Mindfulness (2022) 13:1957–1970
https://doi.org/10.1007/s12671-022-01931-6

ORIGINAL PAPER

Over-Identifying with Social Roles: Selfing Scale Development and Validation

Danielle L. Oyler[1] · Steven D. Pratscher[2] · Pisey Leng[3] · Oleg N. Medvedev[3] · B. Ann Bettencourt[1]

Accepted: 19 June 2022 / Published online: 30 June 2022

Abstract

Objectives People conceptualize their identities, in part, by their social roles. We defined the construct of "selfing" as excessive identification with a social role. This over-identification may influence feelings of psychological stress; research to understand this theorized association requires reliable and valid measurement of the selfing construct.

Method The Selfing Scale was developed and validated using both classical and Rasch methodology with a large sample ($N = 1882$) including undergraduate students and MTurk workers. Two randomized samples ($n = 400$ each) were extracted and subjected to Rasch analysis to ensure replicability of the results. Additional independent samples were used to establish test–retest reliability and validity by examining relationships with other measures relevant to the self.

Results An exploratory factor analysis on the initial 27 items yielded a 25-item solution with acceptable psychometric properties that supported a single overarching selfing factor. To achieve the best Rasch model fit, we uniformly rescored disordered thresholds, removed 7 misfitting items, and used testlet models to address local dependency resulting in a more robust 18-item scale. Conversion algorithms were also developed to transform ordinal scores into the interval-level metric to enhance accuracy of the scale. Selfing was negatively related to trait and interpersonal mindfulness and frequency of meditation among mindfulness practitioners, and positively related to psychological stress among non-practitioners.

Conclusions This study developed a reliable and valid Selfing Scale to measure over-identification with the self that is useful to investigate the impact of selfing on an individual's health and well-being.

Keywords Selfing construct · Not-self · Measurement · Validation · Reliability · Rasch analysis

Although Buddhism may often be associated with spirituality and metaphysical concepts, theorists have argued that the tenets of Buddhist psychology align more closely with Western psychology than religion (Dhar, 2011). For example, both Buddhist and Western psychological traditions, in part, aim to understand human experience and alleviate suffering by incorporating theories and practices based on historical, psychological, and sociocultural perspectives, including modifying illusory cognitive and emotional attachments (Kostner, 2018; Rubin, 2003). The in-depth self-investigation advocated in the Buddhist philosophy coupled with the methodology of self-inquiry within Western psychology may have transformative influences on understanding and achieving well-being (Hasenkamp, 2019). Moreover, Buddhist philosophy offers a sophisticated phenomenology of mind, worldview, and ethics that are flexible enough to be practically integrated within a Western psychological context (Cowley & Derezotes, 1994; Kristeller, 2003). Consequently, Buddhist practices of mindfulness and meditation have been widely integrated into clinical, developmental, industrial-organizational, and social psychology (Chiesa & Serretti, 2009; Grossman et al., 2004; Oyler et al., 2021; Zelazo & Lyons, 2012). As Western psychology has acknowledged mindfulness practices and their benefits, researchers have become increasingly interested in other tenets of Buddhism (Epstein, 2018).

One principal topic of Buddhism—the self—is of particular interest to psychological researchers. One's perception of the self influences psychological well-being (Hanley &

✉ B. Ann Bettencourt
BettencourtA@missouri.edu

[1] Department of Psychological Sciences, University of Missouri, 210 McAlester Hall, Columbia, MO, USA

[2] PAIN RESearch and Intervention Center of Excellence, University of Florida, Gainesville, FL, USA

[3] School of Psychology, University of Waikato, Hamilton, New Zealand

Garland, 2017). Much of the psychological focus on the self has revolved around the self as an object (i.e., "me"-self; McAdams, 2013) that encompasses one's identity, roles, social cognitive processes, beliefs, group memberships, and self-esteem (Harter, 2012). These construals of the self are a composite of socially and culturally constructed past experiences that serve to define the me-self and provide self-worth (Ryan & Rigby, 2015). Consequently, the perception of the *me-self* is often heavily derived from social roles ("I'm a father," "I'm a teacher," Rubin, 2003). This frame of reference involves perceiving the self in a relatively static, permanent way, based on internalized evaluations and self-schemas of who "I am" (Cooley, 1902; Mead, 1934).

Another conceptualization of the self is the self-as-process (i.e., "I"-self, self-as-observer), which is a central component in several psychological theories, such as self-determination theory and the psychological flexibility model (Deci & Ryan, 2008; Rolffs et al., 2018). The concept of self-as-process is more similar to the conceptualization of not-self: the self becomes more fluid, and not beholden to existing self-concepts and internalized evaluations that define the me-self (Deci et al., 1991). This integrative view of the self-as-process results in fewer constraints on behavior, including those stemming from environmental concerns of self-image, and one's mental evaluations and biases of the self (Ryan & Rigby, 2015). Both positive and negative experiences can be framed within the growth process of "I," allowing for adaptive rather than reactive responses (Baer, 2003; Brown et al., 2008). The self-as-process perspective incorporates the fluidity of the self and allows for greater autonomy and endorsement of behavior (Ryan & Deci, 2011), minimizes the reactivity associated with the self, and promotes integrated functioning (Ryan & Rigby, 2015). Yet, this perspective still relies on a coherent sense of self that is continually transformed by incorporating and mastering the environment (i.e., self-determination theory, Ryan & Deci, 2011; Van Gordon et al., 2016). Although closer to the Buddhist conceptualization of the not-self than that of the "me" self, the psychological "I" theories still rely on the existence of a relational self (Van Gordon et al., 2016). Other more abstract psychological conceptualizations of self, such as that of Jungian theory in which the self is a holistic unification of the whole being with no locus, still rely on the implicit assumption of the existence of self (Jung, 1960).

The Buddhist perspective of the not-self differs from the Western psychological conceptualization of the self, in that the implicitly or explicitly understood existence of an inherent self is rejected. The Buddhist concept of the not-self posits that a solid, separate self is an illusion and that the self and its components—identities, perceptions, roles, and relationships—exist in an ever-changing process (Giles, 2019). Because the inherent self is an illusion, clinging to a static self is undesirable and leads to suffering (Lama, 2001; Lama et al., 2005). Buddhism emphasizes that over-identifying with the me-self is a major cause of human suffering: "Many people suffer because of anger, hatred, and judgment. All these problems spring from the mistaken notion of what and who we are. This idea of self, Me, and mine is the source of our inner struggle" (Thubten, 2013 p. 47). Even the most successful maintenance of selfhood is temporary; any happiness or satisfaction one attains from the preservation of self-concept will be lost as impermanence is realized (Thubten, 2013). Circumstances such as wealth, relationships, health, youth, and employment status undoubtedly change, and thus, no one can maintain happiness when the self is defined through phenomena that are in constant flux (Van Gordon et al., 2016, 2018). Although the inherent self is considered an illusion, the Buddhist perspective also acknowledges that at the relative level, the self serves to optimize functioning (i.e., allows for interaction with the environment; Sahdra et al., 2010; Segal, 2003; Wilson, 2019). The not-self perspective allows for the benefits of an impermanent self, such as those associated with social roles, without precipitating the suffering caused by over-identification with a solid self (Ryan & Rigby, 2015).

Mindfulness, a central component of Buddhism, allows for the recognition of the self as illusory (Bazzano, 2019; Lindahl & Britton, 2019; Watts, 1983). Further, it allows people to experience the existence of the self, as both parts of, and at one with, the world (Bazzano, 2019; Watts, 1983). This perspective liberates habitual unconscious thinking about the self (i.e., me-self) and the reactivity associated with clinging to a sense of solid self, in part through social role identities (Epstein, 2018; Puhakka, 2003). "In Buddhist training, we inquire into the very notion of identity, asking who we are in the midst of all these roles. We discover how our identification with a limited sense of self creates our suffering. Releasing ourselves from these limits can free us…." (Kornfield, 2008 pp. 62–63). Although shifting one's sense of self may seem daunting, people may be able to alter their sense of self quite readily. "You've been doing this sort of thing—changing the boundaries of what's self and not-self—all of the time. Think back on your life—or even for just a day—to see the many times your sense of self has changed from one role to another" (Thubten, 2013 p. 11). Research confirms that mindfulness is associated with greater emotion regulation, less reactivity, and greater well-being (e.g., Chambers et al., 2009; Gu et al., 2015). Thus, a shifting sense of self may be, at least partially, responsible for some of these beneficial outcomes. Those with greater mindfulness may be more likely to recognize and embrace the impermanence of self. For example, one process of mindfulness, decentering, allows for the separation of internal experiences and the self (Bernstein et al., 2019). Subjective experience (e.g., emotions) can be recognized without identification with the experience. In other words, a person

may feel angry, without anger being integrated into the sense of self (e.g., I am angry). Although the rejection of an inherent solid self is foreign to Western psychology, the negative consequences associated with how the self is perceived and maintained are not. Psychological research demonstrates the consequences of viewing the self as a discrete entity. Mental fixations with the self and attempts to enhance or preserve self-conceptualizations are associated with anxiety, reactivity, mental illness, and addiction (Brown et al., 2008; Shonin et al., 2014; Shonin et al., 2016; Van Gordon et al., 2018; Hasenkamp, 2019). These negative outcomes provide support for the not-self as a means to mitigate distress (Sahdra et al., 2010, 2016). Buddhist-informed psychological models that serve to define the relationship between the self and environment have also been established. For example, according to ontological addiction theory, maintaining beliefs about an inherent self leads to impaired functioning (Van Gordon et al., 2018). The metacognitive processes model articulates the importance of decentering (i.e., shifting experiential perspective from within one's subjective experience onto the experience itself) and its relationship with mechanisms of mental health. Thus, theoretical and empirical support for the benefits of the not-self framework has been identified. One way in which to advance understanding of the not-self perspective and psychological functioning is to measure the degree to which people identify with a solid sense of self.

Selfing—an over-identification with social role identities and their perceived status—is one way in which the belief in a discrete, inherent self manifests (Rubin, 2003; Ryan & Rigby, 2015). "It is not so much that we have a self, it's that we do self-ing. As Buckminster Fuller famously said, 'I seem to be a verb'" (Hanson, 2009 p. 259). Selfing contradicts the Buddhist teachings of the self as an impermanent interaction between internal and external phenomena; it represents the attachment to a solid sense of self. Thus, persons identifying with a solid, static sense of self would engage in selfing and thus would be high in our construct of selfing. Those who embrace the Buddhist concept of not-self and therefore conceptualize their sense of self as more fluid and impermanent would be low in selfing.

Although the theoretical relationships between mindfulness, the not-self, and stress have been established in Buddhist psychology (Thubten, 2013) and, to a lesser extent, in Western psychology (Ryan & Rigby, 2015), empirical evidence is limited. This may be due to the lack of formalized measurements of the not-self construct. Although many mindfulness scales have been developed (Brown & Ryan, 2003; Feldman et al., 2007; Lau et al., 2006), other Buddhist concepts have received much less attention from researchers (but see Sahdra et al., 2010). Psychometric measurement of the extent to which individuals identify with the me-self may allow for greater understanding of the relationship between selfing and stress and other indicators of psychological adjustment (e.g., anxiety, depression). Such psychometric measurement may also benefit from the Rasch methodology, which becomes increasingly applied to validate and enhance ordinal scales across different areas such as medicine, psychology, and education and demonstrated distinctive advantages (e.g., interval scaling) compared to other more traditional methods (Hobart & Cano, 2009; Rasch, 1960; Tennant & Conaghan, 2007).

The purpose of the current work was to develop and validate the Selfing Scale to measure the degree to which individuals excessively identify with a valued social role (e.g., friend, student, partner, parent) using both traditional and Rasch methodologies. Buddhist psychology posits that because these role identities exist at the relative level and are impermanent, strong identification with a solid sense of self is a source of stress. Western psychology also suggests that referencing the self as "me" does not allow for the same level of integrative functioning as referencing the self as the more fluid "I" (Ryan & Rigby, 2015). Mindfulness is one way in which excessive identification with the me-self can be identified and reduced (Watts, 1983). Although, theoretically (Ryan & Rigby, 2015), the link between mindfulness and a more integrated view of the self has been posited, empirical evidence supporting this link is lacking. We hypothesized that the propensity to engage in selfing would be associated with greater stress and that greater dispositional mindfulness would be associated with lower propensity to engage in selfing.

Method

Participants

Participants in the primary sample ($N = 1882$) included 1575 undergraduate students who participated in an online study for partial course credit and 246 MTurk workers, who participated in exchange for monetary compensation. In addition, members of a Buddhist meditation center ($n = 61$) participated in exchange for a three-dollar donation to the center. Participants were primarily White females and ranged in age from 18 to 86 years. The recommended statically established sample size for Rasch analysis with scale containing 20–30 items should be between 250 and 500 cases to minimize type I error due to inflated chi-square statistics and type II error due to an insufficient number of responses for item calibration (Azizan et al., 2020; Hagell & Westergren, 2016). Therefore, for Rasch analyses, two subsamples were collected, $n = 400$ each: sample A for exploratory and sample B for confirmatory Rasch analysis. A subset of participants ($n = 991$) also completed several measures to evaluate divergent and convergent validity. The sample sizes

and demographics for each of these subsamples (1–6) are reported in Table 1. In addition, another separate sample of undergraduate participants ($n = 191$) was used to examine test–retest reliability.

Procedure

Participants completed an online survey that included the Selfing Scale and, in some samples, additional scales for convergent and divergent validity testing. Participants were asked to consider a role that they deemed as central and important in their lives (e.g., sister, student). Then, they reported the role in an open-response question and were asked to consider that role when rating the 27 items of the initial Selfing Scale. As a fidelity check, participants were asked to type in the same role again (halfway through the scale) and to continue rating the remaining items. For the sample that evaluated test retest reliability of the Selfing Scale, participants were instructed to consider their role as a student so that the same role would be referenced and salient at both time points. All participants involved in this study provided their informed consent, and all study procedures were approved by the authors' institutional ethics committee.

Measures

The Selfing Scale items were developed by consulting two teachers, who have taught or written on the Buddhist topic of *anatta*. The last author corresponded with each consultant about the purposes of the project, discussed the concepts of not-self and selfing, and asked each to generate items. Independently, the last author also generated items. Together, 32 items were initially generated but five of these items were removed and other items were edited for clarity and fit, which resulted in a final set of 27 items. Again, when completing the scale, participants self-identified a role and wrote it in an open-ended text box. Questions were answered using a 7-point Likert-type scale (1 = strongly disagree; 7 = strongly agree).

The 35-item Contingencies of Self-worth Scale was used to assess sources of self-esteem including family support, competition, appearance, God's love, academic competence, virtue, and approval from others (Crocker et al., 2003). Participants endorsed each item on a 7-point Likert Scale (1 = strongly disagree, 7 = strongly agree). Scores for each of the subscales were averaged such that greater scores were associated with greater contingent self-esteem. Cronbach's alpha and McDonald's omega for each of the subscales were as follows: family support ($\alpha = 0.82$ to 0.84; $\omega = 0.78$ to 0.86), competition ($\alpha = 0.85$ to 0.88; $\omega = 0.82$ to 0.88), appearance ($\alpha = 0.76$ to 0.80; $\omega = 0.89$ to 0.89), God's love ($\alpha = 0.95$ to 0.95; $\omega = 0.96$ to 0.96), academic competence ($\alpha = 0.80$ to 0.89; $\omega = 0.80$ to 0.90), virtue ($\alpha = 0.78$ to 0.80; $\omega = 0.80$ to 0.82), and approval from others ($\alpha = 0.77$ to 0.85; $\omega = 0.82$ to 0.88).

Private self-consciousness and public self-consciousness were measured using the 16-item Self-Consciousness Scale (Scheier & Carver, 1985). Private self-consciousness refers to thinking about personal or hidden aspects of the self (i.e., beliefs, aspirations, values, and feelings), which are not easily ascertained by others. Participants rated 16 items on a 4-point Likert Scale (1 = not like me at all, 4 = a lot like me). Scores were computed for each of the subscales such that greater scores were associated with greater self-consciousness. Cronbach's alpha and McDonald's

Table 1 Demographic characteristics by subsample

Characteristic	Subsample 1	Subsample 2	Subsample 3	Subsample 4	Subsample 5	Sample meditators
n	167	242	166	98	246	61
Sample composition	College students	College students	College students	College students	MTurk	Community
Age range	18–23	18–25	18–40	18–24	18–90	18–78
Age mean	18.83	18.80	19.14	18.47	41.50 median	55.51
Age std. dev	.83	1.02	2.19	.927		11.94
Age IQR	18–19	18–19	18–19	18–19		49–63
Female (%)	60.5	61.4	62.7	63.9	62.2	67.2
Ethnicity (%)						
African American/Black	2.4	13.7	8.4	7.2	6.1	1.6
Asian American/Asian	3.6	5.0	6.6	7.2	4.1	1.6
European American/White	87.4	78.7	81.9	81.4	85.4	93.4
Latin American/Hispanic	4.8	0.8	2.4	2.1	2.0	1.6
Other	1.8	2.1	0.6	2.1	24	1.6

For the MTurk sample, age was reported using the following age ranges: 18–20; 21–30; 31–40; 41–50; 51–60; 61–70; 71–80; and 81–90

MTurk Amazon Mechanical Turk workers

omega were computed for private ($\alpha = 0.72$; $\omega = 0.77$) and public ($\alpha = 0.79$; $\omega = 0.79$) self-consciousness.

Individual differences in evaluations of social identity were assessed using the 16-item Collective Self-esteem Scale (Luhtanen & Crocker, 1992). The four subscales include membership esteem, private collective self-esteem, public collective self-esteem, and importance to identity. Participants rated items on a 7-point scale (1 = strongly disagree, 7 = strongly agree); higher scores reflect greater collective self-esteem. Cronbach's alpha and McDonald's omega for the subscales were as follows: membership esteem ($\alpha = 0.77$; $\omega = 0.77$), private collective self-esteem ($\alpha = 0.80$; $\omega = 0.80$), public collective self-esteem ($\alpha = 0.76$; $\omega = 0.72$), and importance to identity ($\alpha = 0.73$; $\omega = 0.73$).

The 12-item Self-concept Clarity Scale was used to assess how clearly defined, internally consistent, and temporally stable the self-concept (e.g., perceived personal attributes) is for an individual (Campbell et al., 1996). Participants endorsed items on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Items were computed such that greater scores reflect greater self-concept clarity. Cronbach's alpha and McDonald's omega for the current sample were $\alpha = 0.76$ and $\omega = 0.82$, respectively.

The 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965) was used to assess self-esteem. Participants rated each item on a 4-point Likert scale (1 = strongly agree, 4 = strongly disagree). Once negatively worded items were reverse scored, the total score was calculated. Cronbach's alpha and McDonald's omega for the current sample were $\alpha = 0.83$ and $\omega = 0.88$, respectively.

The 12-item neuroticism subscale of the NEO-personality inventory was used to assess the stable tendency to feel distress (Costa & McCrae, 1992). Items were rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Scores were computed such that greater average scores indicated greater neuroticism. Once negatively worded items were reverse scored, the total score was calculated. Cronbach's alpha and McDonald's omega for the current sample were $\alpha = 0.86$ and $\omega = 0.88$, respectively.

The 15-item Mindful Awareness and Attention Scale (Brown & Ryan, 2003) was used to assess mindful attention and awareness. Items were rated on a 6-point Likert scale (1 = almost always, 6 = almost never). Responses were recoded such that higher scores indicated greater mindful attention and awareness; these scores were averaged together such that greater scores reflect greater mindful attention and awareness. Cronbach's alpha and McDonald's omega for the current sample were $\alpha = 0.86$ and $\omega = 0.87$, respectively.

The 27-item Interpersonal Mindfulness Scale (IMS; Pratscher et al., 2019) was used to assess individuals' mindfulness during interactions with others. Participants rated items on a 5-point Likert Scale (1 = almost never, 5 = almost always). Scores were computed such that greater scores reflect greater mindfulness. Cronbach's alpha and McDonald's omega for the current sample were $\alpha = 0.89$ and $\omega = 0.91$, respectively.

The 30-item Non-Attachment Scale was used to assess non-fixation (e.g., lack of mental fixations based on acknowledgment of mental representations as impermanent; Sahdra et al., 2010). Participants rated items on a 6-point Likert Scale (1 = disagree strongly, 6 = agree strongly). Scores were computed such that greater average scores were associated with greater non-attachment. Cronbach's alpha and McDonald's omega for the current sample were $\alpha = 0.93$ and $\omega = 0.92$, respectively.

The 10-item Perceived Stress Scale was used to assess perceptions of stress over the last month (Cohen et al., 1983). Five of the items assess negative experiences with and dysfunctional ways of coping with stress, and five items assess positive ways of coping. Participants rated each of the items on a 5-point Likert scale (0 = never, 4 = very often); items were computed such that each participant had a score for positive coping and negative perceptions of and reactions to stress. Cronbach's alpha and McDonald's omega for the current samples ranged from $\alpha = 0.68$ to $\alpha = 0.84$ and $\omega = 0.70$ for positive coping, and $\alpha = 0.75$ to $\alpha = 0.87$ and $\omega = 0.74$ to $\omega = 0.78$ for negative coping, respectively.

The abbreviated 8-item Penn State Worrying Questionnaire was used to assess the severity of worries for an individual (Wuthrich et al., 2014). Participants rated items on a 5-point Likert Scale (1 = not at all typical of me, 5 = very typical of me). Scores were computed such that greater scores reflect greater worry. Cronbach's alpha and McDonald's omega for the current sample was $\alpha = 0.93$ and $\omega = 0.94$, respectively.

Physical health symptomology associated with stress was assessed using a 9-item scale (Emmons, 1992). Participants reported how often they experienced physical symptoms during the past 2 weeks on a 7-point scale (1 = strongly disagree, 7 = strongly agree). Scores were computed such that greater scores were associated with greater physical symptoms. Cronbach's alpha and McDonald's omega for the current sample were $\alpha = 0.75$ and $\omega = 0.75$ respectively.

Finally, the community sample of meditators answered several questions about their meditation practice, such as the number of years of meditation practice, the number of meditation retreats attended, and four items measuring the frequency of meditation practice (e.g., "In the last seven days, how often did you engage in meditation?"). These latter four items were standardized (z-scores) and averaged to create a regularity of practice variable.

Data Analyses

Prior to analyses, participants who provided an idiosyncratic social role (e.g., "human," "hell-raiser," and "cynic") or who

typed in more than one role (e.g., girlfriend and daughter) were dropped from the dataset and not included in the final number of participants in the full primary sample. Descriptive statistics, reliability, and analyses in the primary sample ($n = 1821$) were performed using IBM SPSS v.27, and exploratory factor analyses (EFA) utilized Factor software v. 12.01.02. Internal consistency of the scale was computed and used to identify items that demonstrated the most adequate psychometric properties, while EFA were conducted to evaluate scale suitability for application of the unidimensional Rasch model. The sample ($n = 1821$) was split into two adequate subsamples for EFA using the SOLOMON method (Lorenzo-Seva, 2021). Parallel analysis with polychoric correlations was used by applying unweighted least square (ULS) estimation method and oblimin rotation. The exploratory bifactor model was also tested as an indicator of data suitability for the unidimensional Rasch model.

Rasch methodology was applied using RUMM2030 software. To increase rigor and reproducibility, two randomized samples, A ($n = 400$) and B ($n = 400$), were produced and included an equal proportion of students and workers. Exploratory Rasch analyses were first performed on sample A; then, the confirmatory Rasch analysis was conducted with sample B. There are two polytomous Rasch models: the Rating Scale Rasch model (Andrich et al., 2012) and the Partial Credit Rasch model (Masters, 1982). A likelihood-ratio test was employed to assess the suitability for the unrestricted Partial Credit Rasch model (Masters, 1982). Rasch analysis is an iterative process, of which the goal is to achieve both the individual item and overall fit to the model and unidimensionality (Medvedev et al., 2016). It is expected that all individual items have fit residuals between the range of − 2.50 and 2.50. Scale items should be locally independent, and this is tested by examining residual correlations (Medvedev et al., 2020). If items have residual (error) correlations above 0.20, they are considered as locally dependent, which impacts the overall model fit and may result in spurious correlations interfering with unidimensionality (Christensen et al, 2017; Wainer & Kiely, 1987). Local dependency is a situation when two or more items share common variance that is unrelated to the construct been measured and include method effect (e.g., negatively worded items). We used testlet models to address local dependency between items, minimize measurement error, and improve the overall model fit (Lundgren-Nilsson & Tennant, 2011; Wang & Wilson, 2005). Unlike parceling used in traditional analyses such as EFA and CFA, testlet models used in Rasch analysis are usually based on residual correlations and aimed at resolving local dependency due to spurious correlations between items, which reduces measurement error. In traditional analyses, such modifications do not change the psychometric properties of a scale because they do not develop algorithms to transform ordinal-to-interval-level data accounting for these modifications. In Rasch analysis, all testlet modifications are accounted for in transformation algorithm and enhance the precision of measurement, ultimately improving the psychometric properties of a scale. Meeting expectations of the Rasch model is required for the generation of algorithms to convert the scores from an ordinal to an interval measure (Medvedev et al., 2020).

Across six subsamples (1–6; $n = 991$), zero-order correlations were computed between the Selfing Scale and each of the other 13 measures. Finally, an intra-class correlation coefficient was calculated to determine test–retest reliability among a separate secondary sample ($n = 191$) of undergraduate participants (Wong, 1996).

Results

Internal consistency of the 27-item scale was high (Cronbach's alpha 0.89/McDonald's omega 0.92), but two items (S4 and S10) displayed low item-to-total correlations (< 0.10). After removing these two items, the internal consistency of the final 25 items increased ($\alpha = 0.91/\omega = 0.90$), as shown in Table 2. Both EFA and exploratory bifactor model conducted with 25 items supported one overarching selfing factor, with all item loadings on the general selfing factor > 0.30 and the overall acceptable fit indices: GFI = 0.98, 90% CI [0.98, 0.99]; CFI = 0.98, [90% CI [0.97, 0.98]; and RMSEA = 0.06. The possibility of multiple factors related to selfing was explored, and while the 2-factor solution had a sufficient number of items per factor, it was conceptually uninterpretable and weakened by cross-loadings.

Rasch Analysis

A summary of fit statistics for the initial and the final Rasch analyses of the Selfing Scale for both samples is presented in Table 3. The overall model fit of the initial analysis was unacceptable with significant item-trait interaction and signs of multidimensionality, but the reliability was good (PSI = 0.93). At this point, we examined thresholds of individual items, which were disordered for 16 items, with some of the remaining having only marginally acceptable threshold orders. The common problem was that the thresholds for response categories 2 and 3 were disordered for the majority of items. After the thresholds were uniformly rescored for all items by collapsing response options 2 and 3, no additional disordered thresholds were identified, and the overall model fit improved, but item-trait interaction was still significant ($\chi 2\ (125) = 428.28$, $p < 0.001$). Figure 1 shows an example of rescoring disordered thresholds for item 5 by collapsing response options 2 and 3 on the category response probability curves. The rescoring enabled all disordered thresholds to

Table 2 Standardized loadings and item-total correlations (25 items)

No	Item content	Loadings 1st PC	Item-total correlation
S1	I feel that my esteem for myself is determined by how I am doing in this role	0.65	0.58
S2	There are particular ways that I should think and feel when I fulfill this role	0.58	0.50
S3	It is important to me to project the right image of myself in this role to other people	0.58	0.50
S5	Sometimes I feel that other people's love for me is affected by my fulfilling this role	0.34	0.31
S6	I have a strong sense that this role is an important part of who I truly am	0.46	0.38
S7	When I see others who have this role, I feel that they are doing better than me	0.41	0.40
S8	Sometimes I feel my day is ruined if I perform poorly in this role	0.62	0.57
S9	To a large extent, this role is who I am	0.60	0.53
S11	I spend quite a lot of time each day planning with regard to this role	0.61	0.55
S12	It is important to me that others see me as doing very well in this role	0.69	0.61
S13	I worry about the ways in which I am fulfilling this role	0.63	0.58
S14	Often, I compare myself to others who also have this role, so I know how I am doing	0.62	0.58
S15	Fulfilling this role sometimes causes me to do things that I would not otherwise do	0.31	0.31
S16	I tend to ruminate about whether or not I am performing well in this role	0.67	0.63
S17	I frequently evaluate myself based on how I am fulfilling this role	0.76	0.71
S18	I find myself creating a particular image of myself while fulfilling this role	0.64	0.58
S19	Often I think of myself in terms of this role no matter where I am or what I am doing	0.63	0.57
S20	I feel that my self-esteem is affected by how others evaluate me in this role	0.69	0.64
S21	I have a fairly clear story about myself in this role	0.48	0.40
S22	I feel others frequently evaluate me based upon how I am doing in this role	0.66	0.62
S23	When I compare myself to others that also have this role, often I feel I am doing worse	0.38	0.38
S24	Fulfilling this role sometimes prevents me from doing things that I would otherwise do	0.39	0.38
S25	When I meet someone new, I usually refer to my role and talk about myself with respect to it	0.50	0.46
S26	I feel that, in many ways, this role defines who I am	0.60	0.54
S27	I feel I should adhere to a certain pattern of behaviors when I fulfill this role	0.63	0.58

1st PC the first principal component

Table 3 Summary of fit statistics for the initial and the final Rasch analyses of the Selfing Scale using sample A ($n=400$) and replication using sample B ($n=400$)

Analyses	Person mean		Goodness of fit		PSI	Unidimensionality *t* tests	
	Value / SD		$\chi 2$ (df)	*p*		%	Lower bound
Initial (A1)	0.42	0.74	472.26 (125)	< 0.001	0.93	29.0	26.7 (*no*)
Analysis (A2)	0.61	0.80	428.28 (125)	< 0.001	0.92	29.5	27.4 (*no*)
Final (A3)	0.76	1.02	58.86 (48)	0.14	0.92	6.5	4.4 (*yes*)
Initial (B1)	0.32	0.57	795.79 (125)	< 0.001	0.90	29.3	27.1 (*no*)
Replication (B2)	0.61	0.88	62.44 (48)	0.08	0.90	6.5	4.4 (*yes*)

become perfectly ordered, making item 5 a well-functioning item that now allows distinct discrimination between the response options. Individual items fit statistics for the Rasch model, such as item location, fit residual, and chi-square, are presented in Supplementary Materials indicating seven misfitting items (S5, S7, S15, S17, S23, S24, and S25) with fit residual values exceeding ± 2.50 criteria. After deleting these misfitting items, the overall fit improved, but chi-square for trait item interaction was still significant, indicating misfit to the Rasch model ($\chi 2\ (90) = 93.17$, $p < 0.001$).

At this stage, the residual correlation matrix of individual items was investigated and residual correlations exceeding the critical magnitude of 0.20 were found between 15 out of 18 items testifying local dependency. Both the overall and individual item fit to the Rasch model are affected by local dependency, which can be resolved by using testlet models. Therefore, three teslet models were used that included locally dependent items to resolve local dependency as follows: testlet 1 (items S1, S9, S14, and S22); testlet 2 (items S2, S3, S12, S16, and S27); and testlet 3 (items S6, S8, S13,

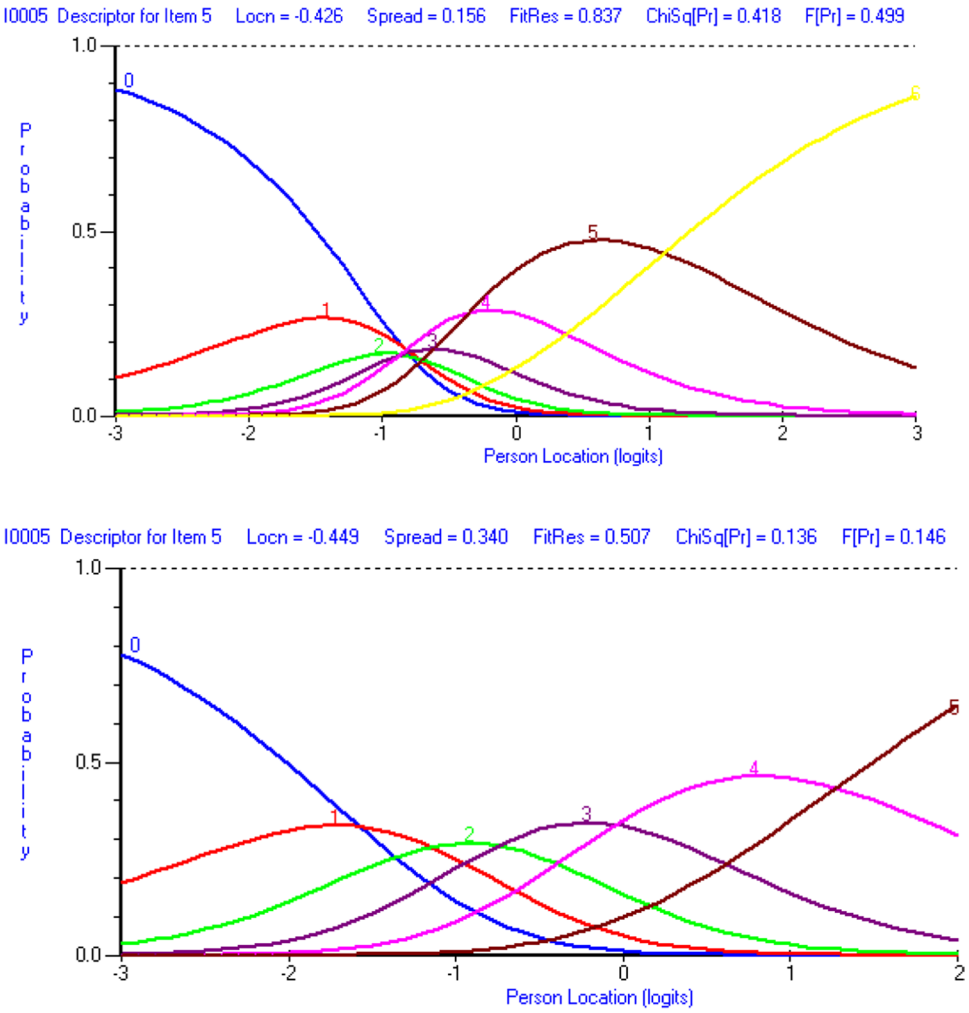

Fig. 1 Category probability curves for item 5 before rescoring illustrating disordered thresholds (above) and after rescoring showing perfectly ordered thresholds (below)

S20, S21, and S26) (Supplementary Table 1). This modification resulted in the best fit to the Rasch model evidenced by non-significant chi-square, unidimensionality, good reliability (Table 1, Final, A3), and no DIF by personal factors sex, age, and sample category (students vs workers). Figure 2 shows the distribution of person abilities of the sample and scale coverage for the final analysis (A3) using universal logit units. It clearly shows that item thresholds cover well sample abilities with no significant floor or ceiling effects. The mean of the sample is above the item mean indicating higher levels of the selfing trait. This result was successfully replicated with sample B ($n = 400$) yielding a similar result (Table 3, replication, B2). In both analyses (original and replication), the reliability of the 18-item Selfing Scale was very high (PSI = 0.90–0.92; $\alpha = 0.90$; $\omega = 0.90$) permitting the use of the scale for individual and group assessment with high precision.

Meeting expectations of the unidimensional Rasch model in both samples supported the robustness of the 18-item Selfing Scale and permitted the development of an ordinal-to-interval conversion algorithm using person estimate of the Rasch model. The scale has a different range because we have collapsed ordinal response options 3 and 4 to address disordered thresholds. The rescoring enabled all disordered thresholds to become perfectly ordered. Table 4 includes converging of ordinal scores into interval-level scores using both logit units and the ordinal scale metric after the ordinal response categories are rescored in the following way to improve reliability: 1 = 1; 2 = 2; 3 = 3; 4 = 3; 5 = 4; 6 = 5; and 7 = 6. This rescoring should be conducted for the whole data before computing the total scores that will range from 18 to 108. Once the total scores are computed, interval-level scores can be found on the right-hand side in logits and the rescored scale metric. By using this conversion table, researchers can enhance the reliability of the ordinal scale scores contributing to higher reliability and validity of the assessment. The test–retest 18-item intra-class correlation coefficient was 0.73 ($p < 0.01$; 95% CI [0.64, 0.79]), indicating adequate scale stability over time and indicating that the scale is measuring the selfing trait.

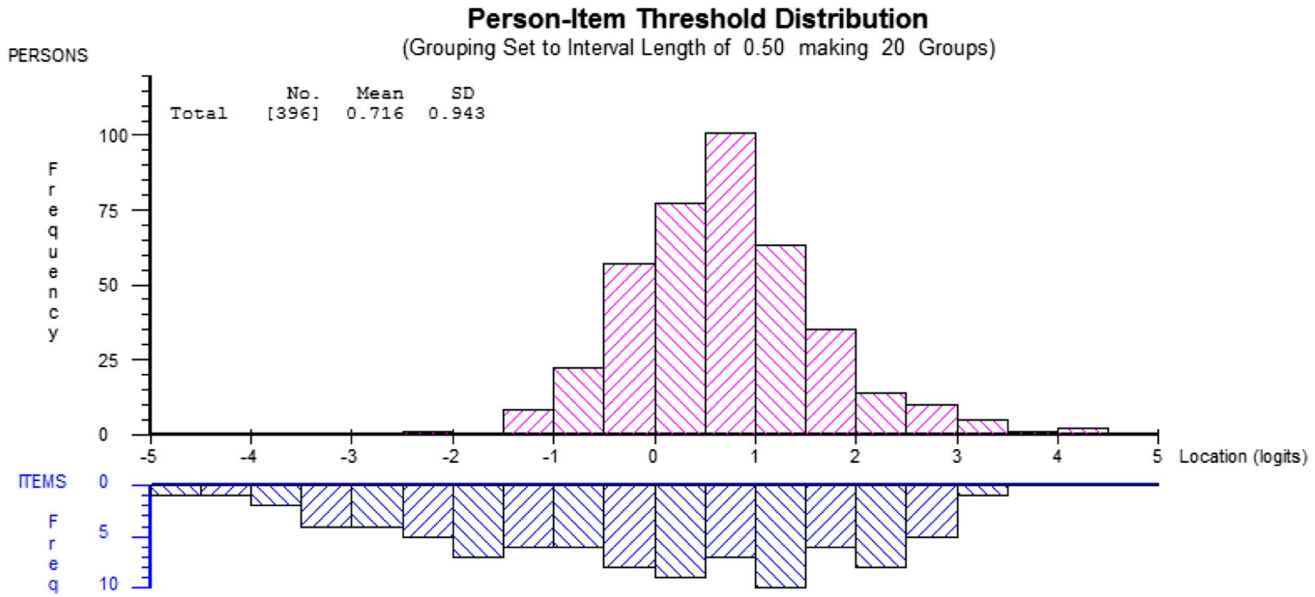

Fig. 2 Person-item threshold distribution of sample A

Convergent and Divergent Validity

As shown in Table 5, the Selfing Scale was correlated with the subscales of the Contingent Self-Worth measure, except for "God's Love" Contingent Self-Worth. These positive associations suggest that a tendency to base one's self-worth (i.e., self-esteem) on specific domains in life is associated with engagement in selfing with respect to social roles. Similarly, the Selfing Scale was positively correlated with Private and Public Self-Consciousness, suggesting that the tendency to feel self-conscious is associated with engagement in selfing. Nevertheless, these moderate correlations suggest that the Selfing Scale does not assess the same construct as those of contingent self-worth and self-consciousness. For the Collective Self-Esteem subscales, only Importance to (collective) Identity was correlated with the Selfing Scale; the correlation with identity is consistent with the definition that selfing can involve an *over-identification* with a social role, but the observed correlation does not suggest that the scales measure the same construct. There was a small positive correlation between scores on the Self-Concept Clarity Scale and those on the Selfing Scale, which may represent that the items in both scales reference the concept of the self, but otherwise, these are not the same constructs.

Consistent with hypotheses, engagement in selfing was associated with more negative outcomes. Scores on the neuroticism measure were positively associated with scores on the Selfing Scale. The correlations generally supported the hypothesis that a greater tendency to engage in selfing is associated with stress. Although scores on the Selfing Scale were uncorrelated with positive ways of coping with stress, the results showed higher scores on the Selfing Scale were positively correlated with negative experiences of stress and dysfunctional ways of coping with stress. Also in general line with predictions, the results indicated that a greater tendency to engage in selfing was associated with more tendency to worry and self-reported physical symptoms (i.e., headaches, congestion, coughing).

Among practitioners, mindfulness practices may reduce over-identification with social roles, but levels of trait mindfulness, more generally, may not predict selfing. For sample 2, neither the MAAS nor the Non-Attachment Scale was significantly associated with the Selfing Scale. Among the community sample of experienced meditators, however, both the measures of mindful attention and awareness ($r = -0.39$, $p < 0.01$) and interpersonal mindfulness ($r = -0.31$ $p < 0.01$) were negatively correlated with the Selfing Scale, suggesting that greater levels of attention, awareness, and interpersonal mindfulness in meditation practitioners may be associated with less engagement in selfing. Consistent with this, the results for the community sample showed that participants' reports of practice regularity were negatively correlated with the Selfing Scale ($r = -0.37$, $p < 0.01$). The results, however, showed only non-significant negative correlations between greater selfing and self-reported years of practice ($r = -0.14$, $p > 0.05$) or number of meditation retreats ($r = -0.13$, $p > 0.05$). In all, these findings suggest that mindfulness practice may reduce selfing, but the trait capacity for attention and awareness may not necessarily allow one to have a more fluid sense of self.

Table 4 Ordinal-to-interval conversion table

Ordinal	Interval		Ordinal	Interval	
Scores	Logits	Scale	Scores	Logits	Scale
18	−5.73	18.00	64	0.05	67.26
19	−5.03	23.92	65	0.11	67.80
20	−4.54	28.08	66	0.17	68.33
21	−4.20	30.99	67	0.24	68.87
22	−3.93	33.31	68	0.30	69.40
23	−3.70	35.28	69	0.36	69.93
24	−3.50	37.02	70	0.42	70.46
25	−3.32	38.55	71	0.48	70.98
26	−3.15	39.94	72	0.54	71.50
27	−3.00	41.22	73	0.61	72.03
28	−2.87	42.40	74	0.67	72.56
29	−2.74	43.50	75	0.73	73.10
30	−2.62	44.53	76	0.79	73.63
31	−2.50	45.52	77	0.86	74.17
32	−2.39	46.45	78	0.92	74.71
33	−2.29	47.33	79	0.98	75.24
34	−2.19	48.18	80	1.05	75.79
35	−2.09	49.00	81	1.11	76.34
36	−2.00	49.78	82	1.18	76.89
37	−1.91	50.55	83	1.24	77.45
38	−1.82	51.30	84	1.31	78.02
39	−1.74	52.04	85	1.37	78.59
40	−1.65	52.75	86	1.44	79.17
41	−1.57	53.45	87	1.51	79.76
42	−1.49	54.15	88	1.58	80.35
43	−1.41	54.82	89	1.65	80.95
44	−1.33	55.49	90	1.72	81.57
45	−1.26	56.15	91	1.80	82.20
46	−1.18	56.80	92	1.87	82.84
47	−1.10	57.44	93	1.95	83.49
48	−1.03	58.07	94	2.03	84.16
49	−0.96	58.69	95	2.11	84.86
50	−0.89	59.31	96	2.19	85.58
51	−0.81	59.91	97	2.28	86.33
52	−0.74	60.51	98	2.37	87.12
53	−0.67	61.11	99	2.47	87.95
54	−0.61	61.69	100	2.58	88.85
55	−0.54	62.27	101	2.69	89.84
56	−0.47	62.85	102	2.82	90.92
57	−0.40	63.41	103	2.97	92.18
58	−0.34	63.98	104	3.14	93.65
59	−0.27	64.53	105	3.36	95.50
60	−0.21	65.09	106	3.65	98.01
61	−0.14	65.64	107	4.11	101.91
62	−0.08	66.18	108	4.82	108.00
63	−0.02	66.73			

Table 5 Zero-order correlations with the Selfing Scale and relevant scales

Scale	Sample	Correlations
Contingent self-worth		
Family support	1, 5	.26**; .54**
Competition	1, 5	.38**; .50**
Appearance	1, 5	.31**; .59**
God's love	1, 5	.02; .15
Academic competence	1, 5	.43**; .53**
Virtue	1, 5	.28**; .53**
Approval of others	1, 5	.40**; .58**
Private self-consciousness	3	.33**
Public self-consciousness	3	.50**
Collective self-esteem		
Importance to identity	2	.25**
Private	2	.10
Public	2	.10
Membership	2	.07
Self-concept clarity	3	.16*
Global self-esteem	3	−.11
Neuroticism	3	.32**
Mindfulness	2, 6	−.12; −.39**
Interpersonal mindfulness	6	−.31**
Non-attachment	2	.06
Negative reactions to stress	2, 3, 4, 5	.21**; .28**; 30*; .31**
Positive coping with stress	2, 3, 4, 5	10; −.05; −.17;.11
Worry	4	.27**
Physical symptoms	4	.26*

Sample 1 ($n=167$), college students; sample 2 ($n=242$); sample 3 ($n=177$), college students; sample 4 ($n=98$), college students; sample 5 ($n=246$), Mturk workers; sample 6 ($n=61$), experienced meditators

*$p<.05$; **$p<.01$

Discussion

The current work developed and validated the Selfing Scale using large samples of undergraduate students and MTurk workers ($N=1882$). The scale is intended to measure the construct of selfing, which we define as the over-identification with a valued social role. The initial principal component analysis yielded a 25-item solution with all items loading onto a single overarching selfing factor. To further refine the scale, Rasch analysis on two randomized samples were conducted. Items not meeting expectations of the Rasch model were removed, item response categories with disordered thresholds were uniformly rescored, and local dependency between items was addressed using three testlet models resulting in the best model fit of the reduced, 18-item Selfing Scale. Therefore, ordinal-to-interval conversion tables were produced based on person estimates of the Rasch model to transform ordinal scores into interval-level data—using

these transformed scores enhances scale accuracy, reliability, and validity and satisfies assumptions of fundamental measurement defined by the Rasch model. Together, the results suggest that the Selfing Scale is a reliable and valid measure to assess trait-like qualities of excessive identification with a social role central to one's life. Further analyses on test–retest reliability and convergent and divergent validity support the robust psychometric properties of the 18-item Selfing Scale.

The results indicated that selfing was expectedly related to other measures of self and identity in expected directions, but the correlations suggested that construct was distinct. Specifically, higher levels of selfing were positively correlated with measures of contingent self-worth, self-concept clarity, the collective self-esteem subscale of importance to identity, and private and public self-consciousness. The positive relationship between selfing and self-related subscales such as approval of others and importance to identity supports the supposition that the selfing construct is capturing aspects central to the me-self (e.g., evaluation of others). Moreover, as expected, higher levels of selfing were negatively correlated with neuroticism, worry, negative reactions to stress, and stress-related health symptoms. These findings support the Buddhist perspective of increased distress associated with identification with a solid sense of self. Although the relationship between selfing and well-being was as hypothesized, the relationship between selfing and mindful attention and awareness, interpersonal mindfulness, and non-attachment was more nuanced. The finding suggested that in the non-practitioner samples, selfing was unrelated to mindfulness-related constructs; however, in the experienced meditators sample, selfing was significantly and negatively correlated with the mindful attention and awareness scale and the interpersonal mindfulness scale. Because we expected selfing to be negatively related to these mindfulness-related constructs in all samples, we ran an additional study using a different mindfulness survey. The brief five-facet mindfulness questionnaire (FFMQ; Baer et al., 2006, 2008; Gu et al., 2016) differs from the MAAS in that it includes five components of mindfulness. In this additional sample of undergraduates from the same university ($N = 585$: mean age = 18.66, SD = 1.70), as expected and consistent with the results for the experienced meditators, higher levels of dispositional mindfulness were negatively correlated with the scores on the Selfing Scale ($r = -0.16$, $p < 0.001$).

Consistent with Buddhist and Western psychology, meditation and mindfulness practices may be beneficial for health and well-being vis-à-vis decreased selfing. First, when practitioners come to embrace the characteristic of not-self, they are liberated from stress and anxiety associated with maintaining a solid sense of self and in turn are able to incorporate both negative and positive life experiences, adaptively (Baer, 2003; Ryan & Rigby, 2015). Second, mindfulness practices may reduce habitual, unconscious thoughts about the self and thereby reduce destructive thought patterns such as rumination and negative self-talk. Mindfulness should also reduce perceived threats to the self. For example, decentering, bolstered by mindfulness, allows for observing experiences from a perceptual distance (Bernstein et al., 2015, 2019). People may choose how to respond adaptively to situations instead of using internalized evaluations and self-schemas to react and maintain preconceived notions of the self (Ryan & Rigby, 2015). In addition, mindfulness is associated with greater regulatory flexibility that promotes adaptive, rather than maladaptive (e.g., avoidance), emotion regulation. This combination of increased regulatory flexibility and more fluid, integrative perceptions of the self should improve psychological and physiological functioning.

Research suggests that mindfulness may serve to promote improved interpersonal interactions, in part, because of reduced reactivity to social threats (Brown et al., 2016). When the propensity to preserve the solid self is diminished, the resulting intrapersonal benefits (e.g., decreased worry and stress reactivity) should have downstream benefits for interpersonal functioning (e.g., relationship satisfaction). The current results may support this perspective because greater interpersonal mindfulness was associated with less selfing among mindfulness practitioners. For example, in the context of a romantic relationship, less selfing may facilitate more open, receptive communication and feedback from one's partner—as opposed to becoming defensive during challenging conversations (Gesell et al., 2020; Lenger et al., 2017). Therefore, reducing over-identification with and attachment to social roles (i.e., selfing), likely through mindfulness practices, may promote healthier relationships, due to a more fluid, less defended, sense of self. This finding, coupled with the results indicating that selfing is associated with more negative outcomes of well-being, suggests that more research on the not-self is warranted.

Limitations and Future Directions

The current work suggests the Selfing Scale is a psychometrically sound scale that will allow for greater integration between Buddhism's concept of not-self and Western psychology's concepts of self. Nevertheless, there are several limitations to consider. Although community and university samples were used to develop the scale, the majority of participants were female, White European American. Future work with the scale in other populations will provide additional evidence regarding reliability and validity. Also, some measures, such as that of mindful attention and awareness, were only examined once among meditation practitioners and once among non-practitioners. Further, only one undergraduate sample was used to assess the relationship between

the Selfing Scale and mindfulness using the FFMQ. The Mindful Attention and Awareness Scale, used as a measure of mindful attention and awareness in the current work, has been criticized for its ability to accurately discriminate between levels of mindfulness (Medvedev et al., 2016). Thus, before strong conclusions can be drawn about the relationship between mindfulness and selfing, correlations between other trait mindfulness scales and the Selfing Scale should be examined. Additionally, selfing should continue to be assessed alongside other psychological constructs of well-being and distress, as well as included before and after mindfulness-based interventions.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s12671-022-01931-6.

Acknowledgements The authors would like to thank the participants for their involvement in the study.

Author Contribution BAB: planned the study, collected data, conducted statistical analyses, and edited the manuscript; DLO: collaborated with data collection, conducted statistical analyses, and wrote the manuscript; SDP: collaborated with the data collection and the planning and editing of the manuscript; PL: collaborated with the data analyses and the editing of the manuscript; ONM: collaborated with the data analyses and the editing of the manuscript. All of the authors approved the final version of the manuscript for submission.

Data Availability The datasets generated and analyzed during the current study are still actively being analyzed. Therefore, data is only available from the corresponding author on reasonable request.

Declarations

Conflict of Interest The authors declare no competing interests.

Informed Consent All participants involved in this study provided their informed consent.

Ethics Statement All study procedures were approved by the University of Missouri institutional ethics committee IRB # 1207973 C.

References

Andrich, D., Humphry, S. M., & Marais, I. (2012). Quantifying local, response dependence between two polytomous items using the Rasch model. *Applied Psychological Measurement, 36*(4), 309–324. https://doi.org/10.1177/0146621612441858

Azizan, N. H., Mahmud, Z., & Rambli, A. (2020). Rasch rating scale item estimates using maximum likelihood approach: Effects of sample size on the accuracy and bias of the estimates. *International Journal of Advanced Science and Technology, 24*(4), 2526–2531.

Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice, 10*(2), 125–143. https://doi.org/10.1093/clipsy.bpg015

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27–45. https://doi.org/10.1177/1073191105283504

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., Walsh, E., Duggan, D., & Williams, J. M. G. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15*, 329–342. https://doi.org/10.1177/1073191107313003

Bazzano, M. (2019). Meditation and the post-secular condition. *Psychotherapy and Politics International, 17*(2), e1490. https://doi.org/10.1002/ppi.1490

Bernstein, A., Hadash, Y., Lichtash, Y., Tanay, G., Shepherd, K., & y Fresco, D. M. (2015). Decentering and related constructs: A critical review and metacognitive processes model. *Perspectives on Psychological Science, 10*(5), 599–617. https://doi.org/10.1177/1745691615594577

Bernstein, A., Hadash, Y., & Fresco, D. M. (2019). Metacognitive processes model of decentering: Emerging methods and insights. *Current Opinion in Psychology, 28*, 245–251. https://doi.org/10.1016/j.copsyc.2019.01.019

Brown, K. W., Ryan, R. M., Creswell, J. D., & Niemiec, C. P. (2008). Beyond me: Mindful responses to social threat. In H. A. Wayment & J. J. Bauer (Eds.), *Transcending self-interest: Psychological explorations of the quiet ego* (pp. 75–84). https://doi.org/10.1037/11771-007

Brown, K. W., Berry, D. R., & Quaglia, J. T. (2016). The hypo-egoic expression of mindfulness in social life. In *The Oxford handbook of hypo-egoic phenomena* (p. 147). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199328079.001.0001

Brown, K. W., & Ryan, R. M. (2003). *Mindful Attention Awareness Scale (MAAS). APA PsycTests*. https://doi.org/10.1037/t04259-000

Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality and Social Psychology, 70*(1), 141–156. https://doi.org/10.1037/0022-3514.70.1.141

Chambers, R., Gullone, E., & Allen, N. B. (2009). Mindful emotion regulation: An integrative review. *Clinical Psychology Review, 29*(6), 560–572. https://doi.org/10.1016/j.cpr.2009.06.005

Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress management in healthy people: A review and meta-analysis. *The Journal of Alternative and Complementary Medicine, 15*(5), 593–600. https://doi.org/10.1089/acm.2008.0495

Christensen, K. B., Makransky, G., & Horton, M. (2017). Critical values for Yen's Q 3: SsIdentification of local dependence in the Rasch model using residual correlations. *Applied Psychological Measurement, 41*(3), 178–194. https://doi.org/10.1177/0146621616677520

Cohen, S., Kamarck, T., & Mermelstein, R. (1983).A global measure of perceived stress. *Journal of Health and Social Behavior*, 385–396.https://doi.org/10.2307/2136404

Cooley, C. H. (1902). Looking-glass self. *The production of reality: Essays and readings on social interaction*, *6*, 126–128. https://doi.org/10.32376/3f8575cb.73d69f51

Costa, P. T., & McCrae, R. R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological Assessment, 4*(1), 5–13. https://doi.org/10.1037/1040-3590.4.1.5

Cowley, A. S., & Derezotes, D. (1994). Transpersonal psychology and social work education. *Journal of Social Work Education, 30*(1), 32–41. https://doi.org/10.1080/10437797.1994.10672211

Crocker, J., Luhtanen, R. K., Cooper, M. L., & Bouvrette, A. (2003). Contingencies of self-worth in college students: Theory and measurement. *Journal of Personality and Social Psychology, 85*(5), 894–908. https://doi.org/10.1037/0022-3514.85.5.894

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/psychologie Canadienne, 49*(3), 182–185. https://doi.org/10.1037/a0012801

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist, 26*(3–4), 325–346. https://doi.org/10.1080/00461520.1991.9653137

Dhar, P. L. (2011). No I, no problems: The quintessence of Buddhist psychology of awakening. *Psychological Studies, 56*(4), 398–404. https://doi.org/10.1007/s12646-011-0111-0

Emmons, R. A. (1992). Abstract versus concrete goals: Personal striving level, physical illness, and psychological well-being. *Journal of Personality and Social Psychology, 62*(2), 292–300. https://doi.org/10.1037/0022-3514.62.2.292

Epstein, M. (2018). On the seashore of endless worlds: Buddha and Winnicott. In A. Hoffer, (Ed.), *Freud and the Buddha: The couch and the cushion*. Routledge. https://doi.org/10.4324/9780429474965-5

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of Psychopathology and Behavioral Assessment, 29*(3), 177–190. https://doi.org/10.1007/s10862-006-9035-8

Gesell, N., Niklas, F., Schmiedeler, S., & Segerer, R. (2020). Mindfulness and romantic relationship outcomes: The mediating role of conflict resolution styles and closeness. *Mindfulness, 11*(10), 2314–2324. https://doi.org/10.1007/s12671-020-01449-9

Giles, J. (2019). Relevance of the no-self theory in contemporary mindfulness. *Current Opinion in Psychology, 28*, 298–301. https://doi.org/10.1016/j.copsyc.2019.03.016

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research, 57*(1), 35–43. https://doi.org/10.1016/S0022-3999(03)00573-7

Gu, J., Strauss, C., Bond, R., & Cavanagh, K. (2015). How do mindfulness-based cognitive therapy and mindfulness-based stress reduction improve mental health and wellbeing? A systematic review and meta-analysis of mediation studies. *Clinical Psychology Review, 37*, 1–12. https://doi.org/10.1016/j.cpr.2015.01.006

Gu, J., Strauss, C., Crane, C., Barnhofer, T., Karl, A., Cavanagh, K., & Kuyken, W. (2016). Examining the factor structure of the 39-item and 15-item versions of the Five-Facet Mindfulness Questionnaire before and after Mindfulness-Based Cognitive Therapy for people with recurrent depression. *Psychological Assessment, 28*(7), 791–802. https://doi.org/10.1037/pas0000263

Hagell, P., & Westergren, A. (2016). Sample size and statistical conclusions from tests of fit to the Rasch model according to the Rasch Unidimensional measurement model (Rumm) program in health outcome measurement. *Journal of Applied Measurement, 17*(4), 416–431.

Hanley, A. W., & Garland, E. L. (2017). Clarity of mind: Structural equation modeling of associations between dispositional mindfulness, self-concept clarity and psychological well-being. *Personality and Individual Differences, 106*, 334–339. https://doi.org/10.1016/j.paid.2016.10.028

Hanson, R. (2009). *Buddha's brain: The practical neuroscience of happiness, love, and wisdom.* New Harbinger Publications.

Harter, S. (2012). *The construction of the self: Developmental and socio-cultural foundations*. Guilford Press.

Hasenkamp, W. (2019). Fruits of the Buddhism-science dialogue in contemplative research. *Current Opinion in Psychology, 28*, 126–132. https://doi.org/10.1016/j.copsyc.2018.12.003

Hobart, J., & Cano, S. (2009). Improving the evaluation of therapeutic interventions in multiple sclerosis: The role of new psychometric methods. *Health Technology Assessment, 13*(12), 1–200. https://doi.org/10.3310/hta13120

Jung, C. G. (1960). *Psychology and religion*. Yale University Press.

Kornfield, J. (2008). *The wise heart: Buddhist psychology for the West*. Random House.

Kostner, D. (2018). It's not about the mindfulness: Foundations of Buddhist thought and why it matters for psychology. In A. Hoffer, (Ed.), *Freud and the Buddha: The couch and the cushion*. Routledge. https://doi.org/10.4324/9780429474965-2

Kristeller, J. (2003). Finding the Buddha/finding the self seeing with the third eye. In S. R. Segall (Ed.), *Encountering Buddhism: Western psychology and Buddhist teachings.* ProQuest Ebook Central.

Lama, D. (2001). *Ethics for the new millennium*. Penguin.

Lama, D., Jinpa, G. T., & Gere, R. (2005). *The world of Tibetan Buddhism: An overview of its philosophy and practice*. Wisdom Publications.

Lau, M. A., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., Carlson, L., Shapiro, S., Carmody, J., Abbey, S., & Devins, G. (2006). The Toronto mindfulness scale: Development and validation. *Journal of Clinical Psychology, 62*(12), 1445–1467. https://doi.org/10.1002/jclp.20326

Lenger, K. A., Gordon, C. L., & Nguyen, S. P. (2017). Intra-individual and cross-partner associations between the five facets of mindfulness and relationship satisfaction. *Mindfulness, 8*(1), 171–180. https://doi.org/10.1007/s12671-016-0590-0

Lindahl, J. R., & Britton, W. B. (2019). 'I have this feeling of not really being here': Buddhist meditation and changes in sense of self. *Journal of Consciousness Studies, 26*(7–8), 157–183.

Lorenzo-Seva, U. (2021). SOLOMON: a method for splitting a sample into equivalent subsamples in factor analysis. *Behavior Research Methods*, 1–13.https://doi.org/10.3758/s13428-021-01750-y

Luhtanen, R., & Crocker, J. (1992). A collective self-esteem scale: Self-evaluation of one's social identity. *Personality and Social Psychology Bulletin, 18*(3), 302–318. https://doi.org/10.1177/0146167292183006

Lundgren-Nilsson, A., & Tennant, A. (2011). Past and present issues in Rasch analysis: The functional independence measure (FIM™) revisited. *Journal of Rehabilitation Medicine, 43*(10), 884–891. https://doi.org/10.2340/16501977-0871

Masters, G. N. (1982). A Rasch model for partial credit scoring. *Psychometrika, 47*(2), 149–174. https://doi.org/10.1007/BF02296272

McAdams, D. P. (2013). The psychological self as actor, agent, and author. *Perspectives on Psychological Science, 8*(3), 272–295. https://doi.org/10.1177/1745691612464657

Mead, G. H. (1934). *Mind, self and society* (Vol. 111). University of Chicago Press.

Medvedev, O. N., Siegert, R. J., Feng, X. J., Billington, D. R., Jang, J. Y., & Krägeloh, C. U. (2016). Measuring trait mindfulness: How to improve the precision of the Mindful Attention Awareness Scale using a Rasch model. *Mindfulness, 7*(2), 384–395. https://doi.org/10.1007/s12671-015-0454-z

Medvedev, O. N., Pratscher, S. D., & Bettencourt, A. (2020). Psychometric evaluation of the interpersonal mindfulness scale using Rasch analysis. *Mindfulness, 11*(8), 2007–2015. https://doi.org/10.1007/s12671-020-01415-5

Oyler, D. L., Price-Blackshear, M. A., Pratscher, S. D., & Bettencourt, B. A. (2021). Mindfulness and intergroup bias: A systematic review. *Group Processes & Intergroup Relations, 25*, 1107–1138. https://doi.org/10.1177/1368430220978694

Pratscher, S. D., Wood, P. K., King, L. A., & Bettencourt, B. A. (2019). Interpersonal mindfulness: Scale development and initial construct validation. *Mindfulness, 10*(6), 1044–1061. https://doi.org/10.1007/s12671-018-1057-2

Puhakka, K. (2003). Buddhist psychology. In S. R. Segall, (Ed.), *Encountering Buddhism: Western psychology and Buddhist teachings*. ProQuest Ebook Central.

Rasch, G. (1960). *Probabilistic models for some intelligence and attainment test.* Danish Institute for Educational Research.

Rolffs, J. L., Rogge, R. D., & Wilson, K. G. (2018). Disentangling components of flexibility via the hexaflex model: Development and validation of the Multidimensional Psychological Flexibility Inventory (MPFI). *Assessment, 25*(4), 458–482. https://doi.org/10.1177/1073191116645905

Rosenberg, M. (1965). Rosenberg self-esteem scale (RSE). *Acceptance and Commitment Therapy. Measures Package, 61*(52), 18. https://doi.org/10.1037/t01038-000

Rubin, J. (2003). Buddhist psychology. In S. R. Segall, (Ed.), *Encountering Buddhism: Western psychology and Buddhist teachings*. ProQuest Ebook Central.

Ryan, R. M., & Deci, E. L. (2011). A self-determination theory perspective on social, institutional, cultural, and economic supports for autonomy and their importance for well-being. In *Human autonomy in cross-cultural context* (pp. 45–64). Springer. https://doi.org/10.1007/978-90-481-9667-8_3

Ryan, R. M., & Rigby, C. S. (2015). Did the Buddha have a self. In K. W. Brown, D. Creswell, & R. M. Ryan (Eds.), *Handbook of mindfulness: Theory, research, and practice* (pp. 245–259). Guilford.

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. https://doi.org/10.1080/00223890903425960

Sahdra, B., Ciarrochi, J., & Parker, P. (2016). Nonattachment and mindfulness: Related but distinct constructs. *Psychological Assessment, 28*(7), 819–829. https://doi.org/10.1037/pas0000264

Scheier, M. F., & Carver, C. S. (1985). The Self-Consciousness Scale: A revised version for use with general populations 1. *Journal of Applied Social Psychology, 15*(8), 687–699. https://doi.org/10.1111/j.1559-1816.1985.tb02268.x

Segal, S. R. (2003). Buddhist psychology. In S. R. Segall, (Ed.), *Encountering Buddhism: Western psychology and Buddhist teachings*. ProQuest Ebook Central.

Shonin, E., Van Gordon, W., & Griffiths, M. D. (2014). The emerging role of Buddhism in clinical psychology: Toward effective integration. *Psychology of Religion and Spirituality, 6*(2), 123–137. https://doi.org/10.1037/a0035859

Shonin, E., Van Gordon, W., & Griffiths, M. D. (2016). Ontological addiction: Classification, etiology, and treatment. *Mindfulness, 7*(3), 660–671. https://doi.org/10.1007/s12671-016-0501-4

Tennant, A., & Conaghan, P. G. (2007). The Rasch measurement model in rheumatology: What is it and why use it? When should it be applied, and what should one look for in a Rasch paper? *Arthritis Care & Research, 57*(8), 1358–1362. https://doi.org/10.1002/art.23108

Thubten, A. (2013). *No self, no problem: Awakening to our true nature*. Shambhala Publications

Van Gordon, W., Shonin, E., & Griffiths, M. D. (2016). Buddhist emptiness theory: Implications for psychology. *Psychology of Religion and Spirituality, 9*(4), 309–318. https://doi.org/10.1037/rel0000079

Van Gordon, W., Shonin, E., Diouri, S., Garcia-Campayo, J., Kotera, Y., & Griffiths, M. D. (2018). Ontological addiction theory: Attachment to me, mine, and I. *Journal of Behavioral Addictions, 7*(4), 892–896. https://doi.org/10.1556/2006.7.2018.45

Wainer, H., & Kiely, G. L. (1987). Item clusters and computerized adaptive testing: A case for testlets. *Journal of Educational Measurement, 24*(3), 185–201. https://doi.org/10.1111/j.1745-3984.1987.tb00274.x

Wang, W. C., & Wilson, M. (2005). The Rasch testlet model. *Applied Psychological Measurement, 29*(2), 126–149. https://doi.org/10.1177/0146621604271053

Watts, A. (1983). *The way of liberation: Essays and lectures on the transformation of the self*. Weatherhill.

Wilson, C. (1999). *Do we really believe in impermanence?* Barre Center for Buddhist Studies. https://www.buddhistinquiry.org/article/do-we-really-believe-in-impermanence/

Wong, S. P. (1996). "Forming inferences about some intraclass correlations coefficients": Correction. *Psychological Methods, 1*(4), 390–390. https://doi.org/10.1037/1082-989X.1.4.390

Wuthrich, V. M., Johnco, C., & Knight, A. (2014). Comparison of the Penn State Worry Questionnaire (PSWQ) and abbreviated version (PSWQ-A) in a clinical and non-clinical population of older adults. *Journal of Anxiety Disorders, 28*(7), 657–663. https://doi.org/10.1016/j.janxdis.2014.07.005

Zelazo, P. D., & Lyons, K. E. (2012). The potential benefits of mindfulness training in early childhood: A developmental social cognitive neuroscience perspective. *Child Development Perspectives, 6*(2), 154–160. https://doi.org/10.1111/j.1750-8606.2012.00241.x