# A measure of positive and negative self-harm beliefs: The Self-Harm Beliefs Scale (SHBS)

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## Table of Contents

**Page**

**List of Figures**



**List of Appendices**



**Introductory Chapter: Thesis Overview**

Non-suicidal self-injury (NSSI), the intentional and deliberate damage of one's body without suicidal intent, is a long-standing concern for health professionals (Klonsky & Muehlenkamp, 2007). It is associated with a range of mental health difficulties (Mangnall & Yurkovich, 2008) and is one of the strongest predictors of suicide (Hawton, Zahl, & Weatherall, 2003). As such, NSSI has become a significant public health issue with a drive to develop more effective treatments and prevention plans (Nock & Prinstein, 2004).

Most recently, research has focussed on identifying the functions of NSSI in order to develop better interventions for this population. Findings have shown that NSSI can serve a range of functions for individuals including emotional regulation and self-punishment (Klonsky, 2009). However, to the author's knowledge there is no existing literature which explores the prevalence of various NSSI functions. Understanding the prevalence of NSSI functions is important to identify the various needs of this population and to develop more targeted interventions.

Chapter 1 of this thesis aims to conduct a systematic review and meta-analysis of the prevalence of NSSI functions. The review suggests that intrapersonal and interpersonal functions of NSSI are highly prevalent however, high-levels of heterogeneity between studies limit the accuracy of prevalence estimates. The review concludes that more consistent measures of NSSI are needed as well as a better understanding of the processes underlying NSSI, including individuals' beliefs or appraisals of NSSI.

Despite the negative consequences of NSSI, there is a growing body of research which suggests that many individuals who self-harm do not wish to stop or reduce NSSI (Kress & Hoffman, 2008). Evidence from qualitative studies suggests that this is because NSSI can have varying positive and negative effects which make individuals reluctant to stop or engage in

treatment (Chapman, Gratz & Brown, 2006). For example, some individuals who self-harm believe that NSSI is an effective way to manage their distress but also recognise that it impacts negatively on their relationships with others (Harris, 2000).

However, research into the perceived positive aspects of NSSI is limited (Edmundson, Brown & House, 2016) and there is a need to better understand how individuals' beliefs or attitudes towards NSSI may contribute to the persistence of NSSI behaviour (Lamb, 2012). Consequently, chapter 2 of this thesis details the development of a measure of positive and negative NSSI beliefs. This includes an exploration of how beliefs influence the maintenance of NSSI. The study concludes that a better understanding of NSSI beliefs may improve interventions for this population.

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**A systematic review and meta-analysis of the prevalence of non-suicidal self-injury (NSSI) functions: The hidden problem of heterogeneity**


## Abstract

***Objective:*** To conduct a systematic review and meta-analysis of the prevalence of non-suicidal self-injury (NSSI) functions. ***Method:*** The electronic databases PsycINFO, Medline, Web of

Science and Global Health were searched from inception up to October 2015 using key search terms. Quantitative studies were included if they a) were in the English language, b) defined self-harm as a deliberate non-suicidal act involving actual or potential tissue damage and c) reported direct data on the functions of NSSI (including self-reported reasons or motivations for NSSI). Meta-analyses using a random-effects model was performed using MetaXL software. ***Results*:** Forty-one studies were identified for the review with twenty-four of these studies contributing suitable data for the meta-analysis. Findings suggested that intrapersonal and interpersonal functions of NSSI were highly prevalent however, high-levels of between-study heterogeneity made it difficult to draw any accurate conclusions about prevalence rates. ***Conclusions:*** This review highlights the need for more consistent measures of NSSI as well as a better understanding of the processes underlying NSSI.

*Keywords*: Non-suicidal self-injury (NSSI), NSSI functions, systematic review, meta-analysis, heterogeneity

## Introduction

Non-suicidal self-injury (NSSI) is most commonly defined as deliberate and intentional damage to one's body without suicidal intent (Klonsky, 2007) and methods include; cutting,

hitting, scratching and burning oneself (Meuhlenkamp & Gutierrez, 2004). The study of NSSI has been complicated by inconsistencies in the definitions and understanding of this phenomenon (Kapur, Cooper, O'Connor & Hawton, 2013). While some literature suggests that all self-injury is underlined by some degree of suicidality, there is growing evidence that NSSI is distinct in function and epidemiology from self-injurious behaviour with suicidal intent (Butler & Malone, 2013). It therefore seems important that research continues to address the unique characteristics and functions of NSSI in order to develop a clearer understanding of this behaviour and its distinct phenomenology.

NSSI has been a long-standing concern for health professionals and is an increasing focus of clinical research (Zetterqvist, Lundh, Dahlstorm & Svedin, 2013). There is evidence to suggest that NSSI is associated with a range of psychological difficulties including depression, anxiety and post-traumatic stress disorder (Bentley, Nock & Barlow, 2014) and it can have adverse effects on family and interpersonal relationships (Tan, Rehfuss, Suarez & Parks-Savage, 2014). Although not used as an attempt to commit suicide, the repeated physical damage caused by NSSI can be very dangerous and sometimes result in unintentional death (Kehrberg, 1997).

Lifetime prevalence rates of NSSI in the UK are estimated at 5-6% (Klonsky, 2011) with evidence of increased prevalence in other populations (Plener, Libal, Keller, Ferget & Muehlenkamp, 2009). As a result, NSSI has become an increasing public health issue with a drive to develop more effective treatments and prevention plans (Nock & Prinstein, 2004). However, NSSI is a diverse and complex phenomenon, presenting significant challenges for professionals aiming to support those who self-harm (Hume & Platt, 2007). Understanding NSSI and the reasons why individuals engage in this behaviour is therefore vital to services developing effective interventions for this population (Klonsky, 2009).

Recently, research in NSSI has focused on understanding the functions of this behaviour including differences in functions among sub-groups of those who self-harm(Skegg, 2005). To date, findings have supported several functions of NSSI including self-regulation, self-punishment and sensation-seeking (Klonsky, 2009). While it is recognised that many of these functions are over-lapping or co-occurring, functions related to regulating affect are most commonly endorsed across a multitude of studies (Lewis & Santor, 2008; Lloyd-Richardson, Perrine, Dierker & Kelley, 2007; You, Lin & Leung, 2013). This is supported by narrative reviews of published studies which highlight affect regulation as the most frequently reported function of NSSI, followed by self-punishment and interpersonal influence (Edmondson, Brennan & House, 2016; Klonsky, 2007). Findings from these studies identify NSSI as a coping strategy for managing negative or unwanted emotions (e.g. anger or anxiety) and overwhelming psychological distress (Chapman, Gratz & Brown, 2006; Nixon, Cloutier & Aggarwal, 2002). However, outcomes from these narrative reviews are limited as they do not account for the varying precision of prevalence estimates across studies (i.e. giving too much weight to studies with small samples) and ignore between-study heterogeneity.

The various functions of NSSI are supported by a series of different theories and models however, the Four Functional Model (FFM) is most strongly evidenced in the literature (Nock, 2009; Nock, 2010; Nock & Prinstein, 2004). This model proposes that NSSI is maintained via four possible reinforcement processes which can be intrapersonal or interpersonal in nature (Bentley et al., 2010). As such, the FFM suggests that NSSI can be maintained by intrapersonal-negative reinforcement (i.e. NSSI reduces negative/ unwanted thoughts or feelings), intrapersonal-positive reinforcement (i.e. NSSI generates positive feelings/ sensations), interpersonal-negative reinforcement (i.e. NSSI provides escape from unwanted social situations/ circumstances) and interpersonal-positive reinforcement (i.e. NSSI elicits help/ desired responses from others). Recent empirical research has employed confirmatory factor

analysis methods to examine endorsed functions of NSSI on various rating scales and findings have consistently shown that reported functions fall closely within the FFM of NSSI (Lloyd-Richardson et al., 2007; Nock & Prinstein, 2004).

While the existing literature has focused on identifying dominant functions of NSSI, it remains unclear how prevalent these various functions are in a self-harming population. This presents an issue in understanding the various needs of this population and in determining appropriate interventions. Indeed, research has suggested that different functions of NSSI may indicate different treatment approaches and so it is important to understand the particular meanings and motivations of self-harm for individuals (Lloyd-Richardson et al., 2007). For example, an individual whose self-harm is largely driven by the need to signal distress to others (Nock, 2009) may require an intervention which allows them to develop other ways to seek support or signal distress. However, for an individual who's self-harm is largely motivated by managing negative affect, this is likely to require a different treatment approach, for example Dialectical Behavioural Therapy (DBT) or emotional regulation group therapy (Andover & Morris, 2014). Both these examples highlight the demands on services to provide varying interventions for this population and for services to have different levels of training and resources within their teams. It is therefore likely that understanding the prevalence rates of common NSSI functions will inform service provision for this population. This is particularly important given increasing rates of NSSI and the need for more effective interventions (Bentley et al., 2010).

To the author's knowledge, there is no existing review that systematically evaluates the prevalence rates of NSSI functions. A secondary benefit of this approach is that it enables the level of between-study heterogeneity to be quantified, providing a better indication of how much confidence can be placed in prevalence estimates. The aims of this study were therefore

two-fold: 1) to undertake a systematic review and meta-analysis of the prevalence of NSSI functions; 2) to estimate the level of heterogeneity in prevalence estimates.

## Method

### Definitions

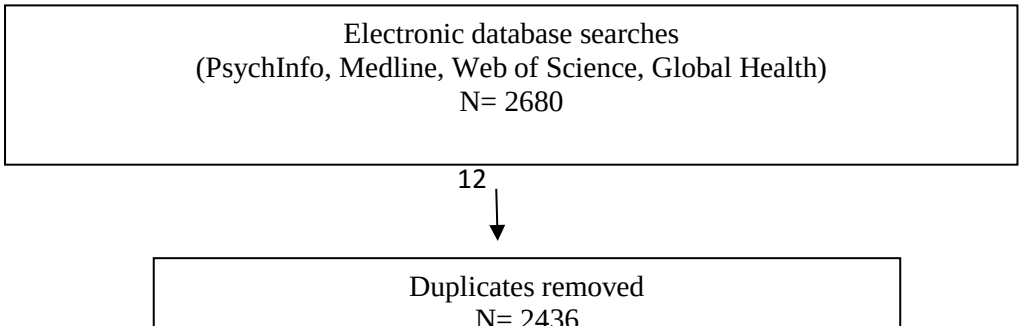
For the purposes of this review, NSSI was defined as intentional and deliberate damage to one's body without suicidal intent (Klonsky, 2007). Where this behaviour was described by study authors using other terms (e.g. self-harm), this was managed by ensuring that there was a clear indication that the act described did not include any intent to die. A broad definition of functions of NSSI (which included reasons and motivations for NSSI, e.g. "to stop negative thoughts") was adopted in line with previous work in this area (Nock, 2009).

### Search Strategy

A protocol (Appendix A) for this review was pre-registered (http://www.crd.york.ac.uk /PROSPERO/display_record.aspID=CRD42015025962). Due to the differences in terms used to describe self-harm without suicidal intent (i.e. deliberate self-harm [DSH], self-injury, NSSI), a broad range of search terms were used. The electronic databases PsycINFO, Medline, Web of Science and Global Health were searched from inception up to October 2015, using the key words: ("self harm*" or "self injur*" or "DSH" or "NSSI" or "self cut*" or "self burn*") AND ("reason*" or "function*" or "motiv*"). This resulted in 2436 studies after the removal of duplications. Literature searches were managed using EndNote X7, a bibliographic citation management software package (http://endnote.com/product-details/X7).

Initially, abstracts and titles were screened independently by two authors (KJ and UM) to determine eligible articles. This was followed up by reviewing full-texts of remaining

articles. In the case of conference abstracts without available full articles, authors were contacted via email to retrieve any published or unpublished material. References within selected articles were also hand-searched for further eligible studies. This was complimented by hand-searches of recently published reviews regarding functions of NSSI, including Edmunds et al. (2016) and Klonsky (2007). Details of the search strategy are presented in Figure 1.



**Inclusion & Exclusion Criteria**

For inclusion, studies were required to a) be in the English language, b) define self-harm as a deliberate non-suicidal act involving actual or potential tissue damage and c) report

direct data on functions of NSSI (including self-reported reasons or motivations for NSSI). Studies which measured deliberate self-harm (i.e. included suicidal acts) were included if NSSI data were separately reported. Studies were excluded if they a) did not contain quantitative data (i.e. qualitative studies), b) reported psychometric properties of rating scales only or c) used exclusively forensic or veteran participant samples. The latter criterion was adopted because the specific characteristics of these groups concerning exposure to violence and access to methods meant these populations warranted a separate review.

## Data Extraction

Extraction of study details was undertaken independently by two authors (KJ and UM) using a pre-specified data-collection form with disagreements resolved by consensus through discussion with the third author (PT). Extraction information included; type of study design, characteristics of participants, study measures and outcome data related to NSSI functions. For two studies (Lloyd-Richardson et al., 2007; van Rooyen et al., 2013) further clarification on data was sought from corresponding authors. In one of these cases, additional data was unavailable and in the other case contact with the author was unsuccessful. Consequently, these studies were excluded from the meta-analysis.

## Methodological Quality

The quality of studies was assessed independently by two authors (KJ, UW) using a tool adapted from the Agency for Healthcare Research and Quality (Williams, Plassman, Burke, Holsinger & Benjamin, 2010). This tool was adapted and used previously in a review of self-harm in populations at risk of psychosis (Taylor, Hutton & Wood, 2015). For this review, the tool (Appendix B) rated whether studies met, partially met, or did not meet quality

criteria in a number of key methodological areas. Quality ratings were combined by the two authors (KJ and UM) and disagreements resolved by a third author (PT).

**Data Synthesis and Analysis**

Meta-analyses of prevalence was performed using MetaXL software (http://www.epigear.com/index_files/metaxl.html). Proportions were subjected to a double arcsine transformation to stabilise the variance, following the recommendations of Barendreqt, Doi, Lee, Norman and Vos (2013). A random-effects model was chosen in advance due to expected differences between studies in the definition and measurement of NSSI and participant characteristics. This allowed a better indication of true heterogeneity in prevalence. Heterogeneity was estimated by calculating the $I^2$-statistic which described the percentage of total variance across studies that was due to heterogeneity rather than sampling error. $I^2$ values of 25%, 50% and 75% suggest low, moderate and high heterogeneity, respectively (Ougrin, Tranah, Stahl, Moran & Asarnow, 2015).

The current study explicitly focused on the most commonly reported functions of NSSI. While various less common functions are reported across studies, their infrequency makes any estimates of prevalence unstable. Therefore, for this review NSSI functions were aggregated using a top-down approach, exploring the prevalence of functions/ motives for NSSI within a series of pre-determined categories (Figure 2). Firstly, functions were divided into two main categories; intrapersonal functions and interpersonal functions, based on theoretical and empirical models of NSSI (Turner, Chapman & Layden, 2012). For each of these main categories, sub-categories were then identified based on the most common reported functions from studies. For example, for interpersonal functions, one sub-category identified was *communicating level of distress*. This included functions such as “to let others know how

desperate I am" and "to show my pain to others". A brief description of each category is included in the results section.

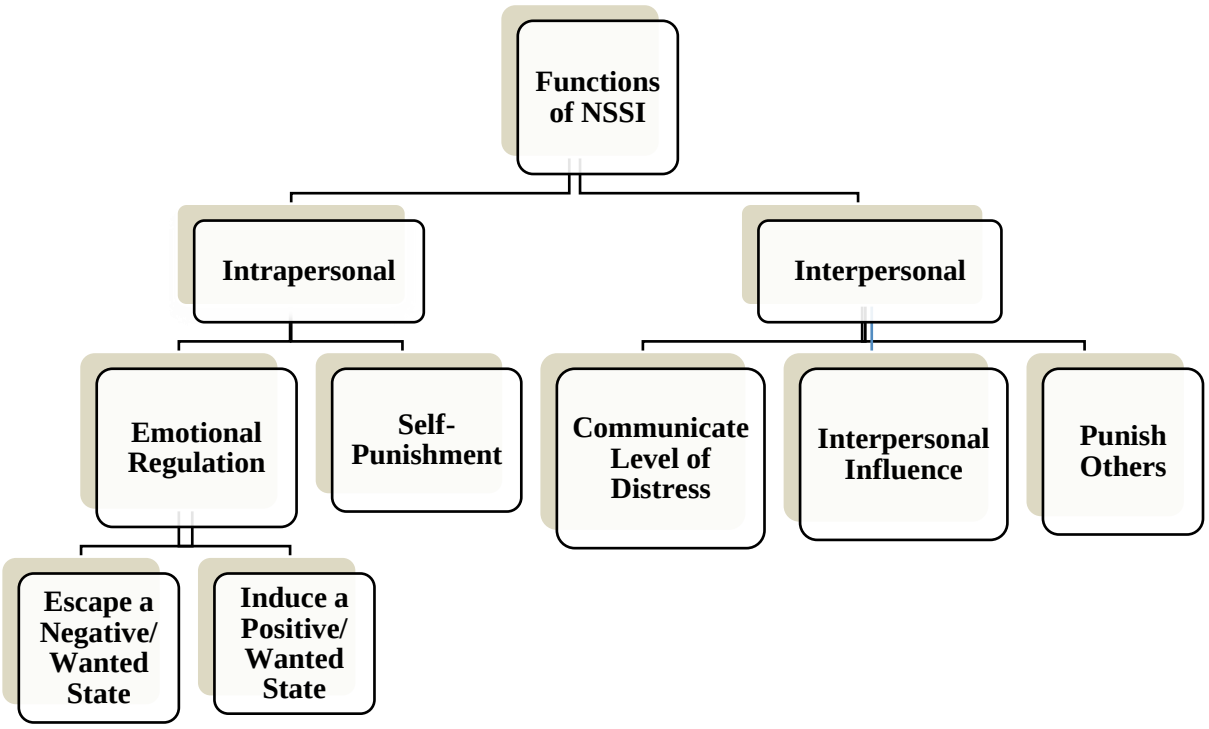



*Figure 2*. Pre-determined categories of NSSI functions.

## Results

Searching electronic databases yielded a total of N=2436 studies after the removal of duplicates. Following screening of titles and abstracts, the full-texts of N=98 studies were reviewed. After parallel screening by the 2nd reviewer, a total of N=41 studies were identified for the review. Of these 41 studies, 24 studies contributed suitable data for the meta-analysis.

### Study characteristics

A summary of study characteristics is presented in Table 1. All studies employed a cross-sectional design with the exception of two longitudinal studies (Snir et al., 2015; Zanaraini et al., 2013). The majority of studies took place in North America (n= 19) followed by Europe (n= 12), Asia (n=7), Australia (n=2) and Africa (n=1).

Twelve studies recruited participants from school/colleges and ten studies from university populations. Fourteen studies recruited participants from psychiatric inpatient units or outpatient clinics with one of these specialising in the treatment of borderline personality disorder (Kliendienst et al., 2008) and another in eating disorders (Claes et al., 2010). The remaining studies recruited from the community (n=3), online youth forums and social networking sites (n=2). The majority of studies (n=25) had a greater number of female participants than male participants. Three studies used exclusively female samples and eleven studies did not report the gender composition of their sample.

The reviewed studies used several self-report measures to determine NSSI functions. Half of the studies (n= 20) used non-validated measures which included questionnaires derived by study authors and adaptations/ initial translations of existing questionnaires. In terms of validated tools, the Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) was the most commonly used across studies (n=10).

**Study quality**

The assessment of study quality is presented in Table 2. Overall, reviewed studies lacked quality in relation to the description of the cohort, choice of measurement tools and the description of collection and handling of data. A significant limitation of most of the studies (n= 35) was inadequate/lack of information in relation to missing data. For a number of these studies, missing data were apparent but there were no details provided in relation to how this was managed (e.g. use of imputation strategies to minimize bias). This is problematic as missing data may have impaired the representativeness of samples or created bias in results (e.g. if those endorsing a certain function were more likely to have missing data). A further limitation of studies was the choice of measurement tools for determining functions of NSSI. For a larger number of studies, functions of NSSI was assessed by combining individual items from various measures, for example selecting items from the Self-Injurious Thoughts and Behaviour Interview (SITBI; Nock, Holmberg & Photos, 2007) and items from the Inventory of Statements about Self-Injury (ISAS; Klonsky & Glenn, 2009). As these tools were designed to be used as whole measures, individualized items have unknown psychometric properties and may lack validity (e.g. reduced content validity). Therefore, it is unclear how well these items measured functions of NSSI. However, it is worth noting that for some of these studies NSSI functions was not the primary outcome and this may be one possible reason why studies adopted this approach.

Table 1

*Characteristics of Included Studies (n=41)*

| | **Author(s), Year, Country** | **Design** | **Sample Source** | **NSSI Sample Characteristics** | **NSSI Functions Measure** |
|---|---|---|---|---|---|
| 1 | Baetens et al (2011); Belgium | Cross-sectional | Youth websites | N=183 (155 female) | Non-validated measure of reasons for NSSI |
| 2 | Calvete et al (2015); Spain | Cross-sectional | High school/ vocational school | N= 999 (579 females) | Non-validated measure of reasons for NSSI |
| 3 | Claes et al (2010) ; Belgium | Cross-sectional | Inpatient eating disorder unit | N=49 | Self-Injury Questionnaire-Treatment Related (SIQ-TR; Claes & Vandereycken, 2007) |
| 4 | Csorba et al (2009); Hungary | Cross-sectional | Child psychiatric outpatient services | N=59 | Ottawa/Queen's Self Injury Questionnaire (OSI; Nixon et al.2002) Hungarian translation (non-validated) |
| 5 | Dahlstrom et al (2015); Sweden | Cross-sectional | High school | N= 502 (284 females) | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 6 | Garcia-Nieto et al (2015); Spain | Cross-sectional | Adolescent outpatient psychiatric services | N=239 (83 females) Mean age= 14.1 (1.9) | Self-Injurious Thoughts and Behaviour Interview-(SITBI; Garcia-Nieto et. al, 2013) Spanish translation (validated) |

| | Author(s), Year, Country | Design | Sample Source | NSSI Sample Characteristics | NSSI Functions Measure |
|---|---|---|---|---|---|
| 7 | Goncalves et al (2012); Portugal | Cross-sectional | Public schools | N= 56 (32 females)<br>Mean age= 15.27 (1.17) | Self-Injury Questionnaire-Treatment Related (SIQ-TR; Claes & Vandereycke, 2007)- Portuguese translation (non-validated) |
| 8 | Heath et al (2009); Canada | Cross-sectional | University | N= 23 (21 females)<br>Mean age= 20.22 (1.76) | Non-validated measure of reasons for NSSI |
| 9 | Kaess et al (2013); Germany | Cross-sectional | Psychiatric inpatient units | N=75 (43 female)<br>Mean age=16.5 (2.6) | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 10 | Kharsati et al (2015); India | Cross-sectional | English- medium colleges | N= 143 | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 11 | Kleindienst et al (2008); Germany | Cross-sectional | Psychiatry departments for treatment of BPD | N= 95 (95 females)<br>Mean age= 30.4 (8.1) | Non-validated questionnaire assessing motives for NSSI |
| 12 | Klonsky (2009); USA | Cross-sectional | University | N= 39 (30 females)<br>Mean age= 19.4 (2.4) | Non-validated questionnaire assessing functions of NSSI |
| 13 | Klonsky (2011); USA | Cross-sectional | Community | N=26 (16 females)<br>Mean age= 55.5 (16.6) | Non-validated questionnaire assessing functions of NSSI |

| | Author(s), Year, Country | Design | Sample Source | NSSI Sample Characteristics | NSSI Functions Measure |
|---|---|---|---|---|---|
| 14 | Kumar et al (2004); USA | Cross-sectional | Adolescent psychiatric inpatient unit | N= 50 (31 females) Mean age= 15.1 (1.2) | Self-Injury Motivation Scale (SIMS-II; Osuch et. al, 1999) |
| 15 | Laye-Gindhu et al (2005); Canada | Cross-sectional | Public school | N= 56 (43 females) | Non-validated questionnaire assessing motives for NSSI |
| 16 | Leong et al (2014); China | Cross- sectional | High school | N=345 (189 females) Mean age= 11.41 (2.63) | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 17 | Lindholm et al (2011); Sweden | Cross-sectional | Female psychiatric units | N= 26 (26 females) Mean age= 20 (3.1) | Inventory of Statements of Self-Injury (ISAS; Klonsky & Glenn, 2009) Swedish translation (non-validated) |
| 18 | Lloyd-Richardson et al (2007); USA | Cross- sectional | High school | N= 293 | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 19 | Martin et al (2010); Australia | Cross-sectional | Community | N=133 (72 females) | Non-validated measure of motivations for NSSI |
| 20 | Misra et al (2013); USA | Cross-sectional | University | N= 218 (134 females) Mean age= 20.1 (4.2) | Inventory of Statements about Self-Injury (ISAS; Klonsky & Glenn, 2009) |

| | Author(s), Year, Country | Design | Sample Source | NSSI Sample Characteristics | NSSI Functions Measure |
|---|---|---|---|---|---|
| 21 | Muehlenkamp et al (2013); USA | Cross-sectional | University | N=183 | Non-validated measure of NSSI functions |
| 23 | Nixon et al (2002); Canada | Cross-sectional | Adolescent psychiatric inpatient unit | N= 42 (36 females)<br>Mean age= 15.7 (1.7) | Non-validated measure of reasons for NSSI |
| 23 | Nock et al (2004); USA | Cross-sectional | Adolescent psychiatric inpatient unit | N= 89 (66 females) | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 24 | Oktan et al (2014); Turkey | Cross-sectional | High school | N= 245 (78 females) | Inventory of Statements About Self-Injury (Klonsky & Glenn, 2009) |
| 25 | Paul et al (2015); UK | Cross-sectional | University | Not reported for NSSI functions sub-sample | Non-validated measure of reasons for NSSI |
| 26 | Robertson et al (2013); USA | Cross-sectional | University | N=149 (104 females)<br>Mean age= 19.1 (2.4) | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 27 | Rodav et al (2014); Israel | Cross-sectional | High school | N=57 | The Ottawa Self-Injury Questionnaire (Cloutier & Nixon, 2003) |

| | Author(s), Year, Country | Design | Sample Source | NSSI Sample Characteristics | NSSI Functions Measure |
|---|---|---|---|---|---|
| 28 | Sadeh et al (2014); USA | Cross-sectional | Adolescent psychotherapy clinic | N=36 (32 females)<br>Mean age= 16.7 (2.3) | Inventory of Statements about Self Injury (ISAS; Klonsky & Glenn, 2009) |
| 29 | Saraff et al (2014); USA | Cross-sectional | University | N= 52 (44 females)<br>Mean age= 19.81 (1.92) | The Inventory of Statements About Self-Injury (ISAS; Klonsky & Glenn, 2000) |
| 30 | Snir et al (2015); USA | Longitudinal | Community | N= 29 (20 females) | Non-validated measure of explicit and inferred motives for NSSI alongside diary entries |
| 31 | Swannell et al (2008); Australia | Cross-sectional | Adolescent psychiatric inpatient unit | N= 38 (28 females)<br>Mean age females= 15.7 (1)<br>Mean age males= 16.1 (0.9) | Non-validated measure to assess motives for NSSI- Adapted the SIMS (Ousch et al., 1999) |
| 32 | Tan et al (2014); Singapore | Cross-sectional | Adolescent psychiatric outpatients | N= 30 (18 females)<br>Mean age= 16.30 (1.70) | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 33 | Taylor et al (2012); USA | Cross-sectional | University | N= 120 (91 females)<br>Mean age= 19.0 (2.2) | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 34 | Turner et al (2012); Canada | Cross-sectional | Social network websites | N= 162 (162 females)<br>Mean age= 22.47 (7.14) | Non-validated measure of NSSI functions |

| | Author(s), Year, Country | Design | Sample Source | NSSI Sample Characteristics | NSSI Functions Measure |
|---|---|---|---|---|---|
| 35 | Van Rooyen (2013) South Africa | Cross-sectional | University | N= 291 | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997) |
| 36 | Westers et al (2014) USA | Cross-sectional | Outpatient clinic | N=30 (21 females) | Self-Injurious Thoughts and Behaviour Interview (SITBI; Nock et al., 2007) |
| 37 | Wilcox et al (2012); USA | Cross-sectional | University | N= 75 (55 females) | Non-validated measure for reasons for NSSI |
| 38 | You et al (2013); China | Cross-sectional | High school | N= 413 | Non-validated measure for functions of NSSI- Adapted FASM (Lloyd, Kelly & Hope, 1997) |
| 39[a] | You et al (2015); China | Cross sectional | High school | N=17 | Non-validated measure of NSSI functions |
| 39[b] | You et al (2015) China | Cross sectional | High school | N=13 | Non-validated measure of NSSI functions |
| 39[c] | You et al (2015) China | Cross sectional | High school | N=12 | Non-validated measure of NSSI functions |

| | Author(s), Year, Country | Design | Sample Source | NSSI Sample Characteristics | NSSI Functions Measure |
|---|---|---|---|---|---|
| 40[a] | Zanaraini et al (2013); USA | Longitudinal study | Psychiatric inpatient unit | N =133 (102 females) Mean age= 27.6 (5.9) | Lifetime Self-Destructiveness Scale (LDLS; Zanarini et. al, 2006) |
| 40[b] | Zanaraini et al (2013); USA | Longitudinal study | Psychiatric inpatient unit | N =129 (107 females) Mean age= 26.3(5.4) | Lifetime Self-Destructiveness Scale (LDLS; Zanarini et. al, 2006) |
| 41 | Zetterqvist et al (2013); Sweden | Cross-sectional | High school | N= 836 | The Functional Assessment of Self-Mutilation (FASM; Lloyd, Kelly & Hope, 1997)- Swedish translation (validated) |

Table 2

*Quality Assessment of Included Studies (n=41)*

| **Authors** | **Unbiased Selection of Cohort** | **Adequate Description of the Cohort** | **Validated Measure for Determining NSSI** | **Validated Methods for Ascertaining Functions of NSSI** | **Adequate Handling of Missing Data** |
|---|---|---|---|---|---|
| Baetens et al (2015) | Partial | Partial | Partial | Partial | Cannot tell |
| Calvete et al (2015) | Partial | Partial | Partial | Partial | No |
| Claes et al (2010) | Partial | Partial | Yes | Yes | Cannot tell |
| Csorba et al (2009) | Partial | Partial | Partial | Partial | Cannot tell |
| Dahlstrom et al (2015) | Yes | Yes | Yes | Yes | No |
| Garcia-Nieto et al (2015) | Partial | Yes | Yes | Yes | Yes |
| Goncalves et al (2012) | Partial | Partial | Partial | Partial | Cannot tell |
| Heath et al (2009) | Partial | Partial | No | No | Cannot tell |
| Kaess et al (2013) | Yes | Yes | Yes | Yes | Cannot tell |
| Kharsati et al (2015) | Partial | Partial | Yes | Yes | No |
| Kleindienst et al (2008) | Yes | Yes | No | No | Cannot tell |
| Klonsky (2009) | Yes | Yes | No | No | Cannot tell |
| Klonsky (2011) | Yes | Yes | Partial | Partial | Cannot tell |
| Kumar et al (2004) | Partial | Yes | Partial | Partial | Cannot tell |
| Laye-Gindhu et al (2005) | Partial | Partial | No | No | Cannot tell |
| Leong et al (2014) | Partial | Yes | Yes | Yes | Cannot tell |
| Lindholm et al (2011) | Partial | Partial | Partial | Partial | Cannot tell |
| Lloyd-Richardson et al (2007) | Yes | Yes | Yes | Yes | Cannot tell |

| **Authors** | **Unbiased Selection of Cohort** | **Adequate Description of the Cohort** | **Validated Measure for Determining NSSI** | **Validated Methods for Ascertaining Functions of NSSI** | **Adequate Handling of Missing Data** |
|---|---|---|---|---|---|
| Martin et al (2010) | Yes | Yes | No | No | Partial |
| Misra et al (2013) | Yes | Yes | Yes | Yes | Partial |
| Muehlenkamp et al (2013) | Yes | Partial | Yes | Partial | No |
| Nixon et al (2002) | Partial | Yes | Partial | Partial | Cannot tell |
| Nock et al (2004) | Partial | Yes | Yes | Yes | Cannot tell |
| Oktan et al (2014) | No | Partial | Yes | Yes | No |
| Paul et al (2015) | Partial | Partial | Partial | Partial | No |
| Robertson et al (2013) | Partial | Yes | Yes | Yes | Cannot tell |
| Rodav et al (2014) | Partial | Partial | Partial | Partial | Cannot tell |
| Sadeh et al (2014) | Yes | Yes | Yes | Yes | Cannot tell |
| Saraff et al (2014) | Partial | Yes | Yes | Yes | Cannot tell |
| Snir et al (2015) | Yes | Yes | Yes | Partial | Partial |
| Swannell et al (2008) | Partial | Yes | Partial | Partial | Cannot tell |
| Tan et al (2014) | Partial | Yes | Yes | Yes | Cannot tell |
| Taylor et al (2012) | Yes | Yes | Yes | Yes | Cannot tell |
| Turner et al (2012) | Yes | Yes | Partial | No | No |
| Van Rooyen (2013) | Partial | Partial | Yes | Yes | Partial |
| Westers et al (2014) | Partial | Partial | Yes | Yes | Cannot tell |
| Wilcox et al (2012) | Partial | Yes | No | No | Cannot tell |
| You et al (2013) | Partial | Partial | Partial | Partial | Cannot tell |

| **Authors** | **Unbiased Selection of Cohort** | **Adequate Description of the Cohort** | **Validated Measure for Determining NSSI** | **Validated Methods for Ascertaining Functions of NSSI** | **Adequate Handling of Missing Data** |
|---|---|---|---|---|---|
| You et al (2015) | Partial | Yes | Partial | Partial | Cannot tell |
| Zanaraini et al (2013) | Partial | Yes | Yes | Yes | Cannot tell |
| Zetterqvist et al (2013) | Yes | Partial | Yes | Yes | Partial |

## Meta-analysis

Twenty-four studies contributed suitable data to calculate prevalence estimates for functions of NSSI. The study by Zanaraini et al. (2013) contributed two separate prevalence estimates and the study by You et al. (2015) contributed three separate prevalence estimates for the meta-analysis. Results from the meta-analysis are presented in Table 3. Sensitivity analysis was used to estimate the contribution of individual studies to heterogeneity.

Table 3

*Meta-analysis Results*

| **Functions of NSSI** | **No. of studies (N)** | **No. of participants (N)** | **Prevalence Ranges %** | **Pooled Prevalence % [95% CI]** | **Heterogeneity % ( $I^2$ )** |
|---|---|---|---|---|---|
| Intrapersonal | 24 | 3004 | 35.7- 100.0 | 69.1 [61.6- 76.1] | 96.4 |
| Emotional Regulation | 24 | 2978 | 35.7- 99.4 | 67.0 [60.0 - 73.6] | 95.7 |
| Escape a Negative/ Unwanted State | 23 | 2847 | 31.5- 99.4 | 64.9 [57.6- 71.9] | 95.8 |
| Induce a Positive/ Wanted State | 23 | 2120 | 3.0 - 92.1 | 45.2 [37.6- 53.0] | 96.1 |
| Self-Punishment | 22 | 1675 | 14.8 – 100 | 46.6 [35.4- 58.0] | 98.0 |
| Interpersonal | 22 | 1708 | 3.1 – 96.2 | 38.5 [28.0- 49.4] | 98.2 |
| Communicate Level of Distress | 15 | 715 | 5.3 - 85.2 | 42.2 [26.4- 58.8] | 97.8 |
| Interpersonal Influence | 8 | 166 | 3.1 – 65.2 | 26.4 [20.3- 32.9] | 95.6 |
| Punish Others | 22 | 1466 | 6.6 – 50.0 | 18.0 [10.9- 26.4] | 90.1 |

*Note*. CI= confidence interval.

**Intrapersonal functions of NSSI.** Intrapersonal functions were identified where the aim of NSSI was to manage or change one's internal state (e.g. emotions, thoughts, physical sensations). Prevalence estimates for intrapersonal functions ranged from 35.7%- 100.0% across included studies. The overall random-effects pooled prevalence for this function was estimated to be 69.1%, 95% CI [61.6- 76.1]. *Emotional regulation* functions applied where NSSI was used to induce a change in emotional state or affect-laden thoughts. The prevalence of this function was estimated to be 67.0%, 95% CI [60.0- 73.6]. Where emotional regulation functions were related to *escaping negative or unwanted states* (e.g. "to stop bad feelings"; "to escape negative thoughts"), meta-analysis results suggested a prevalence of 64.9%, 95% CI [57.6- 71.9]. Results for emotional regulation functions related to *inducing a positive or wanted state* (e.g. "to feel relaxed"; "to be in control") estimated a prevalence of 45.2%, 95% CI [37.6- 53.0]. *Self-punishment* functions were identified where NSSI was used to punish or hurt oneself for various reasons (e.g. "to punish myself for being bad"; "to punish myself for the bad thoughts I have"). The prevalence of this function was suggested to be 46.6%, 95% CI [35.4-58.0]. All intrapersonal functions prevalence estimates included high levels of heterogeneity (with $I^2$ values ranging from 95.7%- 98.0%).

**Interpersonal functions of NSSI.** For this review, interpersonal functions were identified where NSSI was used to influence or change one's external environment (e.g. to increase social support or influence the behaviour of others). Prevalence estimates for interpersonal functions ranged from 3.1% - 96.2% across studies. The overall random-effects pooled prevalence for this function was estimated to be 38.5%, 95% CI [28.0- 49.4]. *Communicating distress* functions were applied where NSSI was used to convey distress to others (e.g. "to show others how desperate I am"; "to show others how hurt I am"). For this function, meta-analysis results suggested an overall prevalence of 42.2%, 95% CI [26.4- 58.8]. *Interpersonal influence* functions were identified where NSSI was used to change others'

behaviour or to evoke a particular response (e.g. “to get others to notice me”; “to seek care from others”). Prevalence estimates for this function were suggested to be 26.4%, 95% [CI 20.3-32.9]. *Punish others* functions were applied where NSSI was used to intentionally hurt or induce emotional pain in others (e.g. “to hurt someone else”; “to make others angry”). The prevalence of this function was estimated to be 18.0%, 95% CI [10.9-26.4] with substantial heterogeneity ($I^2$= 90.1%). This level of heterogeneity appeared attributable to one study (Swannell et al., 2008). However, the removal of this study resulted in slightly reduced prevalence (15.0%), but still high between-study heterogeneity ($I^2$= 87.7%). All other interpersonal prevalence estimates had high levels of heterogeneity (with $I^2$ values ranging from 90.1%- 97.8%).

**Sensitivity analysis**. Due to substantial levels of heterogeneity identified in the analysis, attempts were made to remove any potentially outlying studies however this did not reduce levels of between-study heterogeneity. As a result, it was not possible to attribute high rates of heterogeneity to any one study. Even when studies were limited to the same population or the same measure of NSSI functions (e.g. limiting analysis to only those studies using the FASM), high levels of heterogeneity remained.

**Findings from studies not eligible for the meta-analysis**

Studies which did not provide suitable data for calculating prevalence estimates (i.e. studies which did not report the number or percentage of participants endorsing NSSI functions) were not included in the meta-analysis. However, findings from these studies (n=17) identified intrapersonal functions of NSSI as being most commonly endorsed by participants. Specifically, intrapersonal functions which related to *emotional regulation* and *escaping negative/ unwanted states* were most highly endorsed among the majority of these studies (n=15); consistent with meta-analysis findings. Interpersonal functions related to

*communicating distress* and *interpersonal influence* were most frequently endorsed (n=10), again consistent with findings from the meta-analysis. However, it is worth noting that the quality of these studies was compromised by the use of varying measures of NSSI including measures which used different metrics or anchor points for rating items. As such, it was difficult to compare or combine findings from these studies.

## Discussion

This paper reviewed forty-one studies with the aim to explore commonly endorsed functions of NSSI and the prevalence of each of these different functions. It was hoped that findings would give a clearer indication of the needs of a self-harming population and provide useful information for developing interventions and services. This included identifying any potential treatment implications for various functions of NSSI.

Findings from the review supported commonly endorsed NSSI functions identified in existing studies (Klonksy, Victor & Saffer, 2014; Lloyd-Richardson et al., 2007). Specifically, results from the meta-analysis suggested that intrapersonal functions of NSSI were most prevalent (69.1%) in a self-harming population. Emotional regulation functions were also highly prevalent (67.0%), particularly those functions related to reducing negative/ unwanted states (65%). This finding was consistent with previous research which found converging evidence for affect-regulation functions in NSSI (Klonsky, 2007), particularly functions which involved reducing negative emotions/ thoughts (Selby, Nock & Kranzter, 2014). Lower prevalence estimates were evident for functions related to inducing positive/ wanted states (45.2%) and self-punishment (46.6%) but high levels of heterogeneity were still evident. Interpersonal functions of NSSI were less prevalent (38.5%) than intrapersonal functions (69.1%) however, there was considerable endorsement of functions related to communicating

distress to others (42.2%). This was consistent with previous research which identified "signalling distress to others" as a frequent function of NSSI (Nock, 2007). Lowest prevalence estimates were evident for NSSI functions related to influencing others (26.4%) and punishing others (18.0%).

While these prevalence estimates provide an indication of the range and extent of NSSI functions, it is difficult to draw conclusions from these findings due to substantial variability between the studies. Indeed, all prevalence estimates calculated had high levels of heterogeneity which were beyond what would be expected from any systematic review (Higgins & Thompson, 2002). In this case, it seems important to consider possible clinical and methodological reasons for this and any implications for future research (Higgins & Thompson, 2004).

One methodological issue was the lack of consistent measures for functions of NSSI. This review found that half of included studies used non-validated measures, often consisting of items generated by study authors with limited rationale or evidence for the choice of the items. This raises obvious issues in relation to the suitability and validity of these measures. In addition, a number of studies translated existing NSSI measures without appropriate validation, resulting in possible cultural and conceptual limitations. Moreover, this review highlighted significant variability in the choice of validated NSSI measures even where studies were similar in design and methodology. This included significant variations in the structure and type of questionnaires used to identify and qualify NSSI. This was perhaps reflective of wider inconsistencies in the literature around the definition of NSSI (Klonksy, 2007). However, it may also be an indication of the challenges of designing questionnaires which accurately elicit complex information about motives or reasons for NSSI (Edmundson et al., 2016). Indeed, research into NSSI has highlighted the need for more in-depth, reliable and valid measures of NSSI functions (Laye-Gindhu & Schonert-Reichi, 2005).

Moreover, the significant variability in the findings from this review may also be explained by conceptual issues surrounding functions of NSSI. Research has long established the complex nature of NSSI including the significant variability in its functions (Andover, 2012). Indeed, there is evidence that many people endorse multiple functions of NSSI which are often overlapping or inter-related (Lloyd-Richardson et al., 2007). This is likely to make it difficult to accurately categorize groups of NSSI functions or indeed sub-groups of those who self-harm. This is further complicated by prospective studies which indicate that methods and functions of NSSI change significantly over time (Owens et al., 2015; Zanarini et al., 2013). This instability in function could mean that even across similar or the same samples, endorsement of functions may fluctuate from moment to moment, accounting for the high heterogeneity seen in this review. One explanation may be that the functions of any particular act of NSSI may only be weakly informed by individual-level traits and heavily influenced by contextual factors (e.g. specific triggers, location etc.) leading to the high within-person variability evident in longitudinal studies (Snir et al., 2015; Zanaraini et al., 2013).

Consequently, these findings may have implications for clinical interventions which largely target functions of NSSI. Such interventions, for example DBT, aim to replace NSSI with less harmful behaviours which serve similar functions to NSSI (Peterson, Freedenthal, Sheldon & Andersen, 2008). Findings from this review question whether targeting functions of NSSI is possible, or even helpful, in a clinical context given the variability and plurality in functions for this population. Notably, the evidence-base for these types of interventions, and indeed other NSSI interventions, remains limited (Gonzales & Bergstrom, 2013; Hawton et al. 2015; Warner & Spandler, 2012). This is supported by research which suggests existing models of NSSI do not account for the underlying processes which drive and maintain NSSI behaviour (Fox et al., 2015). This includes limited attention to the varying contexts in which NSSI occurs and limited recognition of individuals who do not wish to stop or reduce their self-harm

(Klonksy & Muehlenkamp, 2007; Laye-Gindhu & Schonert-Reichi, 2005). Further exploration of these underlying processes appears important to better understand NSSI and improve treatment options.

One possible underlying mechanism of NSSI is the beliefs or appraisals that individuals hold about their self-harm. At present, research in this area is limited but suggests that individuals may hold varying beliefs about their self-harm which can impact on their engagement with treatment (Laye-Gindhu & Schonert-Reichi, 2005). Indeed, there is growing evidence in other areas of harmful behaviour, for example eating disorders and addictions, which indicate that individuals' beliefs are central to help-seeking, treatment and recovery (DiClemente, Schlundt & Gemmell, 2004; Williams & Reid 2010). It is likely that, unlike functions of NSSI, individuals' beliefs about NSSI remain stable over time and may therefore be a better target of interventions. Indeed, some research has shown that health-related beliefs remain stable over time and significantly influence engagement and adherence to treatment (Kaufman et al., 2016; Porteous, Francis, Bond & Hannaford, 2010). Understanding the belief processes which underpin NSSI may therefore be vital to better understanding this phenomenon.

The current findings also have implications for research in NSSI. Future claims that a certain NSSI function has a particular prevalence need to be tempered by the recognition that any one study is unlikely to provide a reliable or meaningful estimate of prevalence (or at least that prevalence rates may possibly represent state-like rather than trait-like phenomena). Likewise, the aggregated prevalence rates reported in this review should be viewed with caution, but will nonetheless be more informative than those derived from individual studies.

## Limitations

While this review contributed novel and important information about the study of NSSI functions, it should be considered in light of some limitations. Meta-regression was not conducted; however, such analyses were not planned in the original registered protocol and there is a danger of high Type I error (false positives) associated with using techniques like meta-regression in a post-hoc way (Higgins & Thomson, 2004). Additionally, this review only included studies published in English and therefore it is difficult to know how generalizable findings are to other populations. However, the review did include studies from range of countries including non-English speaking populations. Moreover, this review did not discriminate between male and female samples in its analysis. It may be likely that functions of NSSI operate differently for males and females as there is some evidence that females endorse particular NSSI functions more frequently than males (Zetterqvist, Lars-Gunnar & Svendin, 2014). However, the majority of studies included in this review had predominately female samples and therefore it was difficult to accurately identify any gender differences.

## Conclusions and recommendations

Findings from this review support existing research exploring intrapersonal interpersonal and functions of NSSI (Lloyd-Richardson, 2007). Overall, intrapersonal functions (particularly emotional regulation functions) appear most prevalent in a NSSI population. It seems important that clinicians and researchers continue to explore functions of NSSI and consider the complex and varying reasons why individuals self-harm. However, the varying quality of studies included in this review suggests that there is a need to develop more robust and consistent measures of NSSI functions. This includes measures which accurately capture the fluctuating and overlapping nature of NSSI functions. In this case, it may be beneficial for future research to adopt longitudinal designs, for example experiential-sampling

methods (ESM), which may look more closely at the varying context of NSSI functions. This review also suggests a need for new research into the underlying processes of NSSI functions, specifically individuals' beliefs or appraisals about NSSI. In doing so, it is hoped that more effective and targeted interventions can be developed for those who self-harm.

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## Chapter 2: Empirical Paper

# A measure of positive and negative self-harm beliefs: The Self-Harm Beliefs Scale (SHBS)[1]

[1] To be submitted to the British Journal of Clinical Psychology (5000 word limit excluding abstract, tables, figure and references); Appendix C

## Abstract

***Objectives:*** The current study aimed to develop a measure of positive and negative beliefs in non-suicidal self-injury (NSSI), the Self-Harm Beliefs Scale (SHBS). A secondary aim was to explore the impact of these beliefs on NSSI behaviour. ***Design:*** The study adopted a cross-sectional design. ***Methods:*** Adults (n=98) with a history of NSSI were recruited from general and clinical populations across the North-West of England. The relationship between beliefs and NSSI behaviour (i.e. current NSSI, NSSI severity and future likelihood of NSSI) were assessed. The impact of NSSI beliefs on shame and mental well-being were also explored. ***Results*****:** The SHBS demonstrated good reliability and convergent validity. Individuals with current and historic experience of self-harm endorsed positive and negative beliefs about NSSI. Increased endorsement of positive beliefs appeared to predict current NSSI behaviour as well as future likelihood of NSSI. Both positive and negative beliefs were significant predictors of shame however, only negative beliefs significantly predicted mentalwell-being. NSSI beliefs did not appear to significantly predict NSSI severity. ***Conclusions*****:** The SHBS is a reliable and valid measure of beliefs about NSSI and presents as a useful clinical and research tool. Exploring NSSI beliefs appears important for better understanding the maintenance of NSSI and improving treatment approaches for this population.



*Keywords*: Non-suicidal self-injury (NSSI), positive beliefs, negative beliefs, shame, mental well-being


**Practitioner points**

- The SHBS presents as a reliable and novel clinical and research tool
- Exploring beliefs about NSSI seems important to better understand the maintenance of NSSI and improve treatment outcomes

- Further exploration of the reliability of the SHBS is required with larger, more diverse samples
- Future research should explore the relationship between specific aspects of shame and NSSI beliefs in more detail

## Introduction

Non-suicidal self-injury (NSSI) is defined as the deliberate and intentional destruction of one's body without suicidal intent (Klonsky, 2007). Prevalence estimates for NSSI range from 1%-4% in adults (Nock, 2009) and 13%-23% in adolescents (Jacobson & Gould, 2007) with evidence of rates increasing in more recent years (Muehlenkamp, Claes, Havertape, & Plener, 2012). NSSI is a clinical and public health concern for a number of reasons. Firstly, it is associated with a range of mental health difficulties including depression, anxiety and eating disorders (Mangnall & Yurkovich, 2008) and it is one of the strongest predictors of suicide (Hawton, Zahl & Weatherall, 2003). NSSI often evokes negative reactions from others which can reinforce stigma for those who self-harm and increase social isolation (Ferrey et al., 2016). Moreover, NSSI often results in a range of emotional consequences for the individual including shame, guilt and regret which can heighten feelings of isolation and emotional distress (Gratz, 2003). This can be further reinforced by the physical consequences of NSSI, such as scarring, which increase feelings of shame and guilt. As a result, the unintended consequences of NSSI can perpetuate NSSI behaviour for individuals, often increasing its severity (Saraff, Trujillo, & Pepper, 2015).

Given the adverse emotional, social and physical consequences of NSSI, it is important that research seeks to understand the psychological processes which maintain NSSI behaviour. This includes a better understanding of individuals' motivations for engaging in NSSI and how this may impact on decisions to seek help (Fortune, Sinclair, & Hawton, 2008). Indeed, there is evidence that some individuals do not wish to stop or reduce NSSI (Kress & Hoffman, 2008). Research in this area has highlighted that NSSI can serve many functions for individuals including the reduction of distressing thoughts, distraction from feelings of loneliness and the release of tension (Laye-Gindhu & Schonert-Reichl, 2005). Additionally, research has shown that the functions of NSSI are often influenced by the individual's personal context; for

example, a lack of social support, complex family difficulties or abusive early life experiences (Madge et al., 2011). However, it is likely that motivations for NSSI are also underpinned by the individuals' beliefs about NSSI; for example, a belief that NSSI is the only way to cope with distress. Whilst related, beliefs about NSSI are likely to be more stable than given functions of NSSI, representing overarching judgements or appraisals of NSSI. Also, beliefs may capture perceived longer-term consequences of NSSI whilst functions focus on immediate consequences. This means beliefs and functions may also appear contradictory at times (e.g. someone may engage in NSSI to reduce negative feelings even whilst holding the belief that NSSI leaves them feeling depressed). Exploring individuals' beliefs about NSSI may be central to better understanding this phenomenon and developing more targeted interventions for this population. A clearer understanding of individuals' beliefs may also contribute important information about the maintenance of NSSI and individuals' motivation for treatment.

To date, empirical research exploring individuals' beliefs about NSSI is limited to qualitative research with the exception of one quantitative study (Lamb, 2012). However, there is evidence within eating disorder literature that individuals' beliefs about anorexia and/or bulimia play a central role in treatment engagement (Williams & Reid, 2010). Research has identified that patients can endorse positive beliefs (e.g. a belief that anorexia helps them feel a sense of control) and negative beliefs (e.g. a belief that anorexia is causing relationship difficulties) which can influence motivation for change and the maintenance of their eating difficulties (Gale, Holliday, Troop, Serpell, & Treasure, 2006). As a result, those with eating disorders often feel reluctant to give up the perceived positive aspects of their eating behaviour despite acknowledging the negative effect on their well-being (Colton & Pistrang, 2004).

These findings are important as they may facilitate a better understanding of NSSI given the similarities in the clinical presentation of eating disorders and NSSI. Indeed some authors argue that eating disorders and NSSI are manifestations of the same underlying difficulties with

both groups of behaviour representing similar processes of relieving distress (Cross, 1993). Moreover, both eating disorders and NSSI involve harmful behaviours which physically damage or mark the body in an attempt to cope with overwhelming psychological distress (Ross, Heath, & Toste, 2009). There is also some evidence to suggest that eating disorders are a sub-type of NSSI behaviour, similar to cutting or burning the body (Sansone, Levitt, & Sansone, 2003). Given these similar processes, this study chose to adapt an eating disorder beliefs scale, the Pros and Cons of Anorexia scale (P-CAN; Serpell, Teasdale, Troop, & Treasure, 2004), to explore beliefs in a self-harming population. The P-CAN has demonstrated good reliability and validity in anorexic populations (Gale et al., 2006).

It seems plausible that, like individuals with eating disorders, those who self-harm will endorse positive and negative beliefs about NSSI. This is supported by evidence from qualitative studies where individuals report positive and negative aspects of NSSI, for example, describing NSSI as an effective coping strategy but also reporting that NSSI disrupts personal relationships (Harris, 2000; Hill & Dallos, 2012). It is likely that positive beliefs will mean an individual is more likely to rely on NSSI as a coping strategy during difficult circumstances or periods of stress. However, negative beliefs may not necessarily mean that an individual is less likely to use NSSI, but rather negative beliefs may increase NSSI behaviour. For example, it is likely that negative beliefs are associated with feelings of shame or guilt which may promote further NSSI as a way to cope with distress. As such, it is likely that addressing NSSI beliefs will be an important aspect of clinical interventions for self-harming populations. Indeed, a recent review highlighted that current literature on NSSI lacked an understanding of how perceived positive aspects of NSSI may contribute to the persistence of NSSI behaviour (Edmondson, Brennan, & House, 2016).

At present, assessment methods for NSSI focus solely on behavioural aspects of NSSI (i.e. frequency or severity of NSSI). While this is important, these methods do not account for

individuals' beliefs about NSSI and how this may influence the maintenance of NSSI (Kress & Hoffman, 2008). Therefore, it may be important that clinicians begin to use assessment measures which include an exploration of individuals' beliefs about NSSI. This is likely to better inform clinicians about processes maintaining NSSI behaviour and allow more targeted interventions to be developed for this population. This is particularly important given the limited effectiveness of current interventions and the ongoing need to establish more tailored interventions for those who self-harm (Hawton et al., 2015; Muehlenkamp, 2006). At present no measure of NSSI beliefs has been established in the literature.

The primary aim of this study was to develop a reliable and valid measure of positive and negative beliefs about NSSI, the Self-Harm Beliefs Scale[2] (SHBS). Given the parallels between eating disorders and NSSI, an existing beliefs scale for anorexia (Serpell et al., 2004) was adapted for use with a self-harming population. Adapting measures for psychological research has been demonstrated frequently in NSSI and suicide studies (Klineberg, Kelly, Stansfeld, & Bhui, 2013; McCann, Clark, McConnachie, & Harvey, 2006). Moreover, adapting an existing measure is less burdening to participants, services and researchers and is therefore recommended where possible in research (Artino, La Rochelle, Dezee, & Gehlbach, 2014). A second aim of this study was to explore how positive and negative NSSI beliefs influence the maintenance of NSSI behaviour. It was hypothesized that 1) individuals with experience of self-harm will endorse both positive and negative beliefs on the SHBS; 2) individuals currently self-harming will endorse more positive beliefs than individuals who no longer self-harm, 3) the SHBS will demonstrate convergent validity, characterized by moderate to large correlations

[2] The term "self-harm" was used to describe NSSI as this a more familiar term for a UK lay audience. Subsequently, items on the SHBS and all other study materials refer to self-harm rather than NSSI.

between greater endorsement of positive and negative beliefs and greater shame, 4) greater endorsement of positive and negative beliefs will be related to more severe NSSI behaviour (operationalized as NSSI requiring medical treatment) and 5) greater endorsement of positive beliefs will be related to increased likelihood of future NSSI behaviour.

## Method

### Participants

Participants with a history of NSSI were recruited for the study across the North West of England between June and December 2015 (Appendix D). Participants were eligible to participate if they met the following criteria; a) were aged 18yrs or over, b) had adequate English language and literacy skills (to understand the researcher and complete study measures) and c) reported a history of two or more incidences of NSSI in their lifetime. The latter criterion was applied in order to exclude individuals for whom NSSI was a single uncharacteristic act. For the purposes of this study, NSSI was defined as an act of deliberate and intentional damage to ones' body without suicidal intent. Participants judged to be at immediate risk of harm to themselves, operationalized in the risk protocol (Appendix E) as participants with current suicidal intent with a specific plan and/or access to means, were excluded from the study.

A total of 98 participants were recruited for the study. The majority of participants were female (86.7%) and identified as White British (90.8%). Participants' age ranged from 18-49 years, with the majority of participants aged 18-29 years (89.8%). Over half of the sample were students (59.2%), a total of 57.1% had a current mental health diagnosis and 37.8% reported currently engaging with mental health services. The percentage of participants currently engaging in NSSI (i.e. those who self-harmed within the last year) was 53.1%. A total of 20.4% of the sample reported 2-30 separate incidents of NSSI in their lifetime, with the remainder of

the sample reporting much higher rates. The most frequently endorsed methods of NSSI were cutting (90.1%) and hitting oneself (61.2%).

## Measures

**Demographic questionnaire**. Participant demographic information was collected using a brief questionnaire designed for the study. This included details about participants' gender; age, ethnicity, employment status, contact with mental health services and mental health status.

**Self-injurious thoughts and behaviour interview- short form (SITBI-SF; Nock, Holmberg, Photos, & Michel, 2007)**. Participants' NSSI was assessed using the SITBI-SF which is a 72-item structured interview measuring the presence, frequency and severity of a variety of NSSI thoughts and behaviours. The authors report that the SITBI has good construct validity, demonstrated by high agreement with other measures of NSSI (average $\kappa = 0.93$).

**Warwick-Edinburgh mental wellbeing scale (WEMWBS; Tennant et al., 2007)**. Participants' mental well-being was measured using the WEMWBS which is a 14-item self-report scale. Items are reflective of positive aspects of mental health and are scored on a 1-5 Likert scale, with higher total scores indicating better wellbeing. The WEMBMS has demonstrated good content and criterion validity, with moderate correlations between WEMBS scores and other measures of mental health and well-being (Tennant et. al, 2007). In the current study, the WEMBWS had good reliability ($\alpha = .91$).

**The self-harm beliefs scale (SHBS).** Participants' beliefs about NSSI were measured using the SHBS which was developed for the study. This measure was based on the adaptation of the Pros and Cons of Anorexia Nervosa scale (P-CAN; Serpell et al., 2004) which is a 50-item self-report Likert scale, assessing positive and negative aspects of an eating disorder. The P-CAN has demonstrated good reliability in adult populations ($\alpha = .52–.78$; Serpell et. al,

2004). Permission to adapt the P-CAN for the purposes of this study was granted from the authors. Consultation with individuals with experiences of NSSI (Appendix F) was used to develop the SHBS and resulted in a 40-item self-report questionnaire. Items were rated on a 5-point Likert scale, ranging from +2 (*strongly agree*) to -2 (*strongly disagree*).

**Experience of shame scale (ESS; Andrews, Qian, & Valentine, 2002).** Participants' shame was measured using the ESS which is a 25-item self-report measure of characterological, behavioural and bodily shame. Items are rated on a 1-4 Likert scale with higher scores indicating higher levels of shame. The authors report that the total scale has good construct and discriminant validity (Andrews et al., 2002). In the current study the reliability for the ESS was very good ($\alpha = .95$).

## Power and precision

Power calculations estimated that fifty-five participants were required to achieve sufficient statistical power (Appendix G).

## Procedure

Ethical approval was sought from the National Research Ethics Service (NRES) and was granted in March 2015 (Appendix H). The study was a cross-sectional design using paper-based questionnaires. Study adverts (Appendix I) were placed in waiting rooms in NSSI support groups, community mental health services and student health services. Study adverts were also shared on local Gumtree and university websites. Potential participants contacted the researcher to express an interest in the study via a dedicated email address. The researcher contacted participants via telephone to discuss the details of the study, and if interested, participants were assessed for eligibility using a telephone screening and risk protocol

(Appendix E). Participants deemed too distressed to take part were managed using this risk protocol and signposted to relevant support services.

Eligible participants completed the study with the researcher at a university in the North West of England. Participants were given a study information sheet (Appendix J) and provided with the opportunity to ask questions about the study. Participants provided written consent and completed questionnaires lasting up to 1 hour (Appendix J). At the end of the study, participants were assessed for risk using a risk and safety plan protocol (Appendix K) which included relevant de-brief information. Participants were reimbursed for their time with receipt of a £15 online shopping voucher and given the option to receive a summary of the study findings. Where travel to the University was not possible for participants, the researcher arranged meetings at local community settings (e.g. GP surgeries or the participant's home) where the same procedure was followed.

**Statistical analysis**

Study data was analysed using the Statistical Package for Social Science (SPSS) version 20. Initial data screening identified that the assumption of normality was violated by one of the study of variables and therefore parametric tests could not be used to explore the relationship between variables (Appendix L). Preliminary analyses confirmed that the assumptions of multiple regression analyses were satisfied (Appendix L). For binary outcomes (current NSSI, NSSI severity, likelihood of future NSSI), Mann-Whitney U and logistic regression analyses were used to explore differences between groups. For continuous outcomes (shame, mental wellbeing) multiple linear regressions were used. As all questionnaires were completed with the researcher present there was very limited missing data and all cases were included.

## Results

### Psychometric properties of the SHBS

Mean item scores on the SHBS positive and negative beliefs subscales are presented in Table 4. Scores indicated that participants endorsed both positive and negative beliefs about NSSI. Assessment of item response frequencies indicated that each response category was endorsed by at least one participant for all items on the SHBS. Both the positive beliefs subscale ($\alpha$ = .86) and negative beliefs subscale ($\alpha$ = .85) demonstrated good internal consistency. Corrected item-total correlations (Appendix M) suggested little redundancy of items. Correlation analysis (Table 5) revealed a positive correlation between the two subscales suggesting that participants scoring highly on the positive beliefs subscale may also score highly on the negative beliefs subscale.

For the positive beliefs subscale, item 2 ("self-harm expresses my inner pain"), and item 23 ("self-harm helps me control my emotions") were most strongly endorsed by participants. Item 36 ("I like the way self-harm makes me look") and item 31 ("self-harm gives purpose to me life") were least endorsed by participants on this subscale. For the negative beliefs subscale, item 9 ("I worry that I have hurt people close to me because of my self-harm") and item 39 ("I feel sorry for the effect self-harm has had on my family") were most strongly endorsed. Item 3 ("self-harm has left me unable to feel") and item 24 ("thinking about self-harm takes up all of my time") were least endorsed by participants.

Table 4

*Mean Item Scores on the SHBS Subscales (n=98)*

| SHBS- Positive Beliefs Subscale | | | SHBS- Negative Beliefs Subscale | | |
|---|---|---|---|---|---|
| Item | Mean | SD | Item | Mean | SD |
| SHBS 1 | 0.03 | 1.2 | SHBS 3 | -0.78 | 1.2 |
| SHBS 2 | 0.89 | 1.0 | SHBS 5 | -0.12 | 1.1 |
| SHBS 4 | 0.28 | 1.3 | SHBS 7 | 0.32 | 1.4 |
| SHBS 6 | -1.27 | .9 | SHBS 9 | 0.89 | 1.3 |
| SHBS 8 | -0.62 | 1.2 | SHBS 11 | 0.47 | 1.3 |
| SHBS 10 | -0.87 | 1.1 | SHBS 14 | -0.46 | 1.2 |
| SHBS 12 | -0.44 | 1.2 | SHBS 16 | 0.61 | 1.3 |
| SHBS 13 | 0.28 | 1.4 | SHBS 20 | -0.26 | 1.3 |
| SHBS 15 | -0.95 | 1.2 | SHBS 21 | -0.43 | 1.3 |
| SHBS 17 | -0.68 | 1.3 | SHBS 24 | -0.97 | 1.2 |
| SHBS 18 | -0.28 | 1.3 | SHBS 25 | -0.50 | 1.2 |
| SHBS 19 | -0.87 | 1.2 | SHBS 27 | 0.71 | 1.4 |
| SHBS 22 | -0.73 | 1.1 | SHBS 29 | 0.59 | 1.4 |
| SHBS 23 | 0.49 | 1.3 | SHBS 30 | -0.24 | 1.3 |
| SHBS 26 | -0.65 | 1.2 | SHBS 32 | 0.64 | 1.3 |
| SHBS 28 | -0.82 | 1.2 | SHBS 35 | 0.40 | 1.2 |
| SHBS 31 | -1.33 | .9 | SHBS 37 | -0.63 | 1.2 |
| SHBS 33 | -0.87 | 1.0 | SHBS 38 | 0.66 | 1.3 |
| SHBS 34 | -0.09 | 1.3 | SHBS 39 | 0.85 | 1.2 |
| SHBS 36 | -1.39 | 1.0 | SHBS 40 | 0.73 | 1.3 |

*Note.* SHBS= Self-Harm Beliefs Scale.

**Relationships between SHBS subscales and NSSI**

Results from Mann-Whitney Tests revealed a significant difference in the positive belief scores of current (in the past year) self-harmers (*M*d= -55, n=52) and historic self-harmers (*M*d= -11, n=44), $U$ = 729.5, z = -3.05, p =.002, r = .31. A significant difference was also found in the negative belief scores of current self-harmers (*M*d= 8, n=52) and historic self-harmers (*M*d= 0, n=44), $U$ = 732.5, z = -3.03, p =.002, r = .31. These findings suggested that current self-harmers endorsed more positive and negative beliefs than historic self-harmers. A

significant difference was observed in negative belief scores between severe (i.e. NSSI which required medical intervention) NSSI (*M*d= 7, n=37) and non-severe NSSI (*M*d= 1, n=59), *U* = 803.5, z = -.2.17, p =.03, r = -.22. This finding suggested that only negative beliefs were related to NSSI severity, with greater endorsement of negative beliefs associated with NSSI which required medical attention. There was a significant difference in positive belief scores between participants who reported a high likelihood of future NSSI (*M*d= -5, n=49) and participants who reported a low likelihood of future NSSI (*M*d= -14, n=47), *U* = 551.0, z = -4.40, p =.001, r = .45. This suggested that participants endorsing more positive beliefs reported a greater likelihood of future NSSI.

**Correlations**

Spearman's correlations were performed to explore relationships between study variables. Point-biserial correlations were used for binary variables. As indicated in Table 5, a moderate positive correlation was found between shame and negative beliefs and between shame and positive beliefs. This suggested that higher levels of shame were associated with greater endorsement of positive and negative beliefs. A moderate negative correlation was found between mental wellbeing and positive beliefs suggesting that better mental wellbeing was associated with fewer positive beliefs. A similar relationship was also observed for negative beliefs.

Table 5

*Correlation Matrix of Study Variables, Means and Ranges within the Sample*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Mean/ N | Range |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Gender | _ | | | | | | | | | | | - | - |
| 2. Age | .03 | | | | | | | | | | | - | - |
| 3. MH Diagnosis | -.22* | .09 | | | | | | | | | | - | - |
| 4. Access MH Services | -.19 | .09 | .38** | | | | | | | | | - | - |
| 5. Current NSSI | -.28** | -.17 | .28** | .24* | | | | | | | | 52 | - |
| 6. NSSI Severity | -.09 | .01 | .37** | .32** | .41 | | | | | | | 37 | - |
| 7. Future Likel. NSSI | -.31** | .06 | .53** | .33** | .61** | .18 | | | | | | 49 | - |
| 8. Positive SHBS | -.12 | .16 | .22* | .11 | .31** | .06 | .45** | | | | | -9.9 | - 40 – 27 |
| 9. Negative SHBS | .07 | -.17 | .17 | .11 | .31** | .22* | .20 | .19 | | | | 2.5 | -23 – 38 |
| 10. WEMWBS Total | .25* | .01 | -.39** | -.19 | -.36** | -.18 | -.40** | -.31** | -.35** | | | 44.4 | 22 – 68 |
| 11. ESS Total | .10 | .02 | .31** | .27** | .30** | .26* | .28** | .30** | .32** | -.49** | _ | 74.6 | 32 – 100 |

*Note*. MH diagnosis= Participants who currently have a mental health diagnosis; Access MH services= Participants who currently access mental health services; Current NSSI = Participants who engaged in NSSI in last year; NSSI Severity= Participants who required medical treatment for NSSI; Future Likel. NSSI = Participants who reported a high likelihood of future NSSI; SHBS= Self-Harm Beliefs Scale; WEMWBS= Warwick-Edinburgh Mental Wellbeing Scale; ESS= Experience of Shame Scale
*$p$<.05, **$p$<0.01

Table 6

*Multiple Regression Results*

| | Current NSSI | | NSSI Severity | | Future Likelihood of NSSI | | WEMBS [a)] | | | ESS [b)] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | OR | 95% CI | OR | 95% CI | OR | 95% CI | B (SE) | β | 95% CI | B (SE) | β | 95% CI |
| Gender | 0.11 | [0.01, 1.10] | 1.08 | [0.25, 4.77] | 0.15 | [0.01, 1.67] | 4.83 (2.44) | .18 | [-0.03, 9.68] | 7.92 (4.45) | .16 | [-0.91, 16.75] |
| Age | 3.61 | [0.59, 21.91] | 1.48 | 0.27, 8.01 | 1.18 | [0.19, 7.45] | -0.39 (2.75) | -.01 | [-5.86, 5.08] | 3.59 (5.01) | .07 | [-6.36, 13.54] |
| Employment | 0.35 | [0.04, 3.51] | 2.03 | [0.28, 14.87] | 0.28 | [0.03, 3.07] | -0.86 (0.87) | -.09 | [-2.59, 0.88] | -2.20 (1.59) | -.12 | [-5.36, 0.96] |
| Current MH | 1.96 | [0.67, 5.70] | 4.27* | [1.42, 12.86] | 8.50** | [2.55, 28.27] | -4.50* (1.78) | -.25 | [-8.02, -0.96] | 7.55* (3,23) | .23 | [1.13, 13.97] |
| Access Services | 1.73 | [0.55, 5.43] | 2.68 | [0.97, 7.39] | 2.20 | [0.63, 7.73] | -0.40 (1.78) | -.02 | [-3.93, 3.13] | 4.74 (3.23) | .14 | [-1.68, 11.16] |
| Positive Beliefs SHBS | 1.07* | [1.01,1.12] | 0.98 | [0.94, 1.02] | 1.12** | [1.05, 1.19] | -0.13 (0.07) | -.18 | [-0.27, 0.01] | 0.37** (0.13) | .28 | [0.12, 0.62] |
| Negative Beliefs SHBS | 1.05* | [1.00, 1.10] | 1.03 | [0.99, 1.07] | 1.01 | [0.97, 1.06] | -1.19** (0.07) | -.27 | [-0.33, -0.06] | 0.28* (0.12) | .21 | [0.03, 0.52] |

*Note.* *p<0.05, **P<0.01; CI= Confidence interval for odds ratio (OR); Current NSSI = Participants who engaged in NSSI in last year; NSSI Severity= Participants who required medical treatment for NSSI; Future Likelihood of NSSI = Participants who reported a high likelihood of future NSSI; WEMWBS= Warwick-Edinburgh Mental Wellbeing Scale; ESS= Experience of Shame Scale; Employment= Participants currently employed; Current MH= Participants who currently have a mental health diagnosis; Access Services= Participants who currently access mental health services, SHBS= Self-Harm Beliefs Scale

a) $R^2$=.31, $\triangle R^2$=.26

b) $R^2$=.32, $\triangle R^2$=.27

### Multiple regression

A series of multiple regressions were performed to assess the impact of a number of predictor variables on NSSI, mental wellbeing and shame (Table 6). Multiple regressions were performed using the enter method. Gender, age, employment, mental health status and access to mental health services were entered into models as covariates. Positive and negative beliefs were entered as predictor variables to assess their independent contribution to each of the outcome variables. Logistic multiple regression was used for binary outcomes (current NSSI, NSSI severity and future likelihood of NSSI). Linear multiple regression was used for continuous outcomes (shame and mental wellbeing). Findings indicated that positive and negative beliefs were statistically significant predictors of current NSSI (i.e. NSSI in the last year). Positive beliefs were also a significant predictor of participants reporting a high likelihood of future NSSI. Neither positive nor negative beliefs significantly predicted NSSI severity (i.e. NSSI requiring medical treatment). Both positive and negative beliefs were significant predictors of shame however, only negative beliefs significantly predicted mental wellbeing.

## Discussion

The main aim of this study was to develop a measure of positive and negative NSSI beliefs; the SHBS. Findings suggested that the SHBS was psychometrically sound with both subscales demonstrating good internal consistency within the study. The SHBS also appeared to have good content validity with all scale items endorsed to some degree by both current and historic self-harmers. The SHBS demonstrated convergent validity by evidence of hypothesised moderate correlations between greater endorsement of positive and negative beliefs and greater shame. Findings suggested that items which related to beliefs that NSSI was an effective way of managing distress were most commonly endorsed by participants on the

positive beliefs subscale. On the negative beliefs subscale, most commonly endorsed beliefs related to the negative impact of NSSI on family and other personal relationships.

The second aim of this study was to explore the impact of beliefs on the maintenance of NSSI behaviour. As hypothesised, findings suggested that individuals currently self-harming endorsed more positive beliefs than those no longer self-harming. This was further supported by evidence that positive beliefs were the strongest predictor of current NSSI behaviour in the sample. A possible reason for this may be that positive beliefs contribute to the maintenance of NSSI. For example, it is likely that having more positive beliefs about NSSI may mean the individual is less likely to feel motivated to reduce or stop self-harming and may therefore continue to engage in NSSI. This is supported by qualitative research which highlights that many individuals who self-harm report a lack of motivation to reduce or stop NSSI due its positive aspects (Harris, 2000; Hill & Dallos, 2012; Wadman et al., 2016). This was also supported by findings from this study which showed that only positive beliefs were a significant predictor of participants' reported likelihood of future NSSI. This suggested that participants endorsing more positive beliefs were more likely to anticipate using NSSI in the future. This was consistent with findings from a recent qualitative study which reported that many self-harmers (including those who were recovered) struggled to imagine their lives without NSSI, stating that they felt almost dependent on it as coping strategy (Wadman et al., 2016). In this sense, it is plausible that holding more positive beliefs about NSSI may mean that individuals are more likely to anticipate using NSSI in the future, regardless of whether they currently self-harm.

Contrary to hypotheses, negative beliefs were also related to a greater likelihood of current NSSI behaviour. It may be that negative beliefs reinforce NSSI behaviour because they induce feelings of shame or self-criticism which the individual may then feel compelled to alleviate by NSSI. This is supported by a large body of research which states that NSSI is used

to manage or cope with distressing emotions (Chapman, Gratz, & Brown, 2006; Klonsky, 2007; Muehlenkamp, Brausch, Quigley, & Whitlock, 2013). In this case, it is plausible that negative beliefs present as particularly problematic for individuals as they are likely linked to distressing emotions, such as shame or guilt, which perpetuate and maintain a vicious cycle of NSSI behaviour.

Findings from this study also showed that positive and negative beliefs were significant predictors of shame. A possible reason for this may be that possessing positive beliefs about NSSI may in itself be an adverse experience for the individual. For example, it is possible that positive beliefs would conflict with stigma and many negative social messages associated with NSSI; for example, messages that NSSI is 'repulsive' or 'attention-seeking' (Law, Rostill-Brookes, & Goodman, 2009; Newton & Bale, 2012). Positive beliefs may also conflict with negative messages from the individual's family or friends whom may feel horrified at their loved one's NSSI and who may be eager for the individual to stop (Ferrey et al., 2016). In this context, holding positive beliefs about NSSI may feel 'bad' or 'wrong' and induce strong feelings of shame for the individual self-harming. This is consistent with evidence that the most commonly endorsed negative beliefs on the SHBS related to the adverse impact of NSSI on families or significant others (e.g. "I hate that others worry about me because of my self-harm").

Moreover, it is possible that negative beliefs reinforce feelings of shame through a similar process. For example, it is likely that negative beliefs are consistent with stigma or societal messages about the dangerousness of NSSI which is likely to increase feelings of shame. Additionally, negative beliefs may also mean an individual is more likely to secretly engage in NSSI or attempt to hide it from family or friends, which may heighten feelings of shame. This is supported by research which reports that many individuals keep their NSSI hidden from others due to fears that others will react negatively or lack understanding (Austin

& Kortum, 2004; Gratz, 2003). It is also likely that holding negative beliefs may mean an individual is more likely to feel shame in relation to physical scars or marks as a result of NSSI. Moreover, study findings showed that negative beliefs were a significant predictor of mental wellbeing. It is likely that this can be explained by a similar process to that described above. For example, it is plausible that individuals possessing more negative beliefs are more likely to feel distressed about their NSSI, resulting in poorer wellbeing.

It is worth noting that neither positive nor negative beliefs were significant predictors of NSSI severity. This may be because NSSI severity is better explained by the context in which it occurs, for example, the particular circumstances which precipitate an act of NSSI. Indeed, some research has shown that psychosocial events such as tenuous family relationships and parental criticism are more likely to trigger severe acts of NSSI (Muehlenkamp & Gutierrez, 2004; Muehlenkamp & Gutierrez, 2007).

**Limitations**

Findings from this study should be viewed in light of several limitations. This initial study consisted of a relatively small sample and therefore data on the scores, reliability and validity of the SHBS should be considered as preliminary. Additionally, the limited sample size meant that factor analysis was not possible to explore the factor structure of the SHBS. A lack of existing belief measures in relation to NSSI meant that an assessment of concurrent validity was also not possible. It is worth nothing that the SHBS items were written in the present tense (e.g. “self-harm gives structure to my life”), which may have made it more difficult for historic self-harmers to relate to the items. As such, current self-harmers were likely to be better able to relate to the items on the SHBS and may have felt more able to endorse items as a result.

Additionally, while the SHBS was developed in consultation with individuals with experience of self-harm, consultation with experts (i.e. clinicians and researchers) in the field of self-harm may have strengthened the SHBS. This may been particularly useful prior to generating/ adapting items for the SHBS in order to identify any other relevant items. Furthermore, as the SHBS was developed through the adaptation of an eating disorders questionnaire and is therefore based on a different clinical population, it may lack items which are particularly pertinent to a self-harming population. For example, the SHBS does not account for the chronicity of self-harm often seen in clinical populations (Manca, Presaghi & Cerutti, 2014) and does not acknowledge that self-harm may be the only way an individual has learned to cope with distress. The SHBS is also limited in measuring individuals' beliefs around pleasure-seeking through self-harm as well as beliefs about self-harm being an effective way to control one's environment or punish others (Dixon-Gordon, Harrison & Roesch, 2012). Given these limitations, the SHBS is likely to be limited in addressing the full range of beliefs which underlie individuals' motivations to engage in self-harm. As such, the SHBS may have limited utility across the full range of clinical populations/ presentations and clinical settings. For example, the SHBS may not capture the full range of self-harm beliefs evident in forensic or personality disorder populations and therefore may be less clinically useful in these settings.

This study used a cross-sectional design and therefore causality or direction of effect could not be inferred. Additionally, sub-differences within participants' gender (i.e. participants identifying as neither male or female) were apparent for a small number of cases. However due to the limited scope of this study, these sub-groups were combined with the small number of male participants to form an "other" gender group which was used as a comparison group with females. While this was not ideal, it was felt that sub-differences in gender warranted a separate study which could better recruit these groups of self-harmers and look more closely at their experiences.

## Clinical implications

The SHBS is likely to be a useful clinical tool to help practitioners and service users explore positive and negative belief about NSSI. This is likely to be important in better understanding the maintenance of NSSI and individuals' motivations for treatment. In doing so, it is likely that more targeted interventions could be developed for this population. This may include interventions which mirror those used in eating disorder or addiction populations, such as motivational interviewing (Britton, Bryan, & Valenstein, 2016), which are likely to be more effective at targeting positive and negative aspects of NSSI behaviour. This is likely to improve levels of treatment engagement and outcomes for this population.

Additionally, the SHBS presents as a clinically useful tool for exploring individuals' beliefs about self-harm in the context of personal or systemic formulations. For example, the SHBS could be used to elicit important information about an individual's paradoxical motivations for self-harm which could then be incorporated into a wider personal formulation. This could extend to systemic formulations as the SHBS may provide useful information about an individual's beliefs about self-harm in the context of their social environment or relationships with others. This may be particularly useful in inpatient settings where staff may struggle to understand an individual's positive beliefs about self-harm or to manage the risks associated with frequent self-harm behaviour. In this context, the use of the SHBS may promote a more holistic or shared understanding of the individual and their self-harm. It may also improve the individual's own understanding of their self-harm and reduce any associated distress.

The SHBS may also be a useful tool for clinical research. At present, there are no existing measures of NSSI beliefs and so research has largely neglected exploring this construct, with the exception of a few studies (Harris, 2000; Lamb, 2012; Wadman et al., 2016). The use of the SHBS in future research may allow more complex factors to be examined in

relation to NSSI and increase understanding of this phenomenon. Furthermore, this was the first study to explicitly demonstrate that individuals experience both positive and negative beliefs in relation to their NSSI behaviour. This has important implications for current understandings of NSSI within clinic and general populations. Research has well established the stigma and misunderstanding that self-harmers experience within health services (Jeffery & Warm, 2002; Mackay & Barrowclough, 2005) and more generally within society (Newton & Bale, 2012). In this case, it seems important that public and professional education programmes consider NSSI beliefs and how they may influence the maintenance of NSSI. This is likely to better illustrate the challenges that those who self-harm face in seeking treatment, potentially reducing stigma for this population.

**Conclusions and future research**

This study contributes novel and important information about beliefs in NSSI. Findings suggest that those who self-harm hold positive and negative NSSI beliefs which may influence and maintain NSSI. As such, the SHBS presents as a useful clinical and research tool to further explore beliefs in this population and improve treatment outcomes. It would be helpful for future research to explore the reliability and validity of the SHBS in greater detail through the use of larger, more diverse samples and test-retest methods. Additionally, future research should look more closely at the factor structure of the SHBS through the use of factor analysis techniques. This may help identify any further subscales or items which may be redundant or less relevant to this population. Additionally, given the relationship between beliefs and shame observed in this study, it may be helpful for future research to explore the possibility that shame mediates the relationship between beliefs and NSSI. While it was beyond the scope of this study, it may be useful to explore whether specific aspects of shame (e.g. bodily shame) are related to NSSI beliefs. Additionally, it may be interesting to explore the stability of NSSI

beliefs, for example by using experience sampling methods, which may identify any possible moment-to-moment changes in beliefs.

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# Appendices