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The Sleep Acceptance Scale (SAS): Development, Psychometric Properties, and Applications

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Abstract

Objectives: We developed and evaluated the psychometric properties of the Sleep Acceptance Scale (SAS), a tool designed to measure sleep acceptance via an assessment of cognitive and emotional responses to sleep problems.

Methods: We designed a six-item scale, rated on a 7-point Likert scale, to capture the nuances of sleep acceptance. Data were collected from 1,350 participants, both with and without sleep problems. We employed an Exploratory Graph Analysis (EGA) and a Confirmatory Factor Analysis (CFA) to assess internal consistency, convergent validity, and measurement invariance over time and between groups.

Results: The EGA revealed a unidimensional structure for the SAS, which was also confirmed by the CFA. However, the root mean square error of approximation (RMSEA) was marginally above the ideal threshold. The scale demonstrated high internal consistency ($\omega_{tot} = 0.91$) and strong correlations with measures of insomnia severity, anxiety, depression, and willingness, which supported its convergent validity. Although the SAS maintained temporal stability over 14 days, it lacked configural invariance between good and bad sleepers, which suggested potential differences in how sleep acceptance manifested across these groups.

Conclusions: The SAS effectively measures sleep acceptance and captures important cognitive and emotional dimensions. It can be used to monitor progress in Acceptance and Commitment Therapy (ACT) and mindfulness-based interventions.

Keywords: Acceptance, Acceptance and Commitment Therapy, Factor Analysis, Insomnia, Psychometrics, Sleep, Surveys and Questionnaires, Validation Study

Statement of Significance

The Sleep Acceptance Scale (SAS) offers a novel approach to measuring sleep acceptance, focusing on sleep-related cognitive and emotional processes. Unlike existing tools, the SAS captures individuals' thoughts, feelings, and actions toward sleep, providing insights into their relationship with sleep disturbances. This scale demonstrated strong psychometric properties, although differences emerged between good and bad sleepers. The SAS holds promise for enhancing the assessment of sleep-related interventions, particularly those based on Acceptance and Commitment Therapy (ACT). Future research should explore its long-term stability, cross-cultural applicability, and potential as a predictor of treatment outcomes.

Introduction

Cognitive and behavioral models have emphasized the role of sleep-related cognitions as maintainers of insomnia.[1] Insomnia has been linked to a stringent attachment to sleep needs and expectations, which leads to worry, thought suppression, and rumination.[2,3] Lundh [2] proposed that two cognitive processes were involved in its etiology and maintenance: sleep interpretation and interference. Sleep interpretation refers to the role of beliefs and cognitions regarding sleep as a cause of insomnia complaints.[4,5] Sleep-related cognitions, such as faulty expectations, beliefs, perceptions, and excessive worry, play relevant mediating roles in perpetuating and exacerbating insomnia.[6] Beliefs regarding sleep are an important target of cognitive behavioral therapy for insomnia (CBT-I).

Sleep interference refers to the physiological and cognitive arousal arising from emotional activation or cognitive stress responses,[5,7] which can include the avoidance of private experiences, inflexibility, and attempts to suppress thoughts.[8] Studies have reported the roles of psychological inflexibility and experiential avoidance in the development and maintenance of insomnia.[9–11] Experiential avoidance contributes to this owing to attempts to avoid discomfort conditioned to bedtime, which results in the engagement of behaviors that do not correspond with falling asleep (e.g., forcing sleep, spending a lot of time in bed).[10] For example, many people who suffer from insomnia tend to avoid spending the night awake and strive to fall asleep.[12] According to Espie et al., [12] falling asleep was relatively automatic and could be inhibited by focused attention and repeated attempts to fall asleep. The intense effort to fall asleep, as well as control insomnia, exacerbates and further worsens sleep difficulties.[13]

Psychological inflexibility refers to a rigid pattern of behavior that disregards context and is based on avoiding internal experiences (thoughts, feelings, sensations) to the detriment of value-based behaviors.[14] This occurs through six processes: experiential avoidance, cognitive fusion, lack of awareness of the present moment, self as content, lack of contact with values, and inaction. Both psychological inflexibility and experiential avoidance contribute to the development, maintenance, and exacerbation of various psychological problems,[14] including insomnia. Acceptance and commitment therapy (ACT) focuses on psychological inflexibility, including experiential avoidance, and aims to develop flexibility and acceptance; the generalized repertoire to contact the present moment more fully in a way that allows individuals to adjust their behavior more consistently with their goals and values.[15]

The potential role of experiential avoidance in insomnia has been recognized and has led to increasing researchers and clinicians incorporating ACTs as a therapeutic component of psychological interventions.[11,16,17] Acceptance involves an open attitude without judgment of one's experience.[18] It is also defined as the willingness to feel discomfort without attempting to reduce or avoid it.[19] Although the exclusive contribution of the acceptance process to treatment success has not yet been widely investigated, recent clinical trials reported positive results of ACTs reducing insomnia symptoms [11,16,17,20,21] (see also Rafihi-Ferreira et al. 2023; Martin et al. 2024).

Importance of the acceptance/avoidance process and treatment of insomnia has led to the development of instruments specifically designed to evaluate the acceptance process in insomnia, such as the Sleep Problem Acceptance Questionnaire (SPAQ).[22] This is the only measure of acceptance of sleep difficulties developed till date. Although the SPAQ covers important aspects of the acceptance construct, other aspects need to be explored, including the relationship with sleep and use of control to avoid insomnia. Additionally, general tools to measure acceptance do not address sleep-related behaviors. Furthermore, addressing items of acceptance construct based on questions that can be answered by people with and without insomnia is necessary. Therefore, we proposed a new measure of sleep acceptance, the Sleep Acceptance Scale (SAS).

Considering the increasing attention on insomnia, especially the acceptance of sleep as a mediator and treatment target, the development of reliable and valid measures is relevant. This study aimed to investigate the item content, factor structure, internal consistency, and construct validity of the SAS. We predicted that these results would reflect a unidimensional structure of sleep acceptance. Based on the well-established association between insomnia and psychiatric variables (anxiety and depression) and

insomnia and acceptance, we hypothesized that the SAS would be positively correlated with other measures of acceptance (SPAQ) and negatively correlated with insomnia severity.

Methods

Item development and translation

The initial pool of Sleep Acceptance Scale (SAS) items was developed by the first two authors (RERF and MC), along with a sleep psychologist expert (MLNP, PhD), based on the SPAQ.[22] They used their extensive clinical and academic experience with insomnia and ACT-based therapies and focused on the frequent concerns of patients with insomnia that the SPAQ did not address. Subsequently, the initial item pool was refined to six items, which resulted in a short, unidimensional scale that addressed the central concepts in ACT for insomnia. The SAS items were rated on a 7-point Likert scale that ranged from 1 (never) to 7 (always), and higher scores indicated lower acceptance of sleep problems.

The SAS was pilot-tested among 15 adults (12 women, three men) with sleep problems. Participants' mean age was 43 years (range: 19–57 years). They adequately understood the content, which required no item modifications or reductions.

The six items were written in Portuguese and translated into English by a native English speaker . They were back-translated into Portuguese by a native Portuguese speaker. Both translations were completed by experts. MLNP approved the back-translation from both theoretical and semantic perspectives.

Participants and procedure

Data were obtained from individuals with insomnia symptoms who had enrolled in a randomized controlled trial conducted at our research center at the University of São Paulo, Brazil (El Rafihi-Ferreira et al. [16]; ClinicalTrials.gov (Identifier NCT04866914); see at <https://classic.clinicaltrials.gov/ct2/show/study/NCT04866914>), and 421 healthy controls (without insomnia) enrolled in a cross-sectional study.[23] This study was approved by the Research Ethics Committee of the University of São Paulo Medical School Hospital (HC-FMUSP, CAAE: 46284821.1.0000.0068). All participants provided informed consent.

Participants were recruited via social media and newspaper advertisements between 2021 and 2022. Interested volunteers accessed the REDCap web platform to complete the screening process and evaluate their eligibility. We announced two study proposals: one that targeted volunteers with insomnia (clinical group) and another for volunteers without sleep-related complaints (control group). Eligibility criteria were those aged 18–59 years and could read and write in Portuguese.

The initial sample consisted of 1590 participants. However, after those who failed to provide data for any of the SAS items were excluded, the final sample comprised 1345 participants, with a mean age of 38.57 years (SD = 9.79), and 80.5% female (see Table 1). The clinical group included participants who self-reported they met the following criteria for chronic insomnia according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)[24]: (i) difficulty in initiating and/or maintaining sleep, defined as sleep latency or waking up after the onset of sleep for ≥ 30 minutes, (ii) insomnia present for more than three nights per week for over three months, (iii) sleep disturbance (or associated daytime fatigue) that caused significant distress or impairments in social, occupational, or other functional areas, and

(iv) a score of ≥ 8 on the Insomnia Severity Index (ISI). The control group comprised participants who reported no sleep-related complaints, good quality sleep, and did not meet the DSM-5 criteria for chronic insomnia, with an ISI score of ≤ 7 .

Participants who met the inclusion criteria received an email that requested them to complete the study instruments via the REDCap platform. Data collected included basic demographic information and questionnaires on insomnia, depression, anxiety, and sleep acceptance. To assess the temporal stability of the SAS, participants asked to re-answer the questionnaires via email 14 days after initial completion. Participants did not receive any compensation.

[INSERT TABLE 1]

Additional measures

Participants' data

Sociodemographic information obtained included participants' sex, age, marital status, occupation, and educational level.

Insomnia Severity Index (ISI)

Developed by Morin,[25] the ISI, a retrospective seven-item scale, evaluated the nature, intensity, and impact of insomnia over the past month. It measured difficulties in falling asleep or maintaining sleep, early morning awakening, sleep satisfaction, daytime impairment, perception of sleep problems by others, and concerns regarding sleep problems. Items were rated on a 5-point Likert scale (0 = no severity to 4 = high severity). The total score ranged from 0–28. Scores were classified as absence of insomnia (0–7), mild (8–14), moderate (15–21), or severe insomnia (22–28).

Sleep Problem Acceptance Questionnaire (SPAQ)

The SPAQ, a self-assessment tool, evaluated individual acceptance of sleep issues.[22] This measure comprised eight items that assessed two factors: activity engagement and willingness. Activity engagement refers to the extent of an individual's persistence in routine activities despite sleep dissatisfaction. Willingness captured the ability to give up the struggle to control and overcome sleep problems. Each item was rated on a 7-point Likert scale that ranged from 0 (disagree) to 6 (completely agree). The total score ranged from 0–48, and the willingness items were reversed scored. Higher scores indicated lower acceptance of sleep problems. The SPAQ provides insights into how acceptance of sleep problems may affect treatment outcomes and overall quality of life.

Hospital Anxiety and Depression Scale (HADS)

The HADS comprised 14 items, with two subscales, that assessed anxiety and depression.[26] These items referred exclusively to one's emotional state and did not reflect somatic symptoms. The total score for each subscale ranged from 0–21. Scores of 0–8 and >9 indicated the absence and presence of anxiety/depression, respectively.

The Brazilian version was translated and validated by Botega et al.,[27] with Cronbach's alpha values of 0.68 and 0.77 for anxiety and depression, respectively.

Data Analysis

All analyses were conducted using R software, version 4.4.0.[28] Analysis codes and data are available at https://osf.io/rt9k5/?view_only=b8d26fd9a3c64f0cb3bf3c3b1fdf3a57.

Data screening and item evaluation

Before the primary analyses were conducted, we screened the data for missing observations, data quality, item variation, distribution, and inter-item correlation. We

used the Mahalanobis distance to detect multivariate outliers and applied a Unique Variable Analysis (UVA)[29] to identify redundant items. The UVA identified locally dependent pairs of variables via weighted topological overlap (wTO) and employed the false discovery rate (FDR) to assess the expected count of false positives. Redundant item pairs were those with a wTO of >0.25 and could be removed or combined into a latent variable.[29]

Dimensionality analysis

The SAS was developed as a unidimensional scale, and we used an Exploratory Graph Analysis (EGA)[30,31] to evaluate the plausibility of this assumption. The EGA is a dimensionality assessment method that uses undirected network models to detect the number and content of communities in multivariate data. If a single dimension was detected, the Leading Eigenvalue was used to estimate the network. For more than one dimension, the walktrap algorithm was used for community detection, and the network was estimated via the Graphical Least Absolute Shrinkage and Selection Operator (GLASSO).

After the EGA was applied to the data, we checked the dimensionality stability via the Bootstrap Exploratory Graph Analysis (bootEGA) [30] with 1000 resamples. The BootEGA measured internal consistency with an expected index of at least 0.75, which indicated that 75% of the bootstrap samples replicated the exact dimensions.[32] All analyses were performed using the EGAnet package for R, version 2.0.6.[33]

We also fitted the unidimensional model in a Confirmatory Factor Analysis (CFA) using the lavaan package for R, version 0.6–17,[34] which employed a maximum likelihood estimator with robust standard errors and mean and variance-

adjusted test statistic (MLMV) to compute the correlation matrices. The CFA was used to obtain traditional fit indices, such as chi-square, root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis Index (TLI), and standardized root mean square residual (SRMR). The traditional cut-off values of $SRMR \leq .08$, $RMSEA \leq .06$, and CFI and $TLI \geq .96$ were used to evaluate model misspecification.[35]

Internal consistency and convergent validity

In addition to the stability measure obtained via the EGA, we estimated internal consistency using McDonald's omega total (ω_{tot}).[36] We obtained the point estimate and calculated the bias-corrected and accelerated bootstrap confidence interval (based on 1000 bootstrap samples) for internal consistency indices via the R package MBESS, version 4.9.2.[37] We adhered to the traditional guideline that considered internal consistency indices of ≥ 0.70 as acceptable to evaluate reliability.[38]

To determine convergent validity, we estimated the latent correlations between the SAS, insomnia severity (ISI), SPAQ factors of willingness and active engagement, and HADS subscales of depression and anxiety via structural equation modeling (SEM) with the MLMV estimator. Positive and strong associations were expected between the SAS and insomnia severity, anxiety, and depression. In contrast, negative and strong associations were anticipated between willingness and active engagement (higher scores indicated less acceptance).

Measurement invariance

Considering that sleep acceptance might differ between good and bad sleepers, we assessed the measurement invariance between these two groups via a multigroup CFA. Additionally, we examined the longitudinal measurement invariance between the

baseline assessment and second administration (14 days later). To assess invariance, we restricted the measurement properties across groups/time in increasing levels of stringency and followed a sequence of factor structure (configural invariance), factor loadings (metric invariance), item intercepts (scalar invariance), and item residual variances (strict invariance).[39] Criteria used to evaluate model fit included the chi-squared difference test for goodness-of-fit and alternative fit indices, such as CFI, RMSEA, and SRMR. Analyses were performed via the R package semTools, version 0.5-6.[40]

Results

Data screening and item evaluation

Respondents were required to answer all items to submit their form; hence, there were no participants with missing data after those who failed to answer any of the SAS items were excluded. Subsequently, we identified seven potential outliers flagged by the Mahalanobis distance. However, after close inspection, we maintained them as no sign of careless responding or data entry errors were observed. Therefore, 1345 responses were analyzed. Table 2 summarizes the items' statistics.

We investigated the potential item redundancies via the UVA and found a wTO >0.25 for items 3 (*the thought of going to sleep makes me uneasy*), 4 (*I have negative feelings towards my sleep*), and 6 (*I am scared of not being able to fall asleep*). The highest wTO was between items 3 and 4 (wTO = 0.40), whereas those between items 3 and 6 and items 4 and 6 were just above the cut-off (0.28 and 0.27, respectively). We decided to retain all the items. Specifically, although Items 3 and 4 were directly related

to thoughts regarding the moment of sleep, one focused on emotions while the other referred to thoughts.

[INSERT TABLE 2]

Dimensionality analysis

The EGA indicated the presence of a single community, which supported the unidimensional structure for the scale. The single dimension was consistently recovered in 100% of the 1000 bootstrap EGA samples, which provided strong evidence for its dimensional stability. We conducted a CFA to further assess this unidimensional structure. The fit indices for the CFA model were: $\chi^2(9) = 186.8$, $p < 0.001$, RMSEA = 0.12, 90% CI [0.102, 0.139], CFI = 0.968, TLI = 0.946, and SRMR = 0.045. These indices suggested a good model fit, although the RMSEA was slightly higher than the preferred threshold, which indicated room for improvement.

We assessed a second model in which items 1 and 2, which had the lowest factor loadings in the initial model (0.41 and 0.52, respectively), were explained by a second factor. This revised model demonstrated a slightly better fit: $\Delta\chi^2(1) = 44.7$, $p < 0.001$, RMSEA = 0.106, 90% CI [0.087, 0.126], CFI = 0.978, TLI = 0.958, and SRMR = 0.031. Additionally, we observed increased factor loadings for items 1 and 2 (0.53 and 0.68, respectively) and a high correlation between the latent factors (0.75). While a second factor that accounted for the variability associated with these items might provide a better fit, this was a post-hoc finding without support from the EGA. Therefore, we opted to use the unidimensional model for further analyses.

Internal consistency and convergent validity

In agreement with the EGA's good estimate of dimension stability, we also found good internal consistency for the scale, as evidenced by the high omega

coefficient (ω_{tot}) of 0.91, with a 95% CI [0.90, 0.92]. This strong internal consistency indicated that the items within the scale reliably measured the underlying construct.

To assess the SAS's convergent validity, we fitted an SEM model to estimate the correlations between the latent variables of sleep acceptance (SAS), insomnia severity (ISI), depression (HADS-D), anxiety (HADS-A), active engagement (SPAQ-AE), and willingness (SPAQ-W). This model provided an excellent fit: $\chi^2(545) = 3065.3$, $p < 0.001$, RMSEA = 0.058, 90% CI [0.055, 0.061], CFI = 0.933, TLI = 0.927, and SRMR = 0.047. As expected, we observed a strong positive correlations between the SAS and ISI (0.86), SAS and HADS-D (0.60), and SAS and HADS-A (0.60). SPAQ factors had a strong negative correlation with willingness (-0.70) and weak negative correlation with active engagement (-0.20). These results indicated that lower sleep acceptance was strongly related to sleep-related and emotional distress measures, which supported convergent validity.

Our analysis of measurement invariance between good and bad sleepers yielded poor fit indices, which indicated that our model did not pass the test of configural invariance: $\chi^2(18) = 206$, $p < 0.001$, RMSEA = 0.122, 90% CI [0.103, 0.143], CFI = 0.936; TLI = 0.894; and SRMR = 0.053. To further investigate this discrepancy, we conducted an EGA separately for each group and found that the unidimensional structure was only observed in bad sleepers. In contrast, for good sleepers, the EGA revealed two distinct communities: one that comprised items 1 and 2 and another that comprised items 3, 4, 5, and 6. These findings suggested that the SAS might manifest differently in the two groups. However, fitting different models for each group did not improve the fit indices compared with the unidimensional model applied to the entire sample. Good and bad sleepers' models: $\chi^2(8) = 43.8$, $p < 0.001$, RMSEA = 0.107, 90%

CI [0.058, 0.158], CFI = 0.928, TLI = 0.864, and SRMR = 0.065 vs $\chi^2(9) = 134.2$, $p < 0.001$, RMSEA = 0.116, 90% CI [0.096, 0.138], CFI = 0.949; TLI = 0.915, and SRMR = 0.053, respectively.

We assessed the longitudinal measurement invariance of the unidimensional model with our entire sample and found that invariance held up to the strict level. Although we observed a significant chi-square difference between the metric and scalar levels, the differences in RMSEA, SRMR, and CFI were ≤ 0.002 in all the comparisons. This value was lower than the suggested cut-offs for these indices when $N > 300$ [41], and met the CFI difference criterion of 0.01[42]. These findings supported the longitudinal invariance of our unidimensional model, which indicated that it consistently measured the same construct over time.

Discussion

We developed a Sleep Acceptance Scale (SAS) and examined its psychometric properties. This scale covered domains related to the cognitive process of interference, punctuated by Lundh [2] as a physiological and cognitive arousal that arose from emotional activation or cognitive stress responses. As an alternative to the Sleep Problem Acceptance Questionnaire (SPAQ),[22] the SAS included content not covered by it, such as the individual relation with sleep, one's thoughts and feelings, and their actions to control it.

Our sample comprised 1,350 participants, which included individuals with and without sleep problems. We conducted a EGA and found that the six SAS items conformed to a single dimension. This single dimension of sleep acceptance demonstrated high internal consistency and was strongly correlated with insomnia

severity, anxiety, depression, and willingness. Measurement invariance was maintained across all levels for test administrations conducted 14 days apart. However, our findings suggest that a second dimension might be necessary for sleep acceptance in individuals without sleep problems.

In the item-level analysis, we discovered potential redundancies between items 3 (the thought of going to sleep makes me uneasy), 4 (I have negative feelings towards my sleep), and 6 (I am scared of not being able to fall asleep). This could indicate that these items shared similar semantics.[29] However, from a clinical perspective, inclusion of items that assessed various aspects of one's sleep experience was crucial. Items 3, 4, and 6 addressed emotions related to sleep, thoughts about sleep, and behaviors specific to patients with clinical symptoms, such as the fear of not being able to fall asleep, respectively. Therefore, despite the apparent overlap, all three items were retained for comprehensiveness.

The SAS's dimensionality analysis indicated a single-dimension structure via the six items. As hypothesized, these items represented different aspects of a single construct called sleep acceptance. Alternatively, we found that items 1 and 2 could reflect a second dimension and fit out data equally well. These items referred to experiential avoidance, which was reflected in observed behaviors to control sleep. The remaining items captured internal states, which includes openness to feelings, thoughts, and worries. Although all the items measured sleep acceptance, alternative item separation may be explained by the two underlying mechanisms in which the construct was expressed.

We observed strong associations between the SAS and measures of sleep-related and emotional distress as expected. The low correlation with SPAQ's active engagement

factor might seem surprising. However, considering the content of this factor's items, we noted that they encompassed actions and behaviors that were not exclusively related to sleep. For example, SPAQ's first item stated, "Although things have changed, I am living a normal life despite my sleeping problems." Similarly, other items indicated that active engagement pertained to overall life activities, which may not be directly related to sleep acceptance. In contrast, willingness was directly related to acceptance, which reflected openness to feelings associated with sleep problems. Overall, these findings provide strong evidence regarding the SAS's convergent validity.

We assessed the measurement invariance and concluded that the SAS was invariant across time; however, it was not invariant across the two groups of good and bad sleepers. The SAS demonstrated invariance when we compare the baseline assessment scores with those obtained 14 days later at the configural, metric, scalar, and strict levels, which reflected good temporal stability within this timeframe. However, comparisons between the good and bad sleepers groups based on SAS scores were not warranted owing to lack of configural invariance. While the variability in bad sleepers was better explained by a single dimension, a second dimension that encompassed items 1 and 2 emerged when we estimated the network for good sleepers.

We hypothesized that the experience of trying to control sleep (i.e., the content of items 1 and 2) manifested differently in the two groups. For people with insomnia, there was a greater need to control sleep to alleviate their suffering.[9,11] Conversely, for people without recurrent insomnia, employment of strategies to control sleep is not required. In such cases, the behaviors assessed by these two items might relate with something other than sleep acceptance for those without sleep problems. This

discrepancy highlights the necessity of considering group-specific dynamics when interpreting the SAS scores.

Limitations and future research

We demonstrated the merits of the Sleep Acceptance Scale (SAS) and encouraged researchers to adopt it to measure sleep acceptance. Nevertheless, some important caveats deserve further attention.

First, there was a significant gender imbalance, as 80.5% were female participants, which limited the generalizability to male participants. Additionally, this study focused on participants aged 18–59 years and excluded younger and older populations who may have different experiences and acceptance of sleep problems. Future psychometric studies on the SAS should include a more balanced gender distribution and wider age range.

Regarding the results, items 3, 4, and 6 were flagged as locally dependent. Redundant indicators could potentially bias the estimates of network and latent variable models.[29] Additionally, the SAS did not demonstrate configural invariance between the good and bad sleepers, which suggested that the instrument may not be equally valid across these groups. An alternative model with two dimensions was also compatible with our data, especially for good sleepers. Given the relative uncertainty of the SAS's structure, future research should compare these models via a better-balanced sample of good and bad sleepers. If these findings are replicated, modification of the SAS may be necessary to ensure it similarly captures sleep acceptance across good and bad sleepers.

Second, temporal stability was assessed over a relatively short period (14 days). Hence, long-term stability remains unexamined. Future longitudinal studies should

assess the stability of the SAS over extended periods, including the duration of typical insomnia treatment protocols.

Future research should also focus on other directions. Investigation of the SAS's predictive validity for treatment outcomes, especially in ACT-based interventions, would be relevant. The SAS's scores were validated with a Brazilian-Portuguese-speaking sample. Cross-cultural studies should validate the SAS in different cultural and language contexts to ensure its applicability in different populations.

Conclusion

The Sleep Acceptance Scale is a short scale with adequate psychometric properties suitable for measuring sleep acceptance in patients with sleep problems. This provides a way to evaluate a patient's relationship with their sleep. ACT primarily aims to foster psychological flexibility by focusing on experiential avoidance, which involves acceptance and being open to aversive internal experiences to persist in value-based behaviors that lead to long-term reinforcing outcomes. The SAS will enable researchers and clinicians to monitor user's therapeutic progress, particularly in interventions that incorporate ACT and mindfulness approaches.

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Table 1. Participants' characteristics.

	<i>N</i> = 1345
Age [mean(sd)]	38.57 (9.79)
Female (%)	1083 (80.5)
Bad sleepers (%)	1006 (74.8)
Race (%)	
Asian	48 (3.6)
Black	318 (23.6)
White	966 (71.8)
Other/Not informed	13 (1.0)
Marital status = Unpartnered (%)	702 (52.2)
Education (%)	
Higher education	1046 (77.8)
Secondary school	282 (21.0)
Primary school	17 (1.2)
Employment status = Working (%)	1199 (89.1)

Table 2. Items' statistics.

Item	Mean (SD)	Minimum	Maximum
1. I try to control my sleep by forcing it to happen or being very rigid about the times I should go to sleep and wake up.	3.6 (1.9)	1	7
2. I avoid making plans or doing things I enjoy or need to do because of my sleep.	3.4 (1.8)	1	7
3. I feel uneasy when I think about going to sleep.	3.7 (2.2)	1	7
4. I have negative feelings about my sleep.	3.9 (2.2)	1	7
5. My worries, thoughts, and feelings about my sleep interfere with the way I go about my daily life.	3.6 (2.0)	1	7
6. I am afraid of not being able to sleep.	4.2 (2.3)	1	7

Table 3. Standardized estimates of item's factor loadings and residual variances (uniqueness) for the unidimensional and two-dimensional models.

	Unidimensional model		Two-dimensional model		
	Factor loading	Uniqueness	Factor loading		Uniqueness
Item			Factor 1	Factor 2	
1	.401	.840	.528	-	.721
2	.515	.734	.685	-	.531
3	.918	.158	-	.919	.156
4	.927	.142	-	.928	.140
5	.813	.339	-	.812	.341
6	.866	.250	-	.865	.252

APPENDIX

Sleep Acceptance Scale

The following is a list of statements: Please evaluate the extent to which each statement is true and mark the corresponding number.

1	2	3	4	5	6	7
Never	Very Rarely	Rarely	Sometimes	Frequently	Almost Always	Always

1. I try to control my sleep by forcing it to happen or being very rigid about the times I should go to sleep and wake up.
2. I avoid making plans or doing things I enjoy or need to do because of my sleep.
3. I feel uneasy when I think about going to sleep.
4. I have negative feelings about my sleep.
5. My worries, thoughts, and feelings about my sleep interfere with the way I go about my daily life.
6. I am afraid of not being able to sleep.