



Co-calibration of deliberate self harm (DSH) behaviours: Towards a common measurement metric

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ARTICLE INFO

Article history:

Received 21 April 2011

Received in revised form

18 May 2012

Accepted 20 May 2012

Keywords:

Self-mutilation

Test score equating

Measures

Rasch measurement

ABSTRACT

The purpose of this study was to co-calibrate items from different deliberate self-harm (DSH) behavioural scales on the same measurement metric and compare cut points and item hierarchy across those scales. Participants included 568 young Australians aged 18–30 years (62% university students, 21% mental health patients, and 17% community volunteers). Six DSH scales (containing 82 items) were administered, namely, Self-Injury Questionnaire Treatment Related (SIQTR), Self-Injurious Thoughts and Behaviours Interview (SITBI), Deliberate Self-Harm Inventory (DSHI), Inventory of Statements About Self-Injury (ISAS), Self-Harm Information Form (SHIF) and Self-Harm Inventory (SHI). Data were co-calibrated onto an underlying metric using the Rasch measurement model. The resulting calibration shows that the different scales occupy different ranges on the hierarchy of DSH methods with prevalence estimates ranging from 47.7 to 77.1%. A raw score conversion table is provided to adjust prevalence rates and to equate cut points on the six scales. A Rasch-validated hierarchy of DSH behaviours is also provided to inform the development of DSH nomenclatures and assist clinical practice.

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1. Introduction

Deliberate self-harm (DSH) (also referred to as self-harm) is a sub-type of self-destructive behaviours (Lundh et al., 2007). DSH involves the initiation of an intentional act to cause damage to one's own body (Kreitman, 1977), the resulting harm (or risk of harm) to oneself being direct and immediate (Babiker and Arnold, 1997), the outcome non-fatal (Morgan, 1979), and with multiple intentions and motivations possibly present (Hawton and James, 2005). DSH has been described as an "etiologically heterogeneous, multiply-determined, and complex phenomenon" (Hooley, 2008, p. 157).

DSH behaviours include visible damage to surface body tissues (e.g., cutting, burning) (Wilkinson and Goodyer, 2011), lack of self-care (e.g., excessive exercising to cause an injury) (Turp, 2002), and highly dangerous acts (e.g., swallowing dangerous objects) (Linehan et al., 2006). Many forms of DSH are observed across both clinical and non-clinical populations (Nock, 2010), although some behaviours are rarely reported outside of severe mental illness (e.g., amputation, using acid to burn skin) (Walsh and Rosen, 1988).

DSH behaviours may also include deliberate recklessness to cause harm (Skegg, 2005). Examples are sexual risk taking (Sansone et al., 1998), reckless driving (Patton et al., 1997), and intentional over-use of drugs (Best, 2009). Although such behaviours may have complex motivations (e.g., sensation seeking) and any harm to self may be incidental (Wilkinson and Goodyer, 2011), they are known to be highly inter-related with other forms of DSH (Brown et al., 2005; Martiniuk et al., 2009; Nada-Raja et al., 2004). In addition, recent factor-analytic studies (Latimer et al., 2009; Vrouva et al., 2011) have provided support for a DSH construct that includes reckless behaviours, consistent with some mainstream definitions of DSH (see Silverman, 2006).

There are several behaviours that may cause harm to one's body that are not DSH. For example, factitious disorder is distinguished from DSH because the harm is a means to an end (i.e., to imitate an illness and engage medical professionals in a relationship), rather than an end in itself (i.e., to cope with psychological distress) (Babiker and Arnold, 1997). As a further example, indirect self-injury (e.g., chronic alcoholism and smoking) is distinguished from DSH because the harm is temporally remote (Ross and McKay, 1979).

Presently, there is no comprehensive classification system for describing DSH (Ougrin and Zundel, 2009), although several nomenclatures (comprising of definitions and terminology) have been developed (e.g., Nock, 2010; Pattison and Kahan, 1983). Such nomenclatures can be distinguished from each other according to

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the dimensions of outcome, method, lethality and intent (Ougrin and Zundel, 2009). For example, DSH can be defined as a broad spectrum of non-fatal self-injury and self-poisoning acts irrespective of degree of suicide intent or type of motivation (Hawton et al., 2006). It can also be defined as a narrower set of tissue damaging behaviours performed in the absence of a desire to die (Klonsky et al., 2003).

Deciding between the paradigms of *DSH without suicide intent* and *DSH regardless of intent* to guide research and clinical practice is the subject of much discussion in the literature (Jacobson and Gould, 2007). First, it is difficult to reliably measure intent (Ougrin and Zundel, 2009). Second, significant suicidal ideation may accompany superficial self-harm behaviours with little or no risk of a fatal outcome (Lundh et al., 2007). Third, some highly dangerous forms of self-harm may have little or no conscious suicide intent (Nada-Raja et al., 2004). Fourth, suicide and non-suicide related self-harm may frequently occur in the same individual (Nock et al., 2006).

In the long term, the issues surrounding the measurement of intent will most likely be resolved by empirical research and theory building (Lundh et al., 2007; Ougrin and Zundel, 2009). In the meantime, researchers and clinicians have developed several strategies for distinguishing *suicidal self-harming* from *non-suicidal self-harming*. For example, clinicians generally assess behaviour and then clarify intent for each specific act (Skegg, 2005). Researchers tend to orientate participants to *DSH regardless of intent* or to *DSH without suicide intent* by the instructions and item wording contained in their measurement tools (e.g., Gratz, 2001).

The accepted methodology of assessing behaviours first and intent second is assisted by the large number of published DSH measures that include behavioural scales or items to identify specific methods of self-harm (Nock et al., 2008). Such scales avoid the under-reporting of DSH associated with single item measures (Nock, 2010) and yield a pattern of behaviours that may inform risk assessment and treatment protocols (Whitlock et al., 2006). The number of methods can be counted over a person's lifetime to form a total DSH score (Sansone et al., 1998), and such scores can be used to determine clinical cut-offs for increased risk of suicide, depression, anxiety and personality disorder (Klonsky and Olino, 2008; Nock et al., 2006). The endorsement of at least one method of DSH is an accepted procedure for estimating prevalence rates of DSH (Whitlock et al., 2006).

However, there is little consistency in the range of methods of DSH contained in published behavioural scales (Gratz, 2001) which inhibits the comparison of prevalence rates across studies (Heath et al., 2009; Zlotnick et al., 1996). This is because some behaviours are less likely to be endorsed (e.g., burning) than other behaviours (e.g., scratching), possibly due to being associated with higher levels of psychological distress (Croyle and Waltz, 2007; Walsh and Rosen, 1988; Nock, 2010). The specific behaviours included in a DSH scale therefore have the potential to influence the prevalence rate. To resolve this problem, some researchers (e.g., Gratz, 2001) have argued for the use of a consensus set of DSH behaviours so that the prevalence rates from different studies can be compared.

In other areas of mental health measurement, the variation in scale content has been addressed by co-calibrating items from different scales on the same measurement metric (La Porta et al., 2011; Smith et al., 2006). Co-calibrations can be used to produce a raw score conversion table to allow the equating of clinical cut points and for the adjustment of prevalence rates across studies. Many of these co-calibrations of mental health scales have been conducted by fit of data to the Rasch measurement model (Rasch, 1960) (see Section 2.6). Rasch analysis assumes and tests unidimensionality (Pallant and Tennant, 2007; Streiner and Norman,

2008), and is an accepted analytic technique in mental health measurement (Barkham et al., 2011).

When applied to DSH methods, the Rasch measurement model has the potential to identify clusters of behaviours that occupy different locations on the theorised latent DSH construct. For example, it may be reasonable to expect a cluster of body surface damaging behaviours that have been labelled as non-suicidal self-injury (NSSI) (Wilkinson and Goodyer, 2011). Such finding would give support to the theoretical importance of that particular definition of DSH. A further benefit of the Rasch validated item hierarchy is the potential to inform the many tentative hierarchies (based on clinical experience and/or conceptual labelling) reported in the literature (e.g., Croyle and Waltz, 2007; Skegg, 2005; Whitlock et al., 2008).

In summary of the above, a successful co-calibration has the potential to facilitate the adjustment of prevalence rates across studies, and the equating of clinical cut-points. It also has the potential to produce an empirically validated hierarchy of DSH methods. Further, there is the potential to contribute to the development of a DSH nomenclature (at least for the dimension of method) by validating the tentative hierarchies of DSH methods and by providing evidence for “more or less well defined categories” of self-harm behaviours (Ougrin and Zundel, 2009, p. 13). Finally, a Rasch calibrated hierarchy may assist clinicians to probe for a more complete account of past DSH behaviours in order to inform the risk of future DSH, consistent with recent longitudinal studies (e.g., Glenn and Klonsky, 2011).

This study, therefore, aims to use the Rasch measurement model (Rasch, 1960) to co-calibrate behavioural items extracted from selected DSH behavioural scales to (i) produce a raw score conversion table to equate clinical cut points and prevalence rates across studies; and (ii) to construct a hierarchy of DSH behaviours to inform the DSH nomenclatures and clinical practice.

2. Methods

2.1. Participants

A sample of 568 young Australians participated in the study, comprising 440 females and 128 males aged 18–30 years, with an average age of 20.97 years ($S.D.=3.77$). The sample included 350 university students (274 females, 76 males), 119 mental health patients (96 females, 23 males), and 99 community volunteers (70 females and 29 males). It was appropriate to include a mixed sample so that the psychometric properties of published scales based on a non-clinical sample could be further informed by their administration to a clinical sample, and vice versa.

The participants were recruited from the western suburbs of a large Australian city, a region dominated by low to middle socioeconomic status (SES) populations. English was the first language spoken by 82% of the participants, followed by Arabic (6%), Vietnamese (3%), Spanish (3%), Cantonese (2%), Greek (1%) and Hindi (1%). The mental health patients were recruited from an out-patient mental health clinic, with the primary presentations being depression and anxiety (26%), anxiety (24%), depression (15%), eating disorder (14%), alcohol and other drugs (7%), and other conditions (14%) including relationship difficulties and situational crises.

2.2. Measures

2.2.1. Selection of published DSH tests

Six published DSH tests (see Table 1) were selected based on the following inclusion criteria: test contains behavioural scale comprised of a list of specific methods of DSH, test is appropriate to young adults, test has been standardized as self-report or interview administered, and behavioural items in test have been psychometrically evaluated in peer reviewed journal. All six published DSH tests contained additional items other than those related to methods of DSH. However, only the behavioural scales were relevant to the present study and, therefore, included (Table 1). The scales are referred to by the name of the full DSH test they come from while the number of items is indicative of the methods of DSH, rather than overall set of test items. For example, the ISAS-12 is extracted from the ISAS (total of 58 items) and contains 12 items covering specific methods of DSH.

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