



Sleep value and sleep resilience are important dimensions of sleep health and we measured them: Methods for the Sleep Resilience and Variance in Sleep Valuation (SRVIV) study

Results

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Abstract

Sleep health is a multidimensional construct that is essential for general health and well-being. Sleep value, the amount of worth an individual places on their sleep, and sleep resilience, the ability to function emotionally, cognitively, and physically in the presence of sleep disturbances, are overlooked dimensions of sleep health. To study these sleep health dimensions, we developed the Sleep Valuation Item Bank 2.0, Values Inventory, Monetary Sleep Value Questionnaire, and Sleep Resilience Questionnaire. This paper describes the methods for the Sleep Resilience and Variance in Sleep Valuation (SRVIV) Study. The SRVIV study was conducted to explore the factor structure of sleep value and sleep resilience and determine how they relate to demographic, sleep, and psychological variables. This study resulted in an analysis sample of 455 participants who were recruited by a Qualtrics team and completed a Qualtrics survey consisting of demographic, anxiety, depression, and sleep-related questionnaires, in addition to sleep value and sleep resilience questionnaires. Adult participants were recruited throughout the continental United States and were predominately female (53%), white (82%), married (50%), and had an average age of 45.4 years. The data resulting from this study can be used to address important questions in the field of sleep psychology.

Introduction

It has been asked: what is sleep health, is it important, and can it be measured (Buysse, 2014)? Regarding the first question, broad support is given to defining sleep health as a multidimensional pattern of sleep and wakefulness that is well adapted to individual, social, and environmental demands needed. Regarding its importance, sleep health holds great promise in optimizing an individual's mental and physical well-being and performance (Buysse, 2014; Cappuccio et al., 2011; Jennings et al., 2007). Regarding its measurement, however, which dimensions of sleep health can be measured at the self-report unit of analysis is less clear. The currently proposed dimensions of sleep health that can be accurately measured by self-report have been summarized in the acronym RU SATED: regularity, satisfaction, alertness, timing, efficiency, and duration (Buysse, 2014). Although these dimensions provide a solid framework for examining sleep health (Ravys et al., 2021), we propose two additional psychological dimensions of sleep health for consideration: sleep resilience and sleep value. Validated and refined measures of these psychological dimensions of sleep health are lacking. This study was designed to validate measures of both and allow for exploratory analyses of these constructs in relation to several demographic, health, and sleep variables.

Sleep value

Sleep value refers to the amount of worth an individual places on their sleep (Kay et al., 2023; Nielson et al., 2021). Many major sleep organizations recognize that promoting the value of sleep is essential to health (AASM, 2021; NSF, 2024; SRS, 2023). Sleep researchers have begun recognizing the importance of sleep value to sleep health promotion efforts at the individual and societal levels (Kay et al., 2023; Nielson et al., 2021; Troxel & Romanelli, 2023; Wickwire, 2016, 2021). Kay and colleagues created a novel measure of sleep value called the Sleep Valuation Item Bank (SVIB). The SVIB included items selected to capture feelings, thoughts, and behaviors considered to reflect sleep value (Nielson et al., 2021). Exploratory factor analysis of the original SVIB revealed four latent factors of sleep value: wanting, prioritizing, preferring, and devaluing sleep (Kay et al., 2023). Notably, high levels of ambivalence toward sleep's value were demonstrated across demographic features. Gender differences were observed, with women having higher sleep wanting and lower sleep devaluation scores and men having higher sleep prioritizing scores (Kay et al., 2023). Moreover, the study revealed that older adults tended to

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devalue sleep more than their younger counterparts. Employment status also played a role, as individuals with full-time jobs exhibited greater sleep value than those with other work statuses (Kay et al., 2023). Regarding mental health, individuals experiencing decreased mental health, characterized by high levels of depression and insomnia, had higher levels of sleep devaluation despite valuing sleep in terms of wanting, prioritizing, and/or preferring it (Kay et al., 2023). The finding that insomnia is associated with an ambivalent pattern of valuing sleep, with notably high levels of wanting sleep with high levels of sleep devaluing, raises the possibility that sleep value is multidimensional and there may be healthy patterns and levels of sleep value across its various dimensions, as opposed to sleep value being a “more is better,” monolithic construct. Thus, establishing these latent factors and their healthy patterns is critical. Based on these prior studies, our team identified the need to replace and refine several items and expand the SVIB to better capture a sleep liking or enjoyment dimension. This study employed the SVIB-2.0 that incorporated these updates. A major aim was to refine the factor structure of sleep value with the SVIB-2.0.

While the SVIB captures broad dimensions of sleep value, it does not capture all aspects of the sleep valuation process. Although the SVIB captures self-reported attitudes (i.e., feelings, thoughts, and behaviors) about sleep's value, we also recognized that the process and relative value of sleep may require additional measures. One way to determine the value an individual places on their sleep is to define it in terms widely understood: money. To this end, we developed the Monetary Sleep Value Scale, in which participants rated how much they would pay to obtain increments of more or better sleep and how much they would need to be paid to sacrifice increments of sleep. We also sought to determine the relative value sleep has in the broader value systems of individuals. To this end, we developed the Values Inventory, which asked participants to rate the value of a wide range of commonly held values, including sleep health. Each of these self-report measures was designed to capture the relative worth individuals place on their sleep, each providing unique information to help determine the sleep valuation process.

Sleep resilience

Resilience is typically associated with the ability to adapt to or bounce back from challenges. It involves not only the ability to withstand adverse events but also the capacity to adapt and thrive despite them (Southwick et al., 2014). As a novel concept, we define *sleep resilience* as the ability to function emotionally, cognitively, and physically in the presence of sleep or circadian rhythm disturbances. Examples of sleep resilience include individuals who seem to compensate following sleep deprivation to maintain the same levels of productivity and ultra-marathon runners who operate on little sleep (Gattoni et al., 2021).

Upon investigating existing measures, we found a need for questionnaires addressing sleep resilience, which prompted us to create our own. We developed the Sleep Resilience Questionnaire, which evaluates an individual's ability to feel and function resiliently, in terms of physical, emotional, and cognitive domains, in the presence of past or future sleep/circadian disruption. This measure includes self-reported sleep resilience which encompasses both a retrospective estimation (i.e., how resilient one feels to past or current sleep/circadian disruption) and a prospective estimation (i.e., a belief in one's resilience to future sleep/circadian disruption). Our motivation to develop this measure stemmed

from a desire to understand why specific individuals exhibit greater resilience to sleep/circadian disturbances than others, as well as specific populations of interest, including parents of young children, shift workers, and competitive athletes. Our aim was to incorporate a diverse range of items that assess physical, emotional, and cognitive aspects of sleep resilience, both in the present/past and projected into the future. Previous research focused on individuals' vulnerability to sleep disturbance (Van Dongen et al., 2004), where this measure aims to capture individuals' resilience to sleep disturbances. Given the absence of established measures for sleep resilience, we sought to draw insights from existing definitions and measurements of resilience. The questionnaire underwent numerous revisions during its development and was piloted by research assistants at Brigham Young University, whose feedback contributed to refining the instrument.

In summary, the measures developed and the data collected in this study aim to address overlooked dimensions of sleep health. Once validated, these self-report measures will enable us to determine how sleep value and sleep resilience can be leveraged to improve overall health and well-being. To this end, we also included measures in our survey of demographic variables, sleep disturbance, sleep health, mental health, and physical health.

Methods

Procedures

This project titled “The Sleep Resilience and Variance in Sleep Valuation (SRVIV) Study” was funded by an internal grant from the College of Family, Home, and Social Sciences and was approved by the Institutional Review Board at Brigham Young University (IRB# IRB2023-146). Data were collected by a Qualtrics team via an anonymous online survey. Participant names, signatures, respondents' IP Address, specific location data, and contact information were not collected in the survey. A feasibility sample of 500 adult participants was sought based on funding availability and to meet the statistical guideline of 10 subjects per question on the largest questionnaire in the study (i.e., the Sleep Resilience Questionnaire) ensuring stability and reliability in the analyses, as recommended by Kline (Kline, 2014). Although a prior power analysis was not conducted, this sample size was also determined to be consistent with studies that used factor analysis and structural equation modeling (Ravyts & Dzierzewski, 2024). The survey was open to adult participants within the continental United States, and the Qualtrics team was instructed to obtain quotas for the following categories: age: 18–34 (30%), 35–54 (32%), and 55+ (38%); gender: male (48%), female (52%), and non-binary (natural fallout); and region of the United States: Northeast (17%), Midwest (21%), West (24%), and South (38%).

Participants provided informed consent electronically. Individuals under the age of 18 were screened prior to participation. Participants completed several questionnaires including basic demographics, psychological functioning, and sleep. The questionnaires contained in the survey were administered in the following order: Demographics questionnaire, Sleep Resilience Questionnaire, Values Inventory, Patient Reported Outcomes Measurement Information System Sleep-Disturbances – Short Form (PROMIS-SD), PROMIS Sleep-Related Impairment – Short Form (PROMIS-SRI), SVIB-2.0, Monetary Sleep Value Scale, PROMIS Depression – Short Form, and PROMIS Anxiety – Short Form. To help ensure valid responses, we used Bot detection

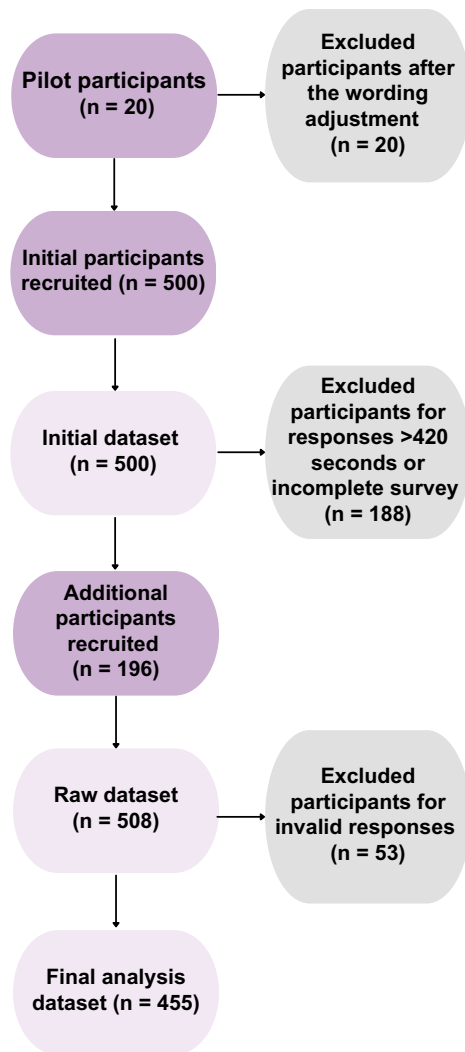


Figure 1. Participant selection flowchart

(reCAPTCHA), prevented multiple submissions, and did not allow indexing. After participants completed the study, the Qualtrics team distributed rewards to participants based on the time commitment of the research study at an estimated rate of \$5.23 an hour. For the 25-minute survey, the average estimated reward was \$2.18 per participant, but the actual amount that each participant received is unknown to the researchers. Data were collected from July 13, 2023, to August 9, 2023.

Figure 1 displays the participant selection flowchart. The Qualtrics team ran a “soft launch” to pilot the survey on 20 participants. Based on the data, we made minor changes to the wording of the SVIB-2.0. Specifically, we changed the scale wording from “Strongly Disagree, Disagree, Neither Agree Nor Disagree, Agree, and Strongly Agree” to “Does not describe me, Describes me slightly well, Describes me moderately well, Describes me very well, and Describes me extremely well.” Due to these changes, the pilot participants were excluded from the final analysis dataset.

After obtaining IRB approval to make this modification to the survey, we instructed the Qualtrics team to fully launch the study and collect an initial dataset with 500 participants. We were allowed to review the dataset for quality and judged that 188 of the

responses were invalid, as they were either not fully completed or were completed in less time than could be thoughtfully done based on pilot runs with students in our lab (i.e., less than 420 seconds), or respondents ranked more than 16 items as ‘Of utmost value’ on the Values Inventory. The Qualtrics research team replaced these invalid responses with 196 new participants, and we approved receipt from them of a raw dataset that included 508 participants.

We took further steps to create the analysis dataset for this study. We developed an exclusion codebook to flag and remove potentially invalid responses. Participants were automatically excluded if they responded with alphabetical text entries on survey items that requested numerical values or entered nonsensical responses in text entries. Some responses were less clearly invalid, and we allowed three flags before we excluded them from the analysis sample. Responses were flagged for (1) having no standard deviation on questionnaires that variance would be expected including the PROMIS-SRI, Sleep Resilience Questionnaire blocks one and four, the Values Inventory, or the SVIB-2.0 – Value items and devalue items; (2) high responses when the average of the SVIB-2.0 value block plus the average SVIB-2.0 devalue block equaled less than 1 or over 6, meaning that participants answered with only low or only high answers on questions that typically would be high on one and low on the other; (3) contradictory responses on negatively and positively worded items of the PROMIS-SD (item 8 + item 6 >6 or =0); and (4) contradictory responses on demographic variables (i.e., responding that they were married and not married on demographic variables). We excluded an additional 53 participants using the exclusion codebook. The final sample after all exclusions consisted of 455 respondents.

Participants

The final analysis sample included 455 respondents. Sample characteristics were determined using a demographics questionnaire that included gender (male, female, non-binary), age (18–86), race and ethnicity (multiple-response allowed for American Indian/Alaska Native, Asian/Asian American, Black/African American, Native Hawaiian or Other Pacific Islander, Hispanic/Latino/Latina, White, and other, where participants were given the option to specify further), education (less than a high school diploma, high school degree or equivalent (e.g., GED), some college, associate degree, bachelor’s degree, master’s degree, professional degree or doctorate degree), number of dependents (e.g., “How many dependents do you claim? – dependents include any qualifying children or relatives claimed on your taxes,” 0–15), household income (less than \$10,000, \$10,000–\$40,000, \$40,001–\$90,000, \$90,001–\$190,000, more than \$190,000), marital status (multiple-response allowed for single, in a committed relationship, married, widowed, divorced, separated, cohabiting, never married, open relationship), mental health numerical rating scale (i.e., “Rate your mental health on a scale 0–100 where 0 = worst imaginable mental health state, 100 = best imaginable mental health state”), and physical health numerical rating scale (i.e., “Rate your physical health on a scale 0–100 where 0 = worst imaginable physical health state, 100 = best imaginable physical health state”). Numerical rating scales for self-reported mental health show a significant correlation with other mental health indicators such as the Patient Health Questionnaire and Geriatric Depression Scale (Ahmad et al., 2014). Numerical rating scales for self-reported physical health demonstrate strong construct validity (Liang, 1986).

In the final analysis sample, 53% identified as female, 46% as male, and 1% as non-binary, 82% were white, 13% as black/African American, and 50% were married. The participants' education levels ranging from less than a high school diploma to doctorate and professional degrees, ages ($Mean = 45.4$), and annual income ranging from <\$10,000 to >\$190,000 were represented. See Table 1 for the full demographic features including estimates for central tendency (means and frequency) and variance.

Measures

Sleep Valuation Item Bank 2.0

Sleep value was determined using the SVIB-2.0 (see Table 2 for full item bank). The SVIB-2.0 questionnaire has 60 items presented in two separate questionnaire blocks, 44 valuing items on block one and 16 devaluing items on block two. The first iteration of the SVIB demonstrated an acceptable reliability coefficient, with a Cronbach's alpha of 0.92 (Nielsen et al., 2021), but had several items with poor face validity or factor loadings. In addition, although it had items such as "I enjoy sleeping," the original SVIB failed to capture a factor of sleep liking or sleep enjoyment. It was proposed that to capture an intrinsic valuation of sleep additional items may be needed (Kay et al., 2023). The revision of the SVIB involved the removal of items that exhibited poor factor loadings and the introduction of new items specifically designed to capture the construct of liking or enjoying sleep. Participants were asked, "For each item, indicate how well the statement describes you," and participants responded on a 5 point Likert-type scale ranging from "Does not describe me" to "Describes me extremely well." For the block 1, higher scores indicate more value, and for block 2 lower scores indicate higher sleep value. The items aimed to understand how participants valued their sleep in terms of wanting, liking, devaluing, prioritizing, and preferring.

Monetary Sleep Value Scale

The Monetary Sleep Value Scale included 16 items presented in two blocks that asked participants to assign a dollar value to give up sleep, obtain more sleep, or get better sleep. See Table 3 for the complete questionnaire. In developing this questionnaire, we aimed to translate the value individuals place on their sleep into a monetary figure to gain insights into how individuals perceive their sleep value. In this approach, we sought to explore a different dimension of the sleep valuation process, which may allow for a more comprehensive understanding of how individuals value their sleep in relation to money. This measure has two blocks – the first block's questions focus on how much money participants would need to be paid to give up sleep, ranging from one hour to seven nights of sleep (184 hours of wakefulness). The second block's questions focus on how much money participants would pay to gain additional sleep ranging from one hour of sleep for one night to undisturbed and refreshing sleep for the rest of their lives. Participants were allowed to respond with the following categories, block one – "I would do it for free," "I would do it for \$1–10," "I would do it for \$11–100," "I would do it for \$101–1000," "I would not do this for any monetary value you could offer," block two – "I would not be willing to pay anything for this," "I would pay \$1–10," "I would pay \$11–100 for this," "I would pay \$101–1000 for this," and I would pay more than

Table 1. Demographic features of the analysis sample ($N = 455$)

Sample characteristic	Sample metrics
Gender	
Female	242 (53%)
Male	209 (46%)
Non-binary	4 (1%)
Age	45.4 (16.7)
Race ^a	
White	372 (82%)
Black/African American	58 (13%)
Hispanic/Latino/Latina	23 (5%)
American Indian/Alaska Native	14 (3%)
Asian/Asian American	11 (2%)
Mixed	4 (1%)
Other	2 (0.4%)
Education	
Less than a high school diploma	17 (4%)
High school degree or equivalent	98 (22%)
Some college, no degree	110 (24%)
Associate's degree	46 (10%)
Bachelor's degree	91 (20%)
Master's degree	77 (17%)
Advanced professional or doctorate degree	16 (4%)
Dependents	1.5 (2.1)
Household income	
Less than \$10,000	51 (11%)
\$10,000–\$40,000	145 (32%)
\$40,001–\$90,000	119 (26%)
\$90,001–\$190,000	98 (22%)
>\$190,000	42 (9%)
Marital status ^a	
Married	226 (50%)
Single	100 (22%)
Divorced	50 (11%)
In a committed relationship	46 (10%)
Widowed	20 (4%)
Never married	12 (3%)
Separated	8 (2%)
Cohabiting	5 (1%)
Self-reported mental health ^b	73.1 (25.8)
Self-reported physical health ^b	70.6 (22.3)

Note: $n(\%)$ and $M(SD)$.

^aIndicates that participants could select multiple options.

^bIndicates that mental and physical health was rated on a scale from 0 to 100.

Table 2. Sample distributions of the Sleep Valuation Item Bank 2.0 (SVIB-2.0)

Item	Mean	SD
Block 1		
I generally desire more sleep	2.17	1.30
When I have nothing to do, I prefer to sleep	1.70	1.40
I generally prefer to sleep in	1.95	1.36
When I wake up in the morning or my alarm goes off, I generally prefer to go back to sleep	1.84	1.34
If I had to choose between sleeping a little longer in the morning or eating breakfast, my choice would be to sleep in	1.97	1.43
I sleep as much as I can	2.04	1.31
I take every opportunity I can to sleep	1.60	1.38
I would rather stay asleep than wake up most mornings	1.76	1.39
I avoid doing things that might disrupt my sleep	1.72	1.36
I want to sleep more even when I feel rested	1.40	1.35
I would want to sleep more if my sleep was more restful	1.72	1.36
I want to sleep more because I enjoy it so much	1.56	1.34
When I feel sleepy at night, I generally choose to get in bed to sleep	2.34	1.23
I would prefer to sleep an extra hour each day than work an extra hour at my current rate of pay (or if not currently employed, I would rather sleep an extra hour each day than work an extra hour at minimum wage)	1.68	1.43
I would prefer to sleep an extra hour each day than spend an extra hour doing the things I enjoy	1.30	1.38
I want to sleep more even when I am not sleepy	1.16	1.33
When I am sleepy at night, I generally prefer going to sleep over staying up later to do my hobbies	1.89	1.36
When I am sleepy at night, I generally prefer going to sleep over staying up later to engage in social activities	2.02	1.33
When I am sleepy at night, I generally prefer going to sleep over surfing the web, watching movies, engaging in social media, or playing video games	1.87	1.34
When I am sleepy at night, I generally prefer going to sleep over staying up later to do household tasks	2.16	1.36
I want to sleep more because I am not getting enough restful sleep	1.98	1.34
If I can't sleep at night, I am willing to take a sleep medication to help me sleep	1.69	1.50
Generally, I want to sleep more because I feel sleepy	2.00	1.31
I generally look forward to going to sleep	2.02	1.28
I schedule my day around my sleep	1.22	1.35
I modify my daytime activities to accommodate my sleep	1.28	1.36
I keep track of how much sleep I've lost and how much sleep I hope to make up later	1.13	1.32
If I lose sleep on one night, I try to make it up by napping or sleeping more another night	1.49	1.32

(Continued)

Table 2. (Continued)

Item	Mean	SD
If I need more sleep, I am likely to sleep in even if it means I will be late for work or other important meetings	1.09	1.31
I enjoy sleeping	2.33	1.22
Generally, I prefer to catch up on sleep when I have days off	1.86	1.37
I like to sleep soundly through the night	2.69	1.15
I desire to get satisfying sleep	2.84	1.10
Sleep is pleasurable to me	2.42	1.21
I value my sleep	2.69	1.07
Sleep is important to me	2.68	1.10
Sleep is valuable because it helps me perform better during the day	2.70	1.12
I value getting a refreshing night of sleep	2.78	1.06
I value having dreamless sleep	1.78	1.34
I value dreaming during sleep	2.07	1.34
I value falling asleep quickly	2.60	1.16
I like how I feel when I'm asleep	2.25	1.24
Sleep is valuable to me	2.66	1.10
It is very important to get a proper amount of sleep every night	2.77	1.08
Block 2		
I put off going to sleep at night even when I am sleepy	1.35	1.33
Sleep is less pleasant to me than being awake	1.13	1.30
I try to get away with as little sleep as possible	1.08	1.27
When I feel sleepy at night, I push through it, so I can stay awake longer	1.27	1.31
I wish I could sleep less than I do	1.09	1.33
I never think about my sleep	1.11	1.27
I avoid sleeping	0.74	1.16
If I could function without sleep, I would sleep less than I do	1.24	1.32
I'm likely to wake up earlier than usual and sacrifice sleep, so I can do something in the morning I look forward to	1.40	1.38
I feel that sleep is a waste of time	0.84	1.21
When I don't get enough time to myself, I will put off going to sleep so I can have "me time."	1.25	1.31
I identify with the mantra "You can sleep when you're dead."	1.05	1.28
I resent that I have to sleep each night	0.93	1.26
If there was a way to eliminate my need for sleep, I would take it.	1.11	1.33
I could get so much more done if I didn't have to sleep	1.35	1.34
When I feel like "I have to sleep," I take revenge by staying awake doing other things I want to do instead.	0.91	1.22

Note: Items were rated on a 0–4 scale. For block 1, higher scores indicate more value, and for block 2 lower scores indicate higher sleep value.

Table 3. Sample distributions for the Monetary Sleep Value Scale items

Item	Mean	SD
Block 1.		
You would have to pay me _____ to lose one hour of sleep tonight.	1.95	1.42
You would need to pay me _____ to lose one hour of sleep each night for the next week.	2.29	1.37
You would need to pay me _____ to lose one hour of sleep each night for the next month.	2.56	1.32
You would need to pay me _____ to lose one hour of sleep each night for the rest of my life.	2.97	1.38
You would need to pay me _____ to lose all sleep tonight (40 total hours of wakefulness).	2.94	1.31
You would need to pay me _____ to lose two consecutive nights of sleep (64 hours total wakefulness).	3.10	1.24
You would need to pay me _____ to lose 3 consecutive nights of sleep (88 hours total wakefulness).	3.17	1.34
You would need to pay me _____ to lose 7 consecutive nights of sleep (184 hours total wakefulness).	3.31	1.26
Block 2.		
I would pay _____ for one extra hour of sleep tonight.	0.61	1.01
I would pay _____ for one extra hour of sleep each night for the next week.	0.67	1.04
I would pay _____ for one extra hour of sleep each night for the next month.	0.78	1.15
I would pay _____ for one extra hour of sleep each night for the rest of my life.	0.87	1.28
I would pay _____ for undisturbed and refreshing sleep tonight.	0.84	1.18
I would pay _____ for undisturbed and refreshing sleep for the next week.	0.91	1.22
I would pay _____ for undisturbed and refreshing sleep for the next month.	0.98	1.28
I would pay _____ for undisturbed and refreshing sleep for the next month.	1.23	1.52

Note: Items were rated on a 0–4 scale. For block 1, higher scores indicate higher payments to lose sleep, while for block 2, higher scores indicate higher payments to gain sleep.

\$1000 for this.” Then, participants were asked to specify further how much money for each question.

Values Inventory

The Values Inventory is a novel 38-item questionnaire we developed to measure participants’ terminal values, including sleep health. See Table 4 for the entire questionnaire. This questionnaire was included to get at the relative value placed on sleep health compared to other commonly held values. Participants were asked to first rate their terminal values on a 5 point Likert-type scale ranging from “Not at all valuable” to “Of utmost value.” After the participants had ranked the 38 items, they were asked to rank their top 10 “Of utmost value” items. We requested respondents to limit their “Of utmost value” rankings to 10 items; however, some participants ranked up to 16 items “Of utmost value.” Those who ignored this requirement and ranked more than 16 items were excluded by the Qualtrics team before sending us the

Table 4. Sample distributions for the Values Inventory items

Item	Mean	SD	Percent rated as “Of utmost value”
Mental health	3.15	0.90	39%
Family	3.12	0.99	42%
Truthfulness	3.04	0.91	31%
Happiness*	3.04	0.85	28%
Physical health	3.03	0.91	32%
Feeling safe	3.02	0.85	28%
Freedom*	2.98	0.87	27%
Self-care	2.93	0.83	21%
A comfortable life	2.91	0.86	21%
Independence	2.88	0.82	18%
Sleep health	2.87	0.85	18%
Wisdom*	2.84	0.78	13%
Self-esteem*	2.82	0.81	15%
A balanced life	2.80	0.89	18%
True friendship*	2.78	0.90	16%
Open mindedness	2.76	0.83	13%
Equality*	2.73	0.86	13%
Gaining knowledge	2.73	0.83	11%
Being respected*	2.67	0.82	9%
World peace*	2.65	0.95	15%
Sense of accomplishment*	2.59	0.83	7%
Work ethic	2.57	0.90	7%
An active life	2.55	0.94	11%
Spirituality	2.53	1.14	19%
Autonomy	2.53	0.91	8%
Appreciation of beauty*	2.53	0.89	8%
Intimacy*	2.51	0.97	11%
A virtuous life	2.47	0.97	11%
Making a lasting contribution	2.42	0.91	6%
Self-exploration	2.40	0.94	9%
Belonging	2.38	0.98	6%
Diversity	2.34	0.95	5%
An exciting life*	2.33	0.99	9%
Being liked	2.24	0.96	4%
Wealth	2.23	1.01	6%
Personal public image	1.92	1.12	4%
Social status*	1.83	1.13	4%
Social influence	1.78	1.14	3%

Note: Items were rated on a 0–4 scale. Higher scores indicate higher value. *Indicates item derived from Milton Rokeach’s work.

dataset. At the end of this survey, participants were asked the following question, “If you could be just as productive at work, school, and other important areas of your life, feel just as good, stay healthy, and get your social needs met, regardless of how much

Table 5. Sample distributions for the Sleep Resilience Questionnaire items

Item	Mean	SD
Block 1: Current Feel		
Feel physically well	2.08	1.20
Resist illness	1.96	1.24
Feel rested/refreshed	2.04	1.33
Feel inclined to exercise	1.89	1.38
Keep a positive outlook	2.20	1.26
Feel satisfied with life	2.00	1.29
Manage my emotions	2.12	1.28
Feel satisfaction from relationships	1.96	1.32
Feel attentive/vigilant	2.05	1.19
Feel aware of the world around me	2.16	1.27
Be able to make smart decisions	2.20	1.22
Feel able to learn and remember new things	2.13	1.21
Block 2: Current Function		
Push through sleepiness	2.05	1.19
Do my daily duties well	2.02	1.25
Perform adequately at school or work	1.85	1.32
Engage fully in hobbies	1.93	1.34
Interact positively with those around me	2.00	1.25
Maintain relationships	1.81	1.31
Make new friends	1.52	1.33
Control undesired impulses	1.77	1.32
Ignore distractions	1.93	1.24
Gain knowledge	1.98	1.28
Solve problems	1.96	1.21
Recall old information or memories	1.98	1.28
Notice small details	1.96	1.28
Block 3: Future Feel		
Feel healthy	2.01	1.26
Avoid getting sick	1.91	1.25
Feel energetic/restored	2.04	1.26
Desire physical activity	1.99	1.25
Maintain a positive attitude	2.03	1.29
Feel content with life	1.98	1.30
Regulate my emotions	1.94	1.27
Be content with my relationships	1.90	1.31
Feel alert	2.09	1.23
Be aware of my surroundings	1.89	1.31
Be able to make logical choices	1.90	1.25
Feel able to gather and store new knowledge	1.92	1.23
Block 4: Future Function		
Resist the urge to nap/doze	1.98	1.26
Adequately perform my daily tasks	2.00	1.24

(Continued)

Table 5. (Continued)

Item	Mean	SD
Keep up with work/school tasks	1.84	1.26
Participate fully in extracurricular activities	1.86	1.29
Have agreeable interactions with others	1.85	1.23
Cultivate current relationships	1.77	1.29
Form new relationships	1.78	1.35
Practice self-discipline	1.89	1.34
Stay focused	2.16	1.26
Learn new things	1.98	1.30
Create solutions	1.93	1.29
Remember/recollect past events/information	1.89	1.29
Catch and correct mistakes	1.95	1.22

Note: Each item was rated on a scale of 0–4. Lower values indicate greater sleep resilience.

sleep you got; how much sleep would you choose to regularly obtain across the 24-hour day?” Our preliminary assessment of the scale showed that the central tendency for this question is 8.43 hours (*SD* 3.6). This question aimed to understand the value individuals assign to sleep based on ideal time allocation.

In developing the Values Inventory, we initiated our process by revisiting the terminal values identified by Milton Rokeach in 1974 (Rokeach, 1974). Recognizing that these values were nearly five decades old, we aimed to update and refine them to reflect contemporary societal norms. To achieve this, we consulted the internet for lists of commonly held values, reviewed lists of values outlined in common behavioral activation activities, and conducted brainstorming sessions within the lab to identify commonly held values. We generated a preliminary list and piloted the questionnaire with research assistants in the lab. Their feedback prompted us to make necessary revisions and enhancements to the questionnaire.

Sleep Resilience Questionnaire

The Sleep Resilience Questionnaire is a novel 50-item self-report measure created to measure participants’ present/past and future resilience to sleep and circadian rhythm disturbances. Participants were asked to rate how much they are impacted by sleep disturbances in different areas of physical, emotional, and cognitive feeling and functioning on a 5 point Likert-type scale ranging from “Not at all” to “A great deal.” Lower values indicate greater sleep resilience. Table 5 shows the entire questionnaire. The questionnaire was presented as four questionnaire blocks: (1) 13 questions for a retrospective estimate of sleep resilience in terms of feelings, (2) 13 questions for a retrospective estimate of sleep resilience in terms of functioning, (3) 12 questions for a prospective estimate of sleep resilience in terms of feeling, and (4) 12 questions for a prospective estimate of sleep resilience in terms of functioning. In the first two blocks, participants are asked, “Think of the times over the past year when you were not sleeping well. How much was your daily functioning impacted by the sleep disturbance in the following areas?” In the second two blocks, participants were asked, “If you were to have sleep difficulties in the

future, how much will the sleep disturbances impact your daytime functioning in the following areas?" Then, participants responded to questions that measured their ability to feel and function well physically, cognitively, and emotionally.

Patient Reported Outcomes Measurement Information System (PROMIS)

Sleep quality was measured using the PROMIS-SD -Short Form, a 7-item self-report measure, and the PROMIS-SRI – Short Form, an 8-item self-report measure. The PROMIS measures have a high internal consistency ($\alpha = .92$ and $.89$, respectively) (Chimenti et al., 2021). Anxiety severity was measured using the PROMIS Emotional Distress – Anxiety – Short Form, a 7-item self-report measure. Depression severity was determined by using the PROMIS Emotional Distress – Depression – Short Form, an 8-item self-report measure. These measures have strong internal consistency ($\alpha = .93$ and $.95$, respectively) (Pilkonis et al., 2011).

Discussion

This study provides a rich resource for answering several current and future questions on the psychology of sleep and circadian rhythms. Sleep value may have implications on how psychosocial and cultural factors influence sleep and circadian health disparities and may be a psychological factor important to consider in the evaluation and treatment of sleep and circadian rhythm disorders. Sleep resilience may play a role in how sleep and circadian rhythms impact psychological functioning including motivation, emotion, cognition, and performance and may inform how sleep resilience can be harnessed to improve psychological, biological, and social outcomes.

In the immediate future, we aim to answer several questions with this dataset including whether these novel scales of sleep value and resilience are valid. We also plan to use the SVIB-2.0 to solidify the factor structure of sleep value. In addition, we also plan to explore whether there are distinct sleep value profiles and how different demographics might vary across each profile. We will also explore how sleep health relates to sleep value and other commonly held values using the Values Inventory. Finally, we plan to explore how different levels of sleep resilience relate to demographics, sleep disturbance, and sleep-related impairment. The primary limitations of this study are that the sample was collected exclusively within the United States, the study's cross-sectional design, and the inclusion of only self-report measures.

Many questions about sleep value and sleep resilience remain and the Final Analysis Sample Dataset is shared at the Community Site as a resource for other investigators to pursue them. We also share these questionnaires for researchers to employ in their own studies. Suggested questions that future research may consider pursuing include the following: What are the benefits of sleep value? How does sleep valuation relate to treatment seeking for sleep problems, willingness to pay for sleep therapy, and adherence to treatment recommendations? Can sleep value inform sleep health promotion efforts or forecast treatment outcomes? Can sleep valuation be utilized to assess if treatment effectively substituted maladaptive beliefs and attitudes about sleep with more adaptive ones? Can resilience to sleep disturbance be enhanced or taught?

Data availability statement. This data is available on the Sleep Psychology Research Directions community site. For the Monetary Sleep Value Scale, we

provided only the Likert scale responses. The open response values can be obtained upon request to the corresponding author.

Authorship contributions (CRediT). **Dustin Sherriff** made substantial contributions to this paper, which include the conception and design of the project, acquisition, analysis, and interpretation of the data. In addition, he was heavily involved in drafting the manuscript.

Levi Ward made a substantial contribution to this paper that includes the conception and design of the project analysis and interpretation of the data.

Danika Calvin made a substantial contribution to this paper, which includes the conception and design of the project

Bryce Klingonsmith made substantial contributions to this paper, which include the conception and design of the project.

Daniel B. Kay made substantial contributions to this paper, which include the conception and design of the project, acquisition, analysis, and interpretation of the data. In addition, he was heavily involved in drafting the manuscript.

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Ethics statement. This project was approved by the Institutional Review Board at Brigham Young University (IRB# IRB2023-146). Study participants gave informed consent to take part in the study.

Connections references

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