other Mixed/Multiple Ethnic background

Employment status:

- Employed full-time
- Employed part-time
- Unemployed
- Student
- Volunteer

Marital status:

- Single
- Partnered
- Married
- Open relationship
- Polyamorous

Appendix U: Self-Injurious Thoughts and Behaviours Inventory Short-Form structured interview (SITBI)

Non-Suicidal Self-Injury

Non-suicidal self-injury refers to any deliberate, self-inflicted damage to body tissue where you did not wish to end your life. Self-injury that is part of your culture would not be included here.

Please consider if you do anything to hurt yourself without wanting to die, and specify what this is below:

Have you ever actually purposely hurt yourself without wanting to die?

(0) *no*

(1) *yes*

Now I'm going to go through a list of things that people sometimes purposely do to harm themselves without wanting to die. Please let me know which of these you've done:

- (1) cut or carved skin
- (2) burned your skin (eg. with a cigarette, match or other hot object)
- (3) inserted sharp objects into your skin or nails
- (4) picked areas of your body to the point of drawing blood
- (5) hit yourself on purpose
- (6) gave yourself a tattoo
- (7) scraped your skin to the point of drawing blood
- (8) pulled your hair on purpose
- (9) swallowed objects foreign to the body
- (10) banged your head
- (11) interfered with wounds (eg. not allowed wounds to heal, unpicked stitches)
- (12) ingested toxic substances (eg. bleach)
- (13) other (specify): _____

How many times in the past year have you purposely hurt yourself without wanting to die? (Please give your best estimate)

How many times in the past month?

How many times in the past week? – **to be asked weekly**

Appendix V: Alexian Brothers Urge to Self-Injure Scale (ABUSI)

The questions below apply to **the last week**. This questionnaire will ask you about urges to hurt or injure yourself where you did not wish to end your own life (non-suicidal self-injury). When answering each question, please only consider your urges to engage in non-suicidal self-injury. If you wanted to die when you had this urge, or were ambivalent about dying, please do not report these urges. Place an "X" in the box next to the most appropriate statement.

1. How often have you thought about injuring yourself or about how you want to injure yourself?

- Never, 0 times in the last week
- Rarely, 1 -2 times in the last week
- Occasionally, 3 – 4 times in the last week
- Sometimes, 5 – 10 times in the last week, or 1 -2 times a day
- Often, 11 – 20 times in the last week, or 2 – 3 times a day
- Most of the time, 20 – 40 times in the last week, or 3 – 6 times a day
- Nearly all of the time, more that 40 times in the last week, or more than 6 times a day

2. At the most severe point, how strong was your urge to self-injure in the last week?

- None at all.
- Slight, that is, a very mild urge.
- Mild Urge.
- Moderate Urge.
- Strong Urge, but easily controlled.
- Strong Urge, but difficult to control.
- Strong Urge and would have self-injured if able to.

3. How much time have you spent thinking about injuring yourself or about how you want to injure yourself?

- None. Less than 20 min. 21-45 min. 46-90 min. 90 min to 3 hrs. 3-6 hrs. More than 6 hrs.

4. How difficult was it to resist injuring yourself in the last week?

- Not difficult at all Very mildly difficult Mildly difficult Moderately difficult Very difficult Extremely difficult Was not able to resist

5. Keeping in mind your responses to the previous questions, please rate your *overall average* urge or desire to injure yourself in the last week.

- Never thought about it and **never** had the urge to self-injure.
- Rarely thought about it and **rarely** had the urge to self-injure.
- Occasionally thought about it and **occasionally** had the urge to self-injure.
- Sometimes thought about it and **sometimes** had the urge to self-injure.
- Often thought about it and **often** had the urge to self-injure.
- Thought about self-injury **most** of the time and had the urge to do it **most** of the time.
- Thought about self-injury **nearly all** the time and had the urge to do it **nearly all** the time.

Appendix W: Brief State Rumination Inventory (BSRI)

Instructions: Please respond to the following items by referring to the way you have felt or thought over the last week. For each item, please choose the option that indicates the degree to which you agree or disagree with the statement.

COMPLETELY DISAGREE (0)

DISAGREE (25)

NEUTRAL (50)

AGREE (75)

COMPLETELY AGREE (100)

1. Over the last week, I've reflected about my mood.
2. Over the last week, I've wondered why I react the way I do.
3. Over the last week, I've wondered why I always feel the way I do.
4. Over the last week, I've thought: "why do I have problems other people don't have?".
5. Over the last week, I've rehashed in my mind recent things I've said or done.
6. Over the last week, I've thought: "why can't I handle things better?".
7. Over the last week, it's been hard for me to shut off negative thoughts about myself.
8. Over the last week, I've wondered why I can't respond in a better way.

Appendix X: Brief Anti-Bisexual Experiences Scale (Brief ABES)

Please rate how often the experience reflected in each of the following items has happened to you personally over the past week. We are interested in your personal experiences as a bisexual individual and realize that each experience may or may not have happened to you. To tell us about your experiences, please rate each item using the scale below.

Check 1st bubble = If this has NEVER happened to you

Check 2nd bubble = If this has happened to you ONCE IN A WHILE (less than 10% of the me)

Check 3rd bubble = If this has happened to you SOMETIMES (10%-25% of the me)

Check 4th bubble = If this has happened to you A LOT (26%-49% of the me)

Check 5th bubble = If this has happened to you MOST OF THE TIME (50%-70% of the me)

Check 6th bubble = If this has happened to you ALMOST ALL OF THE TIME (more than 70% of the me)

1. People have acted as if my bisexuality is only a sexual curiosity, not a stable sexual orientation
2. People have not taken my sexual orientation seriously, because I am bisexual
3. People have addressed my bisexuality as if it means that I am simply confused about my sexual orientation
4. People have assumed that I will cheat in a relationship because I am bisexual
5. People have treated me as if I am obsessed with sex because I am bisexual
6. Others have acted uncomfortable around me because I am bisexual
7. I have been alienated because I am bisexual
8. Others have treated me negatively because I am bisexual

Appendix Y: Bisexual community questions added to the Brief ABES

9. To what extent do you feel part of a wider community of bisexual people?

10. To what extent are you able to seek advice or support from other bisexual people?

Appendix Z: Lay summary poster



The Self-Injury in Young Bisexual people: a Longitudinal investigation (SIBL) study results summary

Why did we do this research?

We knew that bisexual people were at a greater risk of self-injury (hurting themselves on purpose). We were not sure why this was, so we wanted to find out. Urges to hurt oneself can often come before someone self-injures, and these urges can be distressing in their own right. We therefore wanted to look at the urges that people get to hurt themselves and what experiences might occur alongside or precede these urges.

We thought that biphobia (discrimination received because you're bi), rumination (thinking about things over and over in a negative way), self-esteem (how you feel about yourself) and thwarted belongingness (how much you felt like you belonged or not) might have something to do with this.

What did we do?

Young people (aged 16-15 years) who identified as bi and had either thought about self-injury or had self-injured were invited to take part. We asked people to fill out some online surveys once a week for six weeks. The surveys asked questions about the experiences we wanted to find out about.



How many people took part?

In total, we had 207 young bisexual people from 25 different countries take part.

What did we find?

We found a few really important findings. Firstly, we found that self-esteem seems really important when it comes to self-injury. If people in our study had lower self-esteem it seems that they felt a stronger urge to hurt themselves. Lower self-esteem was also related to more severe urges to hurt oneself the following week.

The same was true for feelings of belonging. If people in our study felt like they did not belong strongly to groups or did not feel like they were connected to others, they had stronger urges to hurt themselves.

Rumination was also linked to people wanting to hurt themselves. For people in our study, the more they thought about things over and over again in their minds, the stronger the urge to hurt themselves was.

For biphobia, this was linked to the urges people in our study felt to hurt themselves, but less so than rumination.

What does this mean?

Well, these findings mean that some things like self-esteem, rumination and feelings of belonging seem to be particularly linked to bisexual people's urges to hurt themselves. This means that by improving these things, perhaps this might have an impact on a young bisexual person's urge to hurt themselves. We need to do more research on this though to find out more.



This also tells us that we need to make sure bisexual people are given the chance to develop a positive bisexual identity so that they can feel good about themselves, feel like they belong and don't need to worry about things that might be connected to their sexuality. To do this we need to tackle biphobic discrimination in all settings and work together to help bisexual people feel accepted, both in the Lesbian, Gay, Bisexual, Transgender and Queer+ (LGBTQ+) community, and in the 'straight' world.

[Can I get a copy of the full article\(s\)?](#)

These results are being written into full articles and will be submitted to scientific journals shortly. Once they are published, we will put a link to them on the SIBL twitter page (@siblstudy). You can also email us (sibl@manchester.ac.uk) to get a copy.

[Who can I contact if I want to find out more information?](#)

If you want to know more, or have any other questions or comments, please email Brendan and Sophie at sibl@manchester.ac.uk

[Thank you!](#)

Huge thanks to everyone who took part in the study, and to those that helped us with recruitment! We have really valued doing this research and learning more about the experiences of young bisexual people.

Brendan J Dunlop and Sophie E Coleman

Clinical Psychologists in training and SIBL Co-Investigators



The University of Manchester