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State Mindfulness Scale (SMS)

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Abstract

The *Satipatṭhāna Sutta* describes mindfulness as a mental state characterized by the *objects* of mindful awareness (i.e., *what* experience a person attends to) and *mental qualities* of that mindful awareness (i.e., *how* a person attends to experience). In contemporary psychology, mindfulness is often similarly conceptualized as a trait or a state characterized by two components: attention of physical/bodily and mental present moment experience (i.e., *what* experience a person attends to) and a mental attitude characterized by curiosity and acceptance of present moment experience (i.e., *how* a person attends to experience) (Bishop et al., 2004; Lindsay & Creswell, 2017). Integrating these canonical and contemporary theoretical perspectives, Tanay and Bernstein (2013) developed the State Mindfulness Scale (SMS). The SMS is a 21-item self-report measure designed to assess state mindfulness. More specifically, the SMS is designed to quantify subjective levels of present moment attention to and awareness of two domains of experiential events or objects of which one may be mindful, bodily sensations and mental events, during a specific period of time (e.g., past 15 minutes) and context (e.g., mindfulness meditation or other activity). In this chapter, we review the theoretical foundations, development, initial validation and subsequent psychometric study of the SMS. We also describe the SMS administration and scoring, and briefly, the limitations and possible next steps for the psychometric study of the SMS and the measurement of state mindfulness more broadly.

Key Words: mindfulness, state mindfulness, trait mindfulness, mindfulness measurement

State Mindfulness Scale (SMS)

Theoretical Foundations

The canonical *Satipatṭhāna Sutta* delineates four foundations for mindfulness, each referring to *objects of experience* of which one may be mindful: body, hedonic tone, mind, and mental states conducive to wisdom (Anālayo, 2003; Shulman, 2010; Thera, 1972). Mindful awareness of each of these objects of experience is characterized by the following *mental qualities*: a balanced and sustained application of effort (*ātāpī*), clear knowing (*sampajāna*), and a balanced state of mind free from desire (*abhijjhā*) and discontent (Anālayo, 2003). The *Satipatṭhāna Sutta* thus describes mindfulness as a mental state characterized by the *objects* of mindful awareness (i.e., *what* experience a person attends to) and *mental qualities* of that mindful awareness (i.e., *how* a person attends to experience).

Although a debate in defining mindfulness is ongoing (Chiesa, 2013; Dreyfus, 2011; Van Dam et al., 2018), in contemporary psychology mindfulness is often similarly conceptualized as a trait or a state characterized by two components: attention of physical and mental present moment experience (i.e., *what* experience a person attends to) and a mental attitude characterized by curiosity and acceptance of present moment experience (i.e., *how* a person attends to experience) (Bishop et al., 2004; Lindsay & Creswell, 2017). Studies focusing on mindfulness as a trait have contrasted participants with different levels of experience in mindfulness (e.g., long-term practitioners vs. novices) or examined individual differences in self-report measures of dispositional or trait mindfulness. These include studies focusing on self-reports (e.g., Hollis-Walker & Colosimo, 2011), behavioral measures (e.g., Hodgins & Adair, 2010), indices of brain morphology (e.g., Fox et al., 2014), and indices of functional brain activity not during mindfulness meditation (e.g., Creswell, Way, Eisenberger, & Lieberman, 2007). Studies focusing

on mindfulness as a state have investigated differences in psychophysiological activity or functional brain activity between states of mindful practice and resting states (state X trait interactions; Davidson & Kaszniak, 2015; e.g., Gard et al., 2012); as well as individual differences in self-report measures of state mindfulness (e.g., Lau et al., 2006; Tanay & Bernstein, 2013), or experience samples of mindful states (e.g., Shoham, Goldstein, Oren, Spivak, & Bernstein, 2017; Shoham, Hadash, & Bernstein, in press).

As highlighted in this volume on mindfulness assessment, the large majority of measures of mindfulness are retrospective self-report scales of dispositional or trait mindfulness (see Sauer et al., 2013, for a review). To date, there are three published state mindfulness scales: the state-Mindful Attention Awareness Scale (state-MAAS; Brown & Ryan, 2003), the Toronto Mindfulness Scale (TMS; Lau et al., 2006), and the State Mindfulness Scale (SMS; Tanay & Bernstein, 2013). State mindfulness measures are necessary to study mindfulness as a dynamic mental state with high temporal- and contextual- resolution. Such measurements, we argue, can advance the science of mindfulness by enabling study of, for example: the developmental trajectory of mindfulness over the course of mindfulness training (Shoham et al., 2017; Shoham et al., in press), the effects of mindfulness practice types and “dose” (e.g., duration and frequency; Dahl, Lutz, & Davidson, 2015; Lutz, Jha, Dunne, & Saron, 2015), and the correlates or effects of state mindfulness in different contexts (e.g., mindfulness meditation, daily living) and levels of expertise (e.g., novices, experts).

Despite their important contribution to early study of mindfulness as a state, the state-MAAS and TMS have notable limitations. State-MAAS items do not capture attention and awareness of *physical and mental experience* but are designed to measure mind-wandering and lack of attention and awareness during one’s engagement in daily activities, and not during

mindfulness meditation (e.g., “*I rushed through activities without being really attentive to them*”; see (Van Dam, Earleywine, & Borders, 2010). Likewise, the TMS is limited as it incorporates decentering, that has been conceptualized and studied as a proximal mechanism or outcome of mindfulness (Bernstein et al., 2015; Hadash, Lichtash, & Bernstein, 2017; Holzel et al., 2011; Naragon-Gainey & DeMarree, 2017); and its items do not reflect the breadth of objects and qualities of mindful awareness due to their focus on curiosity, decentering, and limited reference to mindfulness of physical sensations. To overcome these limitations of extant measures of state mindfulness, Tanay and Bernstein (2013) developed the SMS in an effort to better assess the breadth of objects (e.g., body & mind) and qualities (e.g., curiosity, intimacy, sensitivity to experience) of mindful awareness in different contexts (e.g., mindfulness meditation, daily living).

The SMS is grounded in an integrative conceptual and operational model of state mindfulness based on traditional Buddhist and contemporary psychological definitions of mindfulness. Tanay and Bernstein (2013) related to this as the *two-level model of state mindfulness* (see Figure 1). The first level reflects *the objects of mindful awareness* (i.e., *what* experience a person attends to). This level includes the two main domains of objects of attention of which one may be mindful –physical sensations and mental events. Importantly, according to the model, objects in these domains of mindful awareness can have different types of hedonic tone: pleasant, unpleasant, or neutral. In line with the Buddhist canonical *Satipatṭhāna Sutta*, hedonic tone and the two domains of mindful awareness (i.e., physical sensations, mental events) reflect three of the four foundations of mindfulness (Anālayo, 2003). The second level in the model reflects the *qualities of mindful awareness* (i.e., *how* a person attends to experience). In line with mindful attitudes emphasized by contemporary and Buddhist scholars, these qualities

of mindful awareness include perceptual sensitivity to stimuli, deliberate attention, willingness to feel one's subjective experience (originally described as intimacy or closeness to experience), and curiosity (e.g., Anālayo, 2003; Bishop et al., 2004; Lau et al., 2006). Importantly, these qualities are not distinct facets or dimensions but integral properties of mindfulness as a unified mental state.

Figure 1. The two-level model of state mindfulness (Tanay & Bernstein, 2013).

Initial Development and Validation

The State Mindfulness Scale (SMS) is a self-report measure designed to assess state mindfulness (Tanay & Bernstein, 2013). It is designed to quantify participants' perceived level of attention to and awareness of their present experience during a *specific period of time* (e.g., past

15 minutes) and *context* (e.g., following mindfulness meditation or other activity). Items were selected per the proposed conceptual model of state mindfulness grounded in Buddhist scholarship and contemporary psychology as reflected by the *two-level model of state mindfulness* (above). Item content was generated to reflect mindful attention and awareness of mind, body, the pleasant/unpleasant/neutral hedonic tones of these objects of awareness, and the qualities thought to characterize mindful awareness. A particular emphasis was placed on using simple language so that participants with variable levels of mindfulness experience could meaningfully and accurately report on their subjective experience. Moreover, whereas item content was explicitly designed to not admix reference to the *objects* of mindful awareness (i.e., mind and body), authors explicitly sought to generate individual items that concurrently reflect multiple *qualities* of that awareness. The initial pool of items and their wording was developed and revised, iteratively, based on experts' feedback over the course of the measure development and pilot testing. Items were discarded due to lack of linguistic clarity, item content overlapping with other items, or item content not clearly reflective of the conceptual model through which items were generated. A semi-final list of 25-items was generated, and then tested in a series of studies. This pool of 25-items included two reverse-scored items which proved psychometrically problematic, and were consequently omitted. Following factor analytic study and item reduction, the **final SMS included 21 items**. Below we summarize findings from 3 initial development and validation studies. Data reported in this section were reported by Tanay and Bernstein (2013).

First, to empirically explore and evaluate the SMS latent structural and measurement model, **Study 1** included: (1) Exploratory factor analysis (EFA) and parallel analyses of SMS items (N = 178); (2) Confirmatory factor analysis (CFA) of the EFA-extracted solution among an independent sample (N = 175); and (3) Evaluation of the internal consistency and distributional

normality of the derived SMS (sub)scale(s). EFA and CFA supported a higher-order two-factor solution entailing one higher-order state mindfulness factor, and two first-order factors, one reflecting state mindfulness of bodily sensations and the other state mindfulness of mind. These findings are consistent with the two-level model of state mindfulness guiding the development of the SMS (see Figure 1). Specifically, observed factors distinguish between the *objects of mindful awareness* (level I – physical sensations and mental events), but not between the *qualities of mindful awareness* (level II) which are theorized to be integral properties of mindfulness as a unified mental state (not distinct facets or dimensions of mindfulness). SMS scores in this sample demonstrated strong internal consistency (SMS Total $\alpha = .94$; Mind sub-scale $\alpha = .95$; Body sub-scale $\alpha = .89$).

Second, to evaluate the convergent, discriminant, and incremental convergent validity of SMS scores with respect to published measures of state- and trait-mindfulness, **Study 2** tested the cross-sectional associations between SMS Total as well as SMS Body and Mind sub-scale scores with respect to Toronto Mindfulness Scale (TMS state scale; Lau et al., 2006) total and sub-scale scores, Mindful Attention and Awareness Scale (MAAS trait scale; Brown & Ryan, 2003) total scores, and Five Facet Mindfulness Questionnaire (FFMQ trait scale; Baer et al., 2008) total and sub-scale scores. Relations between SMS and TMS sub-scales were moderate in magnitude – highlighting the intended empirical difference in the construct(s) that each was designed to measure. In addition, they observed evidence of discriminant validity with respect to trait mindfulness, as measured by the MAAS and most FFMQ sub-scales, with the key exception of the FFMQ Observing sub-scale, as predicted a priori. Moreover, they reported preliminary evidence of incremental convergent validity, above and beyond the TMS with respect to trait mindful attention and awareness, and specifically dispositional “noticing or attending to internal

and external experiences, such as sensations, cognitions, emotions, sights, sounds, and smells” (FFMQ-observing sub-scale; Baer et al., 2008, p. 330). SMS scores in this sample again demonstrated strong internal consistency (SMS Total $\alpha = .92$; Mind sub-scale $\alpha = .91$; Body sub-scale $\alpha = .85$). Study 2 thus provided an initial set of modest cross-sectional data relevant to the associations between state mindfulness as measured by the SMS and other state- and trait-mindfulness scales.

Finally, **Study 3** tested the following: (1) the stability of SMS scores as a function of time and context; (2) the construct validity of the SMS as a putative index of state mindfulness within the context of a mindfulness training intervention; (3) the incremental sensitivity to change in state mindfulness as measured by the SMS (Haynes & Lench, 2003), relative to the State-MAAS, over the course of a mindfulness training intervention; and (4) the predictive incremental validity of change in SMS scores, above and beyond change in State-MAAS scores, over the course of the training with respect to the development of trait mindfulness. Results provided initial controlled experimental evidence of the context-specific prospective stability, construct validity, incremental sensitivity to change, and incremental predictive validity of the SMS.

First, among the no-intervention (assessment-only) control group, SMS scores demonstrated strong levels of 1-week (mean $r = .65, p < .01$) and 6-week (mean $r = .68, p < .01$) test-retest reliability. Likewise, among the mindfulness intervention group, SMS scores demonstrates strong 1-week (mean $r = .64, p < .01$) and 2-week (mean $r = .63, p < .01$) test-rest reliability between observations taken during mindfulness meditation; similar levels of stability were observed for 6-week ($r = .59, p < .01$) test-retest reliability between observations in daily living (cf. mindfulness meditation). Moreover, and an important indicator of hypothesized context-sensitivity of state mindfulness, test-retest reliability of SMS scores between daily living

and mindfulness meditation contexts were small to moderate in magnitude in 1-week ($r = .47$ $p < .01$), 2-week ($r = .22$, *n.s*) and 6-week ($r = .45$ $p < .01$). This context-related dissociation of SMS score stability provides preliminary evidence for the construct validity of SMS scores as a temporally- and context-sensitive index of state mindfulness. Finally, degree of elevation in SMS scores from pre- to post-intervention, prospectively predicted elevation of trait mindfulness as measured by the MAAS at 6-weeks post-intervention. Moreover, the SMS displayed incremental predictive validity with respect to the development of trait mindfulness above and beyond the State-MAAS. They proposed that in light of the incremental sensitivity to change findings, and these incremental predictive validity data, there is reason to argue that the SMS may make a unique contribution to the mindfulness measurement literature.

Subsequent Evidence of Reliability and Validity

Validation in Different Populations. The SMS has to-date been studied and demonstrated reliability amongst a number of population groups: (a) college and university students (e.g., Hussein, Egan, & Mantzios, 2017, $\alpha = .92$ pre- and $.94$ post- mindfulness intervention); (b) adults and young adults from the general community (e.g., Koval & Todaman, 2015, $\alpha = .95$; Roche, Barrachina, & Fernández, 2016, $\alpha = .95$); (c) meditation-naïve participants and/or experienced meditators (e.g., Bravo, Pearson, Wilson, & Witkiewitz, 2018, SMS-Body $\alpha = .88$, SMS-Mind $\alpha = .94$); (d) participants engaged in mindfulness training or mindfulness-based intervention (e.g., Calma-Birling & Gurung, 2017, SMS Total $\alpha = .94$; Jislin-Goldberg, Tanay, & Bernstein, 2012, $\alpha = .92$, one-month test-retest reliability $r = .52$, one-week test-retest reliability measured immediately following weekly mindfulness meditation sessions $r = .72$; Kohlenberg et al., 2015, $\alpha = .86$); and (e) multiple specific population groups and sub-groups such as adults exposed to recent traumatic (e.g., Nitzan-Assayag et al., 2017), and deprived and

non-deprived daily cigarette smokers (e.g., Luberto & McLeish, 2018, $\alpha = .91$ and $.95$, before and after a 10-minute sitting meditation exercise, respectively; Paz, Zvielli, Goldstein, & Bernstein, 2017). Importantly, as a state measure of mindfulness, it has been studied among meditation-naïve adults in the *context* of mindfulness meditation specifically (see above), in controlled lab settings, in response to mindfulness interventions or experimental manipulations of present moment attention and awareness (e.g., Alliot et al., 2017; e.g., Hadash, Segev, Tanay, Goldstein, & Bernstein, 2016), as well as in daily living (e.g., Pryss et al., 2018; Shoham et al., 2017). Notably, to the best of our knowledge, there are no published data to-date examining the performance or psychometrics of the SMS amongst children or adolescents nor amongst clinical population groups to whom mindfulness-based interventions are often delivered.

Experimental Validation: Sensitivity to Change. The majority of studies that contribute to the validation of the SMS have examined the effect of mindfulness training, meditation practice or laboratory experimental present moment attention and awareness manipulations on state mindfulness. This form of validation has characterized early psychometric study of SMS because of the nature of the construct (state mindfulness) and the intended utility of the SMS to study mindfulness training and meditation. To-date, findings generally suggest that relative to various (passive and active) control conditions, mindfulness practice and/or training leads to significant elevations in SMS scores (Luberto & McLeish, 2018; Paz et al., 2017; Roche et al., 2016; Shoham et al., 2017).

As part of a study of responding to a biological stressor among daily smokers deprived of cigarettes for 18-hours ($N = 104$), Paz et al (2017) found that, relative to a coping-as-usual control condition, a 7-minute mindfulness intervention laboratory analogue (i.e., present moment attention and awareness training) led to elevated SMS scores ($F(1,79) = 95.69$, $p = .000$).

Luberto and McLeish (2018) found that adult daily smokers ($N = 44$) who received a brief mindfulness exercise demonstrated elevated SMS scores (i.e., change in SMS scores from pre- to post-intervention) ($t_{43} = -4.75, p < .001$) relative to controls ($N = 42$) ($t_{41} = 0.42, p = .67$) ($F(1) = 14.24, p < .001, \eta^2_{\text{partial}} = .15$). Hussein et al (2017) tested the effects of mindful construal diaries to assist in weight control among 54 participants. The mindfulness diaries intervention led to significant elevation in SMS scores from pre- to post-intervention ($t_{39} = 3.82, p < .001, d = .58$). Kohlenberg et al (2015) found that elevations in SMS scores from pre- to post-intervention were greater among an *intrapersonal* (i.e., traditional group intra-personal mindfulness meditation, $N = 37, M(SD) = .71(.8)$) and *interpersonal* (i.e., inter-personal mindfulness meditation practice involving group interaction and intimacy-related self-disclosure, $N = 43, M(SD) = .58(.81)$) mindfulness interventions relative to a (nature video) control condition ($N = 34, M(SD) = .26(.7)$) ($F(2,111) = 2.90, p = .059, \eta^2 = .015$). Planned comparisons revealed that, although SMS scores increased from pre- to post-intervention across conditions (interpersonal condition: $t_{36} = 5.81, p < .001, d = .88$; intrapersonal condition: $t_{42} = 4, p < .001, d = .72$; control condition: $t_{33} = 2.37, p = .024, d = .37$), significant differences were only found between the intrapersonal and interpersonal conditions relative to the control condition. Koval and Todaman (2015) found that participants exposed to a boredom-inducing task (Vowel Cancellation task condition) reported lower SMS scores than control participants (Reading Task condition) ($t_{86.119} = -2.024, p = .044, d = .418$). This is unique evidence not only of the sensitivity of SMS to reflect elevations in state mindfulness following various forms and “doses” of mindfulness training, but to reductions in state mindfulness that may follow from mental states characterized by mindlessness or mindwandering. Roche et al (2016) found that, relative to a non-intervention control group, a one-month Exercise Without Movement (EWM) yoga intervention (i.e., yoga method focused on

the development of attention, consciousness and control through attention, relaxation, breathing and meditation practices; Rama, 1984) led to significant elevations in SMS scores (i.e., change from pre- to post-intervention) ($F = 2.094, p = .043, \eta^2_{\text{partial}} = .125$). Moreover, they reported that change in SMS scores was significantly correlated with reductions in anxiety (Beck & Steer, 1990; $r = -.569, p < .001$); and depression (Beck, Steer, & Brown, 1996; $r = -.355, p < .05$) symptoms. Finally, Bravo et al (2018) found that a brief mindfulness exercise (i.e., focused on *bodily* sensations and the breath) elicited higher SMS Body sub-scale scores ($F(1,297) = 18.39, p < .001, \text{partial } \eta^2 = .06$), but not SMS Mind sub-scale scores ($F(1,297) = 1.14, p = .29, \text{partial } \eta^2 = .00$).

Criterion Validity: Known-Group. Koval and Todaman (2015) found that self-report meditation experience was correlated with SMS scores ($r = .271, p = .008$). Likewise, participants who reported that they practiced meditation "weekly" or "almost every day" displayed higher SMS scores compared those who practiced "sometimes", had only "tried" meditation, or had never practiced ($t_{93} = 2.64, p = .01, d = .543$). Bravo et al (2018) found that: (1) individuals with previous meditation experience and higher scores on trait mindfulness had the highest levels of state mindfulness of body and mind; and (2) among individuals with meditation experience, the strengths of the associations between trait and state mindfulness increased with frequency of meditation practice.

Structural Validity. There have been no reported tests of the factor structure of the SMS beyond CFA and EFA reported by Tanay and Bernstein (2013). Anecdotally, in our lab, we have conducted such analyses in multiple populations and contexts and have consistently observed similar factor structure as originally reported.

Convergent and Incremental Validity. Here we consider studies and findings examining associations between SMS scores and other measures of mindfulness (i.e., state- but not trait-mindfulness) and related variables (e.g., mindfulness-related processes, mental health). First, with respect to other measures of *state* mindfulness, we only found reports by Tanay and Bernstein (2013) with respect to the TMS ($r = .43$) and state-MAAS ($r = .05, n.s.$). This may be largely a byproduct of the limited number of measures of state mindfulness available and the relatively limited use of these measures to study state mindfulness to-date. Nevertheless, we mention here that, with respect to *trait* mindfulness, associations between SMS scores and measures of dispositional or trait mindfulness (e.g., FFMQ sub-scales, MAAS) have been explored both as evidence of convergent, discriminant, and incremental validity (Bravo et al., 2018; Tanay & Bernstein, 2013).

Additional forms of convergent validity have been explored by examining the associations between SMS scores and processes thought to be closely related to mindfulness broadly and state mindfulness more specifically. In a prospective randomized controlled mindfulness intervention study ($N = 51$), Jisling-Goldberg, Tanay, and Bernstein (2012) found that during mindfulness meditation, greater levels of SMS scores were significantly correlated with greater levels of state positive affect ($r_{session1} = .43, r_{session2} = .45, r_{session3} = .53; p's < .05$). Moreover, this association between SMS scores and state positive affect was largely unchanged even after controlling for baseline levels of trait-mindfulness and trait PA (i.e., partial r 's: $r_1 = .52, r_2 = .41, r_3 = .4; p's < .05$). Hadash et al (2016) found that, relative to non-intervention control condition ($N = 53$), a mindfulness intervention ($N = 138$) (i.e., 4-session mindfulness training) led to changes in a manifestation of equanimity (reactivity to unpleasant hedonic tone) over time as a function of degree of elevations in SMS scores over the course of the intervention

($F(3,219) = 2.92, p = .03$). They found that mindfulness training led to reductions in reactivity to unpleasant hedonic tone over time, as a function of elevation in SMS scores (i.e., responding to the training): from session 1 to session 2 ($t_{118.9} = 3.83, p = .0002$), from session 1 to session 3 ($t_{122.7} = 2.52, p = .0129$), and from session 1 to session 4 ($t_{120.8} = 3.39, p = .0009$). In an experience sampling study wherein state mindfulness was based on SMS items, Shoham et al (2017) found that state mindfulness scores were correlated with levels of decentering as well as emotional valance and emotional arousal, over the course of a 6-session mindfulness training intervention. Specifically, the associations between state mindfulness and decentering were significant in daily living ($\beta = .25, SE = .04, t = 7, p < .0001$) but the magnitude of this association was stronger meditative states ($\beta = .47, SE = .05, t = 3.67, p < .0002$). Moreover, they found that state mindfulness levels were related to positive emotional valence (happy – sad difference scores) in daily living ($\beta = .17, SE = .06, t = 3.00, p = .003$) and meditative states ($\beta = .45, SE = .09, t = 5.24, p < .001$). Finally, they reported that state mindfulness levels were related to reduced emotional arousal (calm – nervous difference scores) in meditative states ($\beta = .61, SE = .12, t = 5.16, p < .001$) but not in daily living ($\beta = .09, SE = .08, t = 1.16, p = .25$). Finally, Alliot et al (2017) found that relative to a 7-min video control condition, a 7-minute mindfulness video intervention led to reduced number of finger food consumed (e.g., degree of self-control and behavioral reactivity to reward), and this effect was moderated by SMS scores ($F(1,66) = 5.00, p = .029$). Moreover, they found that the effect of the mindfulness intervention on total energy intake was also moderated by SMS scores ($F(1,66) = 4.55, p = .037$).

Discriminant or Divergent Validity. To-date, limited research has examined discriminant validity of SMS scores. Bravo et al (2018) found that SMS scores and sub-scales of the FFMQ were small in magnitude consistent indicating that individual differences in SMS

scores were largely not accounted for by levels of trait or dispositional mindfulness (i.e., SMS-Mind and FFMQ-Observing ($r = .23, p < .05$), FFMQ-Describing ($r = .27, p < .05$), FFMQ-Non-reactivity ($r = .26, p < .05$); SMS-Body and FFMQ-Observing ($r = .21, p < .05$), FFMQ-Describing ($r = .27, p < .05$), FFMQ-Non-reactivity ($r = .25, p < .05$).

Translations of the SMS

To the best of our knowledge, the SMS has been translated and back-translated to a number of language where work is either ongoing or published. These languages include: English, Hebrew, Spanish, German, Dutch, Portuguese, French, Polish, and Chinese. Interested researchers can contact A.B. to access these translations.

Citation, Administration, and Scoring

The SMS is a self-report measure that may be administered in paper/pencil, online, and mobile experience sampling formats. The SMS has been administered individually as well as in a group setting. The SMS quantifies participants' perceived level of attention to and awareness of their present experience during a *specific period of time* (e.g., past 15 minutes) and *context* (e.g., following mindfulness meditation or other activity). The scale measures attention to and awareness of two domains of experiential events or objects of which one may be mindful: bodily sensations (i.e., SMS-Body sub-scale), mental events (i.e., SMS-Mind sub-scale, e.g., emotions, patterns of thoughts, etc.), or a combined total score. Numeric responses (i.e., 1 = *not at all* to 5 = *very well*) to the 21 items are summed or averaged (see Table 1). Higher scores reflect higher levels of state mindfulness. Participants are instructed as follows: "*Below is a list of statements. Please use the rating scale to indicate how well each statement describes your experiences in the past 15 minutes*", and asked to describe what they were doing during this 15-minute period of time. Depending on the study design and context of interest, researchers can change the

instructions to probe a different period of time (e.g., 5-, 10-, 20-minutes). To cite the measure, refer to: Tanay, G., & Bernstein, A. (2013). State Mindfulness Scale (SMS): development and initial validation. *Psychological assessment*, 25(4), 1286.

Table 1. The SMS subscales and related Items.

SMS Items	<u>Subscale I</u> State Mindfulness of Mind	<u>Subscale II</u> State Mindfulness of Body
1. I was aware of different emotions that arose in me	✓	
2. I tried to pay attention to pleasant <u>and</u> unpleasant sensations.	✓	
3. I found some of my experiences interesting	✓	
4. I noticed many small details of my experience	✓	
5. I felt aware of what was happening inside of me	✓	
6. I noticed pleasant and unpleasant emotions	✓	
7. I actively explored my experience in the moment	✓	
8. I clearly physically felt what was going on in my body		✓
9. I changed my body posture and paid attention to the physical process of moving		✓
10. I felt that I was experiencing the present moment fully	✓	
11. I noticed pleasant and unpleasant thoughts	✓	
12. I noticed emotions come and go	✓	
13. I noticed various sensations caused by my surroundings (e.g., heat, coolness, the wind on my face)		✓
14. I noticed physical sensations come and go		✓
15. I had moments when I felt alert and aware	✓	
16. I felt closely connected to the present moment	✓	
17. I noticed thoughts come and go	✓	
18. I felt in contact with my body		✓
19. I was aware of what was going on in my mind	✓	
20. It was interesting to see the patterns of my thinking	✓	
21. I noticed some pleasant and unpleasant physical sensations		✓

Limitations

There are a number of limitations that may inform use as well as ongoing study of the SMS. First, the SMS is a relatively new measure. The overall body of empirical research of SMS psychometrics and utility is modest in scale and scope. As reviewed, a number of psychometric properties need further study (e.g., discriminant/divergent validity, structural validity, study in younger populations as well as clinical populations, known-group criterion validity). Moreover, future research could evaluate SMS scores with respect to putative markers or proxies of state mindfulness across levels of analysis (e.g., electrophysiology, fMRI) (Tang, Hölzel, & Posner, 2015). Second, and critically, the SMS is a self-report measure characterized by well-documented limitations inherent to such methods. These include retrospective recall biases (e.g., Shadish, Cook, & Campbell, 2002) and introspective abilities or meta-awareness that may not only depend on, but may also influence, the validity of participant self-report on state mindfulness (e.g., Grossman, 2008; Hadash et al., 2016; Sauer et al., 2013). Accordingly, the SMS guides participants to report on a specific brief time-period (e.g., past 15 minutes) and context (e.g., during mindfulness meditation, daily living, etc). Finally, beyond the SMS and self-report methods of mindfulness, the development of behavioral measurement methods that quantify state mindfulness by integrating first- and third-person perspectives may represent an important way forward for mindfulness research (Ruimi et al., 2018; Thompson, 2017; Varela, 1996).

Summary

In this chapter we reviewed Buddhist and contemporary psychological contemplative perspectives conceptualizing mindfulness as a state and their implications for its measurement. We described the SMS, a 21-item self-report measure of state mindfulness grounded in the two-

level model of state mindfulness and initial years of empirical study of its psychometric properties and utility. Use of the SMS, in multiple languages and contexts, in research and applied settings, is now fast growing. We hope that the SMS will prove useful to advance the field's study and application of mindfulness training and mindfulness-based interventions.

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