ABSTRACT

Nonattachment is defined as a flexible and balanced way of relating to one's experiences without clinging to or supressing them. Nonattachment has a long history in Buddhist writings and has recently emerged in modern psychological research. The growing popularity of nonattachment can be attributed, in part, to the development of an empirical scale to measure it. The Nonattachment Scale, created by Sahdra and colleagues in 2010, is a 30-item scale designed to measure nonattachment as it might manifest in the everyday lives of typical Americans. Nine experts belonging to three major Buddhist traditions reviewed 135 candidate nonattachment items in terms of fit with their notion of nonattachment. Seventy-five items received consistently high ratings across the different traditions and were used in all subsequent scale reduction analyses. The resulting 30-item nonattachment measure has been found to be reliable and have good criterion and discriminant validity. The Nonattachment Scale has also been translated into Spanish and Chinese for use with non-English speaking populations. In addition, two short forms of the Nonattachment Scale have been developed: the NAS-7 and the NAS-SF (7 and 8 items respectively). Their validation and psychometric properties are discussed and a brief comparison of the scales is provided. This chapter also provides details on how to use the Nonattachment Scale in research as well as a discussion on the future directions of nonattachment measurement.

Keywords: Nonattachment; Scale development; Buddhism; Short forms; Valid; Reliable

THE NONATTACHMENT SCALE

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Theoretical Foundations.

Nonattachment, defined as a "flexible, balanced way of relating to one's experiences without clinging to or supressing them" (as cited in Sahdra, Ciarrochi, Parker, Marshall & Heaven, 2015, p.2), is a new construct in modern psychology that has been increasing in popularity over the past decade. Despite its recent introduction to the psychological field, nonattachment has a long history in Buddhism, originally emerging in Buddhist writings over 2,000 years ago (Sahdra et al., 2015).

According to Buddhism, suffering does not originate from the external world, but rather from people's own minds (McIntosh, 1997). Specifically, suffering occurs because of attachments, which are rigid and inflexible beliefs "that distort the cognition of its object (such as the self or any other cherished object) by exaggerating its admirable qualities and screening out its disagreeable qualities" (Asanga, 4th – 5th Century BCE/1950, as paraphrased by Sahdra, Shaver & Brown, 2010, p.116). Attachments lead to suffering when the rigid and inflexible beliefs fail to match reality (Sahdra et al., 2015). Suffering is inevitable as reality cannot always match the individual's beliefs as nothing in life is stable, certain or unchanging (Sahdra et al., 2010). For example, people age, get sick and die, circumstances change and material possessions can be lost or damaged.

Nonattachment, the solution to attachment, emphasises a flexible way of relating to ones experiences, where an individual neither clings to or rejects/supresses positive and negative experiences respectively (Sahdra et al., 2010). Thus, as a nonattached individual relates to their experiences flexibly, suffering does not occur because they do not apply rigid and inflexible beliefs to an ever-changing reality. A nonattached individual is believed to have an objective perception of reality, a greater openness to undesirable facts of life, lower

levels of selfishness and greater connectedness with others (Sahdra et al., 2010). It is important to note that a nonattached individual is not detached from their own thoughts and feelings (Sahdra et al., 2015). In fact, a nonattached individual is engaged with both their desirable and undesirable thoughts and feelings, but in a way that does not result in clinging to desirable experiences while suppressing or rejecting negative ones (Sahdra et al., 2015).

A number of existing concepts in psychology have some conceptual overlap with the Eastern concept of nonattachment. Both attachment theory (Ainsworth, 1978; Bowlby, 1969) and Buddhist nonattachment emphasize the importance of reducing clinginess and aloofness in order to function optimally. For example, in line with how a nonattached person neither clings to nor rejects/suppresses positive and negative experiences respectively, secure attachments styles are characterized by low levels of attachment anxiety, a state of being typified by high levels of grasping and clinging, and low levels of avoidant attachment, which is associated with suppression of unwanted thoughts and feelings (Mikulincer, Dolev, & Shaver, 2004; Sahdra et al., 2010; Sahdra & Shaver, 2013). Moreover, they both describe an optimally functioning individual as one who experiences high levels of autonomy and who is compassionate towards others (Chödrön, 2008; Mikulincer & Shaver, 2007; Sahdra & Shaver, 2013). In addition, Fromm (2013), in his book 'To Have or To Be', writes about the Being Persona (i.e. someone who defines themselves through what they do in each moment) and the Having Persona (i.e. someone who defines themselves through what they have such as their wealth, material objects, jobs, relationships etc.). Fromm suggested that those with a Having Persona are easily threatened and defensive because they are constantly clinging onto to things they have and fear loss and change (Fromm, 2013). Linkers and Nonlinkers (McIntosh & Martin, 1992) also appear to be conceptually related to Buddhist attachment and nonattachment. Linkers are defined as those individuals who believe that the attainment of lower-order goals (e.g. losing weight) results in the attainment of higher-order goals (e.g.

being happy). McIntosh and Martin (1992) argue that Linkers become attached to the attainment of lower order goals and can suffer when they are unobtainable.

Prior to the development of a scale to measure nonattachment, proxy scales were employed for nonattachment research. For example, Coffey and Hartman (2008) and Coffey, Hartman, and Fredrickson (2010) both investigated nonattachment using a proxy scale, the Linking Inventory (LI; McIntosh & Martin, 1992). However, the dichotomous response structure of the LI makes it inadequate for measuring individual differences (Feng et al., 2016), and those who are not encouraged to value either of these dichotomies will not perform reliably on the measure (Bhambhani & Cabral, 2016).

Thus, in response to the growing interest in nonattachment and the need for an empirical measure, Sahdra and colleagues (2010) developed the 30-item Nonattachment Scale (NAS). Since its development, it has been used by a number of people in its full form (Arch, Landy, & Brown, 2016; Bhambhani & Cabral, 2016; Codato, Armenti, Testoni, & Guglielmin, 2012; Griffiths et al., 2017; Lamis & Dvorak, 2014; Nguyen & Nguyen, 2018; Noguchi, 2017; Osman, Lamis, Bagge, Freedenthal, & Barnes, 2016; Sahdra & Shaver, 2013; Swails, Zettle, Burdsal, & Snyder, 2016; Tran et al., 2014; Van Gordon et al., 2018; Van Vugt & Slagter, 2014), in other languages (Chao & Chen, 2013; Feliu-Soler et al., 2016; Ju & Lee, 2015; Montero-Marin et al., 2016; Wang, Wong, & Yeh, 2016) and in short forms (Chio, Lai, & Mak, 2017; Epel et al., 2013; Feng et al., 2016; Kelley, Pransky, & Lambert, 2015; Sahdra, Ciarrochi, & Parker, 2016; Sahdra et al., 2017; Sahdra et al., 2015; Van Gordon, Shonin, Dunn, Garcia-Campayo, & Griffiths, 2017; Van Gordon, Shonin, & Griffiths, 2016). In sum, the NAS has had a significant impact on the field, with many researchers investigating the construct.

THE NONATTACHMENT SCALE

Item Generation and Item Selection.

Sahdra and colleagues (2010) developed conceptualisations of attachment and nonattachment based on classical and contemporary Buddhist texts as well as consultations with 18 Buddhist experts, who represented three major Buddhist traditions (Therevadan, Zen and Indo-Tibetan). It was agreed that "attachment, in the Buddhist sense, can take the form of possessiveness (e.g., in relationships), a sense of ownership of persons or things; jealousy; preoccupation; clinging; defensiveness; compulsion; obsession; acquisitiveness; defensive avoidance; competitiveness; and anxiety about gaining, escaping, or being able to avoid. When people are attached (in the Buddhist sense), their sense of well-being is contingent, that is, dependent, on a particular state of affairs. Phenomenologically, they feel stuck or fixated on ideas, images, or sensory objects and experience an internal pressure to acquire, hold, avoid, or change. From a Buddhist perspective, an attached individual oscillates between self-aggrandizement and self-degradation" (Sahdra et al., 2010, p.118). Nonattachment "can be expressed and therefore observed as psychological flexibility (lack of fixation), nonreactivity (even mindedness), more quickly recovering from upsets, allowing, releasing, supporting others' capacity to choose, and a sense of ease. When people are nonattached, their perceived sense of well-being is noncontingent—that is, not dependent on particular circumstances. Phenomenologically, nonattachment has the subjective quality of not being stuck or fixated on ideas, images, or sensory objects and not feeling an internal pressure to acquire, hold, avoid, or change. Rather than being aloof, indifferent, uncaring, or unengaged (which are common misconceptions about nonattachment in the West), the nonattached individual genuinely cares about, is engaged in, and responsive to the present situation without falling into self-aggrandizement or self-degradation" (Sahdra et al., 2010, p. 118). Based on these conceptualisations, the authors considered how both attachment and nonattachment might manifest in the everyday life of a typical American. This resulted in an item pool of 135

items, which consisted of approximately equal numbers of positively (i.e. measures of nonattachment) and negatively (i.e. measures of attachment) worded items.

Next, the face validity of the 135 items was assessed by 9 Buddhist experts who, on average, had 18 years of monastic and/or teacher-led training (range = 6–37) and who had significant teaching and meditation experience (*M* = 18 years, range = 1–34 years). It is important to note that 7 of the experts had training in more than one major Buddhist tradition. This ensured that the manifestation of nonattachment in the items transcended differences in the conceptualisation of Buddhist nonattachment across different traditions. Face validity was assessed with the use of a worksheet that asked the Buddhist experts to rate, on a 5-point Likert scale (where 0 was *no fit* and 4 was *excellent fit*) how well the items fit the conceptualisations of attachment and nonattachment, how accurately the items portrayed the construct, how clear the wording was and how straightforward the items were. Based on the completed worksheets, the authors calculated the content validity coefficient (V statistic; (Aiken, 1996). The results indicated that 75 of the 135 items had good face validity. These 75 items underwent a final editorial revision wherein 2 items were slightly adjusted and 3 items were removed altogether. This culminated in a preliminary 72 item nonattachment scale which was subjected to further analysis.

EFA and CFA Validation.

The preliminary 72 item nonattachment scale was completed by a sample of 331 American college students. The resulting data was subjected to an EFA that was conducted in SPSS using the principal axis method of estimation. Sahdra and colleagues (2010) report that the difference between the eigenvalues of the first and second factors was substantial (9.82 and 1.81 respectively) and that the examination of the scree plot identified a clear "elbow" after the first factor. Taken together, this was evidence for a one factor solution which accounted for 28.56% of the item variance. A total of 32 items (28 positively and 4

negatively worded items) had item loadings above 0.40 on this factor. The internal consistency of the 32 items was 0.92. The authors conducted a second EFA with the 32 items identified by the first EFA. The data for this analysis came from 201 American adults. The item loadings revealed that 30 items loaded above 0.40 on a single factor. Thus, the two items without significant loadings were removed. The remaining 30 items accounted for 35.24% of the variance and had a Cronbach's coefficient alpha of 0.94.

Next, using data from American adults and guidelines provided by Kishton and Widaman (1994) and Little, Cunningham, Shahar, and Widaman (2002), the authors created 10 random parcels of the 30-item scale of nonattachment which were then subjected to CFA in MPlus (Muthén & Muthén, 2007). The CFA results supported a one-factor model and all fit indices were within the recommended limits: the χ^2/*degrees of freedom* ratio was 2.26 (78.92/35) and within the recommended upper limit of 3:1; the Tucker-Lewis Index was 0.97; the comparative fit index was 0.98; the root mean square error of approximation was 0.06; and the standardised root mean square residual was 0.03, all of which were within the recommended limits (≤0.94, ≤0.94, ≤0.06 and ≤0.03 respectively; (Bentler, 1990; Steiger & Lind, 1980; Tucker & Lewis, 1973). A high Cronbach's alpha coefficient (0.93) was also obtained. Based on these results, these 30 items became known as the Nonattachment Scale (NAS).

Psychometric Properties.

Test-retest reliability.

Forty-two American college students completed the NAS for a second time, one month after its first administration. Sahdra and colleagues (2010) report an intraclass correlation of 0.87 ($p < .0001$), indicating that 73.8% of the variance in scores from time 1 to time 2 was accounted for by nonattachment. Thus, there is evidence of test-retest reliability for the NAS, suggesting that it would be suitable for use in short-term longitudinal studies.

Known-groups validity

To investigate known-groups validity, the authors compared the NAS scores of 85 American adults who reported that they meditated (weekly hours of practice $M = 2.03$, $SD = 1.65$; years of practice $M = 13.59$, $SD = 15.50$) to a group, matched on age and gender, who reported no engagement with meditation. On average, the meditators had higher scores on the NAS ($M = 4.64$, $SD = 0.82$) than the comparison group ($M = 4.39$, $SD = 0.76$; $t(168) = 2.06$, $p = 0.04$, Cohen's $d = 0.32$). In addition, when the meditators who practiced for three or more hours a week ($n = 22$; $M = 4.98$, $SD = 0.72$) were compared against a comparison group of nonmeditators ($n = 22$; $M = 4.33$, $SD = 0.79$), the difference between the groups became even more pronounced ($t(42) = 2.85$, $p = 0.007$, Cohen's $d = 0.86$). Moreover, the NAS scores of meditators were significantly positively correlated with weekly ($r = 0.25$, $p = 0.02$) and hourly ($r = 0.23$, $p = 0.04$) years of practice. In sum, the NAS can discriminate between individual differences in the practice of meditation.

Convergent validity

American college students completed measures of anxious attachment, mindfulness, acceptance, non-reactivity, self-compassion, noncontingent happiness, materialism and autonomous motivation. As expected by Sahdra et al. (2010), correlations between the NAS and the above measures were all significant and were all classified as being moderate to high (absolute correlation coefficient values ranged from 0.35 to 0.60; Cohen, 1951). Specifically, the NAS was positively related to mindfulness, acceptance, nonreactivity, self-compassion, non-contingent happiness and higher autonomous motivation and was negatively related to anxious attachment and materialism. Thus, convergent validity of the NAS was confirmed.

Discriminant validity

American college students completed measures of avoidant attachment, depersonalisation, absorption, amnesia, difficulty identifying feelings, difficulty describing

feelings, externally oriented thinking, controlled motivation and impersonal motivation. As evidence of discriminant validity, Sahdra and colleagues (2010) reported no link between NAS scores and impersonal motivations and difficulties describing feelings. Modestly sized (*rs* = - 0.24 to - 0.35) inverse correlations were observed between NAS and the remaining variables, providing further evidence for discriminant validity.

Incremental validity

Least squares regression models were conducted by Sahdra and colleagues (2010) to examine whether the NAS is particularly susceptible to socially desirable responding. A sample of 98 American college students completed the NAS and a measure of social desirability and incremental validity was assessed. Social desirability scores and nonattachment scores were modestly related ($r = 0.36$, $p < 0.01$). However, controlling for social desirability scores did not impact the correlations between the NAS and other variables, suggesting that NAS captures variance beyond social desirable responding.

Subsequent Evidence of the Psychometric Properties of the NAS

The NAS has since been found to have excellent internal consistency by a number of other researchers, (Codato et al., 2012; Swails et al., 2016; Tran et al., 2014), with Cronbach's alpha scores ranging from 0.87 (Arch et al., 2016) to 0.94 (Lamis & Dvorak, 2014). Moreover, similar convergent and divergent validity findings have been reported by other researchers. For example, Sahdra and Shaver (2013) also found that nonattachment is negatively correlated with anxious attachment styles. In addition, the positive association between nonattachment and mindfulness, specifically the five facets of mindfulness, has been replicated by Bhambhani and Cabral (2016) and Sahdra et al., 2016.

Sahdra and colleagues (2010) also report significant links between nonattachment and a number of personal and interpersonal benefits. They found that higher levels of nonattachment were associated with greater subjective well-being and eudemonic well-being.

Nonattachment was also positively correlated to extraversion and negatively correlated with neuroticism (Sahdra et al., 2010), a pattern in personality traits associated with greater subjective well-being (Costa & McCrae, 1980). Nonattachment was also negatively correlated with depression, anxiety and stress, as well as difficulties in emotion regulation (Sahdra et al., 2010), a finding which has been replicated by Lamis and Dvorak (2014) and Bhambhani and Cabral (2016). Regarding interpersonal benefits, the NAS was found to be positively correlated with perspective taking, empathy, generosity and extraversion (Sahdra et al., 2010), all of which have been found to have social benefits (e.g. Eisenberg & Miller, 1987; Galinsky, Ku, & Wang, 2005; Kasser, 2005; Lee, Dean, & Jung, 2008). Moreover, Sahdra et al. (2015) report that nonattachment predicts peer-rated kindness and helpfulness in adolescence. Taken together, this provides cumulative evidence for the personal and interpersonal benefits of nonattachment.

Validation of the NAS Using Rasch Measurement Theory.

The psychometric properties of the NAS were further investigated by Feng and colleagues (2016) using Rasch measurement theory (RMT). RMT is considered to be a 'modern' psychometric methodology that differs from classical test theory (CTT) in that it acknowledges an individual's response to an item is going to be influenced by qualities of both the individual and the item (Gorin, Embretson, & McKay, 2008). RMT differs from other popular modern psychometric methodologies, such as item response theory (IRT), in that it endeavours to fit the data to a model, rather than fitting a model to the data (Petrillo, Cano, McLeod, & Coon, 2015).

Feng et al (2016) tested the model fit for the NAS five times before the best fit was obtained. The first test showed good reliability (person separation index score = 0.93), but the overall model fit was weak (test 1; $\chi^2(180) = 642.73$, $p < 0.001$), 13 items had disordered thresholds (i.e., when a greater ability of a person on the construct being measured is not

consistently associated with a gradual increase of scores for an item) and unidimensionality was not confirmed. The authors addressed the disordered thresholds by collapsing the *disagree moderately* and the *disagree slightly* response options, and the *agree moderately* and *agree slightly* response options, a technique known as threshold ordering. However, acceptable criteria were still not obtained (test 2; $\chi^2(180) = 469.44$, $p < 0.001$). Next, the authors examined the model fit of the individual items. Four items were identified as having fit residuals above 2.5, high chi square values, low loadings on the first principal component and low item-to-total correlations, all of which indicates a poor fit to the model. Despite the removal of these items, the model fit was still not satisfactory (test 3; $\chi^2(156) = 250.53$, $p < 0.001$). Local dependency (i.e., the extent to which items are correlated with each other) was investigated. Feng and colleagues (2016) found 8 groups of locally dependent items (those with residual correlations above 0.20; Andrich, 2011) and combined them into sub-tests. The model fit was re-examined, and a good fit was obtained (test 4; $\chi^2(60) = 68.23$, $p = 0.22$). The authors found a differential item functioning (DIF) effect for age for item 29 so they split it by age, which resulted in a superior model fit (test 5; $\chi^2(66) = 68.08$, $p = 0.41$).

Further analysis of the model confirmed its unidimensionality and found a satisfactory item-threshold distribution. When compared with the original NAS, the revised 26-item NAS was found to be superior at discriminating between individual nonattachment levels. Scores from the NAS and the revised 26-item NAS were highly correlated ($r = 0.93$, $p < 0.001$) and an independent samples t-test between meditators and nonmeditators suggested that the revised 26-item NAS has discriminant validity ($t(398) = 3.00$, $p < 0.05$). Thus, Feng and colleagues (2016) conclude that the 26-item revised NAS scale is a more precise measure of nonattachment.

SHORT FORMS OF THE NAS

There are two main benefits for developing a short-form of the NAS. Firstly, lengthy questionnaires can result in participants becoming fatigued, bored or overly burdened, which in turn can reduce the quality of data (Cook, Heath, & Thompson, 2000). Secondly, a short-form may assist in the clinical assessment and application of nonattachment. Two short forms of the NAS have been developed: the NAS-7 and the NAS-SF.

NAS-7

Validation

The first step of shortening the NAS was to evaluate the face validity of each item. Thirteen items were initially identified as problematic by Elphinstone, Sahdra and Ciarrochi (2015) because they were deemed to assess multiple concepts or had semantic overlap with other constructs. For example, the item, "I find I can be calm and/or happy even if things are not going my way" may yield different answers depending whether the respondent focuses on 'calm' or 'happy' concepts in the item. As another example, the item "I can admit my shortcomings without shame or embarrassment" is problematic because it requires respondents to consider two very different emotions, potentially leading to inconsistent interpretations across participants. The item "I can accept the flow of events in my life without hanging onto them or pushing them away" overlaps with the construct of acceptance and non-reactivity. The item "I can remain open to what life offers me regardless of whether it seems desirable or undesirable at a particular time" overlaps with the construct of open-mindedness, which is considered to be an outcome of nonattachment (Sahdra & Shaver, 2013).

The 17 items that passed this stringent evaluation were subjected to CFA in Australian and American samples. The authors considered results from both samples when removing items on the basis of having squared multiple correlations (SMCs) of at least 0.25, and modification indices (MI), especially if MIs indicated that two items were excessively

similar and potentially covaried due to factors unrelated to nonattachment. The aim was to derive the most parsimonious model that had no redundant items, provided adequate model fit, and was likely to be invariant across samples. This process culminated in good fitting models in a sample of the general American population ($\chi^2(14) = 25.66$, $p < 0.05$, CFI = 0.97, TLI = 0.95, RMSEA = 0.06, SRMR = 0.05, $N = 157$) and a sample comprising undergraduate and members of the general population in Australia ($\chi^2(14) = 19.07$, $p > 0.05$, CFI = 0.99, TLI = 0.99, RMSEA = 0.03, SRMR = 0.03, $N = 189$). The model was also found to display metric and scalar measurement invariance, suggesting that participants in different samples understood and scored on the NAS-7 items in a consistent fashion. The model fit was also examined in an independent Australian undergraduate sample ($N = 107$), suggesting that model fit was acceptable, $\chi^2(14) = 30.26$, $p < 0.01$, CFI = 0.95, TLI = 0.92, RMSEA = 0.10 (90% CI = 0.05-0.16), SRMR = 0.06. The items that comprise the NAS-7 are items 2, 6, 7, 12, 15, 19 and 23 (see Table 1 below).

Psychometric properties

Elphinstone and colleagues (2015) compared the NAS-30 and NAS-7 in Australian and American samples. While the NAS-30 was found to display higher Cronbach's alpha coefficients ($\alpha = 0.95, 0.94$) in each respective sample, the NAS-7 was also found to be highly reliable, $\alpha = 0.84, 0.84$. Considering that Cronbach's alpha can increase with the number of items (Cronbach, 1951), this result was not unexpected. Importantly, the NAS-30 and NAS-7 were highly correlated in each sample ($r = 0.93, 0.92$, $p < 0.001$) and correlated very similarly with a range of other variables, highlighting the validity of the short-form. For example, in the Australian sample the respective correlations for the NAS-30 and NAS-7 with satisfaction with life were $r = 0.53$, $p < .001$ and $r = 0.56$, $p < 0.001$. Similar results were also obtained for self-actualization ($r = 0.66, 0.61$, $p < 0.001$), and depression ($r = -0.54, -0.54$, $p < 0.001$).

In sum, the authors found that the NAS-7 appears to perform similarly to the original NAS-30. The NAS-7 is also highly reliable and displays similar levels of validity as the original measure. These results have been subsequently supported by the findings of Sahdra et al., (2015) who ran a CFA on the NAS-7 and found that it had a good model fit ($\chi^2(14) = 155.28$, $p < 0.001$, CFI = 0.96, TLI = 0.94, RMSEA = 0.07, SRMR = 0.03, $\alpha = 0.82$). Sahdra et al., 2016 also found that the NAS-7 displayed adequate model fit, reliability, and validity, and appears to be statistically distinct to mindfulness. Good internal consistency for the NAS-7 has also been reported elsewhere (Sahdra et al., 2016; Sahdra et al., 2017).

Feliu-Soler et al. (2016), while validating the Spanish version of the NAS, also investigated the Spanish version of the NAS-7. Although the RMSEA value of 0.086 (90% CI 0.060 - 0.114) was above the recommended cut off of 0.08 (Van de Schoot et al., 2012), the authors report that NAS-7 had a significant chi square value ($\chi^2 = 46.90$, $p < .001$), and other fit indices, such as a CFI of 0.94 and TLI of 0.91, suggested an adequate model fit. Feliu-Soler et al. (2016) report that the internal consistency of the NAS-7 was satisfactory in a sample of meditators ($\alpha = 0.85$) and non-meditators ($\alpha = 0.83$). In addition, they report convergent validity between the NAS-7 and measures of mindfulness, decentring, resilience, emotional dysregulation and psychopathology. Despite thr inadequate RMSEA value, the authors recommend that the abridged version of the NAS be used in settings where measurement time is limited or in the administration of large batteries of items. The data Feliu-Soler et al. (2016) used to analyse the NAS-7 items was extracted from the full length NAS and is, therefore, a possible limitation of their findings on the NAS-7 as it is important to validate a short form of a scale in the form that it will be administered in, rather than extracting its items from the full length assessment (Smith, McCarthy, & Anderson, 2000).

The NAS-SF

Chio et al. (2017) sought to develop an abridged version of the NAS using IRT (Embretson & Reise, 2013). IRT is another 'modern' psychometric approach to scale development and evaluation. Like RMT, it assumes that responses on items are a result of both individual skill levels as well as item difficulty (Gorin et al., 2008). While IRT is significantly more computationally complex than CTT, advocates of the method argue that the advantages are worth the additional complexity (Gorin et al., 2008).

Validation

First, the authors conducted an EFA on the polychoric correlation matrix with maximum likelihood on data from students and staff from Hong Kong University. The ratio of the first eigenvalue to second eigenvalue was 6.88 to 1, confirming unidimensionality of the NAS. The variance explained by this one factor solution was 37%. The next step was to fit a unidimensional graded response model (GRM) to the data which identified some misfit (M_2* = 2012, df = 285, p < 0.001, RMSEA = 0.0787, 90% CI [0.074 - 0.08], SRMSR = 0.068). The residual correlations were examined, revealing 3 pairs of items with residual correlations higher than 0.20 (Andrich, 2011). The authors relaxed the local independence assumptions for these pairs which resulted in an improved model fit (M_2* = 1466, df = 282, p < 0.001, RMSEA = 0.064, 90% CI [0.061 - 0.067], SRMSR = 0.055). In addition, all absolute values for residual correlations were now less than 0.20. The S-χ^2 index of item fit (Orlando & Thissen, 2000) revealed no evidence of misfit. Therefore, the authors used the parameter estimates of the modified GRM to make item selection decisions. In addition, the authors investigated DIF using likelihood ratio tests and found that all items functioned similarly across age and gender.

The authors specified that items would be selected for the short form based on their contribution to test information across the range of trait levels. More specifically, they selected items that were 3 standard deviations above and below the sample mean. These

items also had to cover a good range of locations on the item information curve. Based on these parameters, Chio et al. (2017) selected items 1, 2, 3, 5, 16, 18, 20 and 21 (see Table 1 below). The estimated marginal reliability of the abridged scale was 0.91, the test information was about 10 and the correlation between trait level estimated for the full and the shortened scale was 0.944. Therefore, they concluded that the 8-item short scale reflected the full scale of NAS well and demonstrated adequate internal consistency (Chio et al., 2017). This abridged version of the NAS, consisting of 8 items, became known as the NAS-SF.

Psychometric properties

In order to investigate the criterion validity of the NAS-SF, an independent sample of 393 college students completed the NAS-SF as well as measures of peace of mind, well-being, anxiety, depression, stress, compassion, social connectedness and mindfulness. The authors report that the NAS-SF showed evidence of criterion validity. Significant and positive Pearson correlation coefficients were reported between the nonattachment scores from the NAS-SF and mindfulness. In addition, the nonattachment scores were significantly linked to peace of mind, well-being (psychological, social and emotional), social connectedness and compassion. Finally, stress, depression and anxiety were all inversely linked to scores on the NAS-SF. Thus, Chio et al (2017) conclude that the NAS-SF has good criterion validity.

Discussion on NAS short-forms

The NAS-7 and the NAS-SF were developed using different psychometric methodologies, namely CTT and IRT respectively. Petrillo et al. (2015) conducted a study where they compared CTT, IRT and RMT for scale evaluation. They found that all methods produced similar results and all approaches were able to identify problematic items. However, IRT and RMT could also identify potential reasons for why they were problematic as well as possible solutions (Petrillo et al., 2015). The authors conclude that, when possible,

IRT and RMT should be used, but emphasise that the benefits of CTT should not be dismissed (Petrillo et al., 2015). In another study Prieto, Alonso, and Lamarca (2003) used both CTT and RMT, sometimes seen as a type of IRT (Gorin et al., 2008), to shorten a quality of life scale. Although the methods produced different scales, the authors did not find evidence that one scale was superior to the other (Prieto et al., 2003). Therefore, just because the NAS-7 and the NAS-SF were created using different methodologies and have very little overlap with regards to retained items, this does not mean than one is superior to the other.

To further explore this claim we examined the NAS-7 and NAS-SF in the Australian sample used to develop the NAS-7. Both short-forms were highly correlated with each other ($r = 0.82$, $p < 0.001$) and were each highly correlated with the NAS-30 (NAS-7 $r = 0.92$; NAS-SF $r = 0.90$, both $p < 0.001$). According to the findings of Sahdra et al. (2010), higher scores on the NAS-30 are associated with reduced materialism, greater life satisfaction, and reduced depressive symptoms. In the Australian sample, the NAS-7 and NAS-SF respectively were associated with lower levels of materialism ($r = -0.41$, $r = -0.37$, both $p < 0.001$), greater satisfaction with life ($r = 0.56$, $r = 0.57$, both $p < 0.001$), and lower scores on the depression ($r = -0.55$, $r = -0.55$, both $p < 0.001$). It therefore appears that both short-forms of the NAS provide similar results.

SCALE VERSIONS IN OTHER LANGUAGES

Chinese

Chao and Chen (2013) investigated the validity and reliability of the NAS in a sample of 313 military soldiers in Taiwan. They report that the NAS was both valid and reliable. Nonattachment was found to be related but distinguishable from the Chinese construct of Zhong-Yong thinking (an individual considers an issue from multiple perspectives and then makes behavioural decisions that will benefit themselves and the general good; Wu & Lin, 2005). Chao and Chen (2013) also found that NAS scores were positively correlated with a

number of positive constructs, including subjective wellbeing and self-determination. In addition, nonattachment was negatively linked to several negative constructs, including state-trait anxiety and perceived stress. The Chinese version of the NAS has since been administered, by Wang et al. (2016), to 270 university students. The researchers report that the Chinese NAS has high internal consistency ($\alpha = 0.92$; Wang et al., 2016).

Spanish

Validation

Feliu-Soler et al. (2016) translated the NAS into Spanish and examined its psychometric properties in a sample of 625 Spanish adults. The results of the first EFA supported a one-factor solution: there was a substantial difference between the eigenvalues of the first (12.68) and second factor (1.47); the scree plot revealed an "elbow" after the first factor; and the first factor accounted for 42.3% of the variance, while the remaining factors each accounted for less than 5%. A second EFA was conducted where a one-factor solution was specified. The second EFA also supported the extraction of a single factor solution that accounted for 42% of the variance. In addition, all items loaded significantly on this factor (λ 0.32).

The authors tested wo models using CFA, one where all the items load onto one latent factor and another that also incorporated correlated error terms for the negatively worded items. The second model was tested because inadequate model fits are often obtained when examining scales composed of both positively and negatively worded items as they tend to load onto separate factors (Woods, 2006). Although the CFA of model revealed a significant chi square value ($\chi^2 = 1016.36$, $p < 0.001$) and an acceptable RMSEA of 0.069 (90% CI 0.064 - 0.074), the other fit indices were inadequate (CFI = 0.83, TLI = 0.82). The inclusion of the correlated residuals for the negatively worded items in the second model did not improve the overall model fit ($\chi^2 = 1011.38$, $p < 0.001$; CFI = 0.83; TLI = 0.82; RMSEA = 0.069, 90% CI

0.064 - 0.074). Therefore, due to parsimony considerations, the authors advocate for the retention of the first model. They also report that the Spanish version of the NAS had good internal consistency ($\alpha = 0.949$).

Psychometric properties.

Construct validity. In order to assess construct validity, participants completed measures of mindfulness, decentering, resilience, depression, stress, anxiety and difficulties in emotion regulation. Separate correlation analyses were conducted for non-meditators and meditators. For both non-meditators and meditators all correlations between nonattachment scores and the other variables were in the expected direction. Specifically, non-meditators and meditators nonattachment scores were significantly positively correlated with mindfulness, decentering and resilience. In addition, their scores were significantly negatively correlated with difficulties in emotion regulation, depression, stress and anxiety. The number of years meditators reported practicing meditation for, the number of hours a week they meditate as well as the frequency of meditative practice were all significantly positively correlated with nonattachment ($r = 0.14$, $p = 0.02$, $r = 0.22$, $p < 0.0001$ and $r = 0.27$, $p < 0.0001$ respectively), suggesting a relationship between nonattachment and mindfulness.

Known-groups validity. Known-groups validity was assessed by Feliu-Soler et al. (2016) by comparing the nonattachment scores of non-meditators, meditators and a sample of individuals with bipolar disorder (BPD). The results of an analysis of variance (ANOVA) found significant between-group differences in NAS scores between these three groups. Bonferroni-corrected post-hoc comparisons were then conducted and revealed that the participants in the BPD group had significantly lower levels of nonattachment compared to the participants who reported meditating. The non-meditators also had significantly lower nonattachment scores compared to the meditators. Combined, this is evidence for known-groups validity as the Spanish version of the NAS was able to distinguish between non-

meditators, meditators and those with BPD. In sum, the Spanish version of the NAS has been found to be a valid measure of nonattachment. In addition, it has construct and known-groups validity.

USING THE NONATTACHMENT SCALE IN RESEARCH

Below is the 30-item version of the NAS (Sahdra et al., 2010) as well as instructions for its use.

Instructions: "To help us understand your general approach to life and your views about yourself, others, and life in general, tell us the extent to which the following statements reflect your experiences at this point in your life. Select a number from 1 to 6 on the scale provided with each statement to rate the extent to which you agree with it. Please answer according to what *really reflects* your experience rather than what you think your experience should be"

Table 1

The Nonattachment Scale

	Scale Item	Revised 26-item NAS	NAS-SF	NAS-7
1.	I can accept the flow of events in my life without hanging onto them or pushing them away.	*	*	
2.	I can let go of regrets and feelings of dissatisfaction about the past.	*	*	*
3.	I find that I can be calm and/or happy even if things are not going my way.	*	*	
4.	*I have a hard time appreciating others' successes when they outperform me.*			
5.	I can remain open to what life offers me regardless of whether it seems desirable or undesirable at a particular time.	*	*	
6.	I can enjoy pleasant experiences without needing them to last forever.	*		*
7.	I view the problems that enter my life as things/issues to work on rather than reasons for becoming disheartened or demoralised.	*		*

8.	I can enjoy my possessions without being upset when they are damaged or destroyed.	*		
9.	The amount of money I have is not important to my sense of who I am.	*		
10.	I do not go out of my way to cover up or deny my negative qualities or mistakes.	*		
11.	I accept my flaws.	*		
12.	I can enjoy my family and friends without feeling I need to hang on to them.	*		*
13.	*If things aren't turning out the way I want, I get upset.*			
14.	I can enjoy the pleasures of life without feeling sad or frustrated when they end.	*		
15.	I can take joy in others' achievements without feeling envious.	*		*
16.	I find I can be happy almost regardless of what is going on in my life.	*	*	
17.	Instead of avoiding or denying life's difficulties, I face up to them.	*		
18.	I am open to reflecting on my past mistakes and failings.	*	*	
19.	I do not get "hung up" on wanting an "ideal" or "perfect" life.	*		*
20.	I am comfortable being an ordinary, less than perfect human being.	*	*	
21	I can remain open to thoughts and feelings that come into my mind, even If they are negative or painful.	*		
22.	I can see my own problems and shortcomings without trying to blame them on someone or something outside of myself.	*		
23.	When pleasant experiences end, I am fine moving on to what comes next.	*		*
24.	*I am often preoccupied by threats or fears.*			
25.	I am not possessive of the people that I love.			
26.	I do not need to hang on to the people I love at all costs; I can let them go if they wish to go.	*		
27.	I do not feel I need to escape or avoid bad experiences in my life.	*		
28.	I can admit my shortcomings without shame or embarrassment.	*		
29.	I experience and acknowledge grief following significant losses, but do not become overwhelmed, devastated or incapable of meetings life's other demands.	*		

30. I am not possessive of the things I own. *

Note: The 6-point scale is labelled as follows: 1 = disagree strongly, 2 = disagree moderately, 3 = disagree slightly, 4 = agree slightly, 5 = agree moderately, 6 = agree strongly. Items in italics are reverse coded.

Administering and Scoring the NAS

The majority of researchers who have used the NAS have administered it as part of a larger battery of measures that are completed by participants online (Bhambhani & Cabral, 2016; Cebolla et al., 2017; Codato et al., 2012; Ju & Lee, 2015; Lamis & Dvorak, 2014; Noguchi, 2017; Osman et al., 2016; Swails et al., 2016; Tran et al., 2014; Van Vugt & Slagter, 2014). It has also been administered as a pen-and-paper questionnaire (Feliu-Soler et al., 2016; Wang et al., 2016). Sahdra and colleagues (2010) established test-re-test reliability with one month between the two administrations of the NAS. Since then, the NAS has been used in two intervention studies, the first administered the NAS at baseline and one month later (Montero-Marin et al., 2016) and the other had participants complete the NAS at baseline and six months later (Griffiths et al., 2017).

Items 4 (“I have a hard time appreciating others’ successes when they outperform me”), 13 (“If things aren’t turning out the way I want, I get upset”) and 24 (“I am often preoccupied by threats or fears”), are reverse coded. Mean scores are then calculated from all items, with higher scores indicating higher levels of nonattachment.

NAS Citation and Copyright Information

The Nonattachment Scale should be cited as follows: Sahdra, B. K., Shaver, P. R., & Brown, K. W. (2010). A scale to measure nonattachment: A Buddhist complement to Western research on attachment and adaptive functioning. *Journal of Personality Assessment*, *92*(2), 116-127. doi:/10.1080/00223890903425960. The NAS is in the public

domain, so is freely available to researchers and practitioners intending to use the scales for non-commercial purposes.

FUTURE DIRECTIONS

Recently, the performance of the NAS has been examined in clinical samples (e.g. Feliu-Soler et al., 2016). However, a greater understanding of how the NAS performs in various clinical samples would be a valuable contribution to the field. In addition, the NAS has only been translated and validated in two languages (Chao & Chen, 2013; Feliu-Soler et al., 2016). Future research should endeavour to validate the NAS in more languages and also investigate its applicability and utility in other cultures. More can be done to further revise and enhance the measurement of nonattachment. For example, multifactorial scales that examine different areas of life/experiences would provide an enhanced understanding of nonattachment. In line with this idea, a nonattachment-to-self scale has been developed (Whitehead, Bates & Elphinstone, 2018) with the aim of providing more information about self-focused thoughts or beliefs than the original measure which is more general in nature.

SUMMARY

Nonattachment, defined as a "flexible, balanced way of relating to one's experiences without clinging to or supressing them" (as cited in Sahdra et al., 2015, p.2), is growing in popularity in psychology, and has been the focus of an increasing number of research report thanks to the development of an empirical nonattachment measure. Sahdra and colleagues (2010), with the help of Buddhist experts from three major Buddhist traditions, developed the 30-item Nonattachment Scale (NAS) which was found to be valid and have good convergent, discriminant, incremental and known-groups validity. The NAS has since been translated into Spanish (Feliu-Soler et al., 2016) and Chinese (Chao & Chen, 2013), for use in non-English speaking populations. In addition, two short forms of the NAS have been developed, the

NAS-7 (Elphinstone et al., 2015) and the NAS-SF (Chio et al., 2017), which have 7 and 8 items respectively.

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