Personality and Individual Differences 230 (2024) 112801

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Dispositional optimism, sleep, and trait affective mediators: A latent variable approach

Nicole R.Y. Chen [a,*,1], Nadyanna M. Majeed [a,b,*,1], Adalia Y.H. Goh [a], Paye Shin Koh [a], Jonathan L. Chia [a], Andree Hartanto [a]

[a] Singapore Management University, Singapore
[b] National University of Singapore, Singapore

ARTICLE INFO

Keywords:
Optimism
Sleep
Depression
Anxiety
Latent variable analysis

ABSTRACT

Dispositional optimism has been shown to be associated with better sleep. However, most existing studies rely on subjective assessments of sleep, which may not align with objective assessments of sleep. Additionally, research investigating the mechanisms underlying the association between optimism and sleep is lacking. Moreover, the confounding role of possible content overlap in measures relevant to the constructs of interest has been neglected. To address these gaps, we utilised latent variable analysis and investigated the mediating role of depression and trait anxiety across two large-scale studies (total $N = 2312$), with objective sleep measures included in Study 2. In Study 1 ($N = 1010$), a significant and medium association was found between optimism and better subjective sleep. Here, depression emerged as a robust mediator. In Study 2, both objective ($N = 742$) and subjective ($N = 1302$) sleep measures were analysed. Findings revealed a small and significant association between optimism and better subjective sleep, which was mediated by depression. However, optimism was not associated with objective sleep. Trait anxiety was a non-significant mediator in both studies. The current study suggests that the association between dispositional optimism and subjective sleep outcomes do not translate to similar results with objective sleep.

1. Introduction

The pivotal role of sleep in biological restoration (Hawkley & Cacioppo, 2004; Robles & Carroll, 2011) and health maintenance (Gangwisch et al., 2005; Lemola et al., 2013; Swinkels et al., 2013) has led numerous works to delve into factors affecting sleep. Some established factors that have been shown to affect sleep include sociodemographic factors such as race (Carnethon et al., 2016; Grandner et al., 2016; Mezick et al., 2008), marital status (August, 2022; Kim et al., 2018; Whinnery et al., 2014), socioeconomic status (Friedman et al., 2007; Gellis et al., 2005; Mezick et al., 2008), age (Kim et al., 2021; Ohayon et al., 2004), and sex (Madrid-Valero et al., 2017; Meers et al., 2019; Suh et al., 2018). Apart from sociodemographic factors, individual differences such as stable personality traits have also been explored as potential factors affecting sleep. One emerging and promising factor that has been shown to be associated with better sleep quality is dispositional optimism (e.g., Lau et al., 2015, 2017; Lemola et al., 2011; Uchino et al., 2017).

1.1. Dispositional optimism

Dispositional optimism is the stable tendency to generally expect positive future outcomes across various life domains (Scheier & Carver, 2018). Substantial research has indicated that dispositional optimism can enhance various aspects of life. For example, optimists invest more in their relationships (Assad et al., 2007; Segerstrom, 2007) and experience less marital well-being decline (Neff & Geers, 2013). Optimistic individuals are also more likely to report high levels of life satisfaction (Ho et al., 2010; Wrosch & Scheier, 2003). Optimism buffers against emotional reactivity to daily stressors (Majeed et al., 2021), promotes faster wound healing (Ebrecht et al., 2004), and improves cardiovascular health (Scheier et al., 1989, 1999). Optimism also positively affects employment prospects, with more optimistic individuals being preferred for jobs (Mohanty, 2010), and earning higher wages (Mohanty, 2012).

* Corresponding authors.
E-mail addresses: nicolechen.2023@phdps.smu.edu.sg (N.R.Y. Chen), nadyanna@u.nus.edu (N.M. Majeed).

[1] Authors contributed equally. The order of co-first authors provided here was randomised. Co-first authors can prioritise their names when adding this paper's reference to their resumes.

https://doi.org/10.1016/j.paid.2024.112801
Received 13 January 2024; Received in revised form 3 May 2024; Accepted 4 July 2024
Available online 13 July 2024

1.2. Dispositional optimism and sleep

A promising and emerging line of research is on the association between dispositional optimism and sleep (Hernandez et al., 2020; Lau et al., 2015, 2017; Lemola et al., 2013; Uchino et al., 2017). For example, Uchino et al. (2017) found that higher levels of dispositional optimism were associated with better self-reported sleep quality measured using the Pittsburgh Sleep Quality Index (PSQI) in a healthy community sample to a large extent (zero-order $r = -0.45$; covariate-adjusted $\beta = -0.41$). Similarly, Conway et al. (2008) found that poor self-reported sleep was associated to a large extent with lower levels of optimism among young grandmothers (zero-order $r = -0.36$).

The link between dispositional optimism and sleep can be understood through the broaden-and-build theory of positive emotions (Fredrickson, 2004), which posits that experiencing positive emotions leads to a broadening of cognitive processes and an enhancement of personal resources. Positive emotions could effectively counteract and mitigate the impacts of negative emotions, such as neutralising or reversing the effects that negative emotions have on thought and action patterns. This has been termed the "undo hypothesis" (Fredrickson et al., 2000; Fredrickson & Levenson, 1998). Furthermore, positive emotions enhance coping resources (Aspinwall & Taylor, 1997; Fredrickson & Joiner, 2002), and aid individuals in achieving diverse sets of coping strategies (Anthony, 1987; Cohler, 1987; Werner & Smith, 1992). This upward spiral can contribute to positive physical well-being, such as increased longevity (Danner et al., 2001; Ostir et al., 2000), which could also extend to sleep.

In line with the broaden-and-build theory, depression has been proposed as a potential mechanism of dispositional optimism and sleep (e.g., Lau et al., 2015, 2017; Uchino et al., 2017). Optimistic individuals experience lower levels of depression as they tend to engage in proactive coping and seek social support during stressful events (Ironson et al., 2005; Tindle et al., 2012). Conversely, pessimistic individuals may experience negative thinking patterns that exacerbate depressive symptoms (Fischer et al., 2018), which in turn could lead to sleep disturbances (Harvey, 2002). This pathway via depression, however, could have been inflated in the existing literature due to measurement issues associated with the three variables – measures of optimism, depression, and sleep tend to have overlapping item content. For example, the two most common measures of depression—CES-D (Radloff, 1977) and DASS (Lovibond & Lovibond, 1995)—have items that are likely to tap on optimism or optimism-adjacent constructs (i.e., CES—D: "I felt hopeful about the future"; DASS: "I felt that I had nothing to look forward to"), and/or on sleep (i.e., CES—D: "My sleep was restless"). The overlap in content is problematic as it becomes challenging to accurately discern if the observed relationships between two or more variables is genuine at the construct level or is simply a result of shared content at the measurement level.

Apart from depression, another mechanism that has yet to be investigated is trait anxiety – a stable personality characteristic that predicts an individual's tendencies to perceive stressful events as threatening (Bradley, 2016; Spielberger, 1966). In line with the broaden-and-build theory, optimists are more likely to persist in their efforts to cope successfully when inundated with stressors (Scheier & Carver, 1988) and are more likely to seek out social support and emphasise the positive aspects of stressful situations, which buffers against negative emotions (Scheier et al., 1986), such as anxiety. Lower levels of trait anxiety have been shown to buffer against disturbed sleep, increased sleep onset latency, and poorer sleep quality compared to higher levels of trait anxiety (Forbes et al., 2008; Horváth et al., 2016; Sadigh et al., 2014; Weeks et al., 2019). The poorer sleep could be attributed to hyperarousal (Sysoeva & Verbitsky, 2015), where more anxious individuals experience prolonged heart rate accelerations during sleep, and display brain activations that were similar to activations at wakefulness (Sysoeva & Verbitsky, 2015).

It is crucial to recognize that despite the similarity in the underlying mechanisms of depression and anxiety, they exhibit differences in other aspects, such as positive affectivity, arousal, and temporal focus (Clark & Watson, 1991). For instance, individuals with depression (but not anxiety) were found to be characterized by a lack of positive affect, whereas individuals with anxiety (but not depression) were characterized by high levels of physiological hyperarousal (Clark & Watson, 1991). More importantly, depression is primarily past-oriented and involves feelings of loss associated with unattained goals (Andrews & Thomson, 2009; Johnson-laird & Oatley, 1989). In contrast, anxiety is future-oriented and driven by the uncertainty of potential future threats (Eysenck & Fajkowska, 2018; Grupe & Nitschke, 2013). This distinction suggests a possibility of two distinct mediating paths between dispositional optimism and sleep quality, as well as anxiety being a more robust mediator compared to depression, as anxiety and optimism share a common a future-oriented dimension whereas depression does not.

1.3. Issues of sleep measurements

Most studies on dispositional optimism and sleep quality (e.g., Lau et al., 2015, 2017; Uchino et al., 2017) have utilised sleep measures which are subjective in nature, such as the PSQI (Buysse et al., 1989). Relying solely on subjective self-reported sleep measures may restrict our understanding of the optimism and sleep relationship as subjective sleep measures are not always comparable to objective sleep measures (Calhoun et al., 2007; Edinger et al., 2000; Grandner et al., 2006; Kobayashi et al., 2012). Objective sleep assessments provide data derived from physiological measurements (O'Donnell et al., 2009), which offer a concrete and unbiased view of sleep parameters, whereas subjective sleep assessments provide insights into an individual's personal sleep experiences (Zavecz et al., 2020).

The divergence between subjective and objective sleep assessments may stem from how an individual's perception of sleep does not necessarily translate into observable objective sleep outcomes (Chan, 2009). Subjective sleep logs have been shown to overestimate sleep latency and severely underestimate total sleep time. Additionally, since sleep onset is a progressive rather than a discrete event (Tryon, 2004), the use of sleep onset as the construct of interest can lead to discrepancies between objective and subjective sleep evaluations as objective and subjective measures are each sensitive to different phases of the sleep-onset process, which involve three phases (Tryon, 1996, 2004). Objective measurements tend to be more sensitive during the first and second phases of the sleep-onset process, which are quiescence and decreased muscle tone respectively (Tryon, 2004). For subjective measurements, they are more sensitive during the third phase, which is the auditory-threshold increase phase (Birrell, 1983; Lichstein et al., 1983; Tryon, 2004). Therefore, the exclusive reliance on either type of sleep assessment at the expense of the other may hinder a holistic evaluation of an individual's sleep experience, as subjective sleep assessments capture data that represent the individual's perceived reality (Chan, 2009; Van Den Berg et al., 2008), whereas objective sleep assessments capture data that is not influenced by human bias (Van Den Berg et al., 2008).

Additionally, an issue that has emerged in the usage of PSQI measuring subjective sleep concerns its factor structure. The PSQI consists of seven components (Buysse et al., 1989), which are then summed to form an overall sleep quality score. However, the use of a single score threshold and the dichotomous categorisation of individuals (i.e., ≤ 5 for "good" sleepers and > 5 for "poor" sleepers) is controversial, with critics arguing that the unidimensional treatment of the PSQI oversimplifies the complex nature of sleep (Dunleavy et al., 2019). Indeed, several studies have shown that evaluating sleep quality via a two-factor (Jiménez-Genchi et al., 2008; Magee et al., 2008) or three-factor (Carpenter & Andrykowski, 1998; Cole et al., 2006) scoring system might offer a more robust assessment of sleep quality, and this is also further supported by a systematic review evincing a multidimensional structure of the PSQI (Manzar et al., 2018).

1.4. The present study

In summary, the current empirical work aims to address two important research gaps through two large-scale studies. First, the current study examines two potential mechanisms, namely the mediating pathways of depression and trait anxiety.

Second, to address the gaps in the measurement of sleep quality, we included an objective measure of sleep to comprehensively examine the dispositional optimism and sleep association beyond the usage of subjective measures. In addition, the current study employs structural equation modelling, which allows us to delve into the underlying relationships among the variables of interest and account for measurement errors in each personality construct (Bollen & Long, 1993). Taken together, we hypothesise that higher levels of dispositional optimism will be associated with better sleep, and that this association will be mediated by depression and trait anxiety as two parallel mediators.

2. General method

2.1. Transparency and openness

The current work's design and its analysis plan were not pre-registered. Materials and data for the Singapore sample have been made publicly available on Researchbox (#442; https://researchbox.org/442), while those for the US sample are available from ICPSR (https://www.icpsr.umich.edu/). Analytic code and materials of interest for both studies are also available on Researchbox. All analyses were conducted in R version 4.3.1 (R Core Team, 2023). Descriptives were extracted using *psych* version 2.4.3 (Revelle, 2021). Latent variable analyses were conducted using *lavaan* version 0.6–17 (Rosseel, 2012) set to handle missing values using full-information maximum likelihood, and to calculate 95 % confidence intervals via the Monte Carlo method with 2000000 samples drawn using *semTools* version 0.5–6 (Jorgensen et al., 2022). All standardised effect sizes were interpreted following Funder and Ozer's (2019) recommended guidelines.

2.2. Design and sample

2.2.1. Singapore sample

The Singapore sample comprises four independent subsamples, as part of larger-scale projects broadly examining daily experiences and stress reactivity in young adults in Singapore from December 2020 to February 2021 (first subsample; Goh et al., 2023; Ng et al., 2022), from June 2021 to August 2021 (second subsample; Majeed et al., 2023a), from July 2022 to September 2022 (third subsample; Majeed et al., 2023b), and from January 2023 to March 2023 (fourth subsample). As the procedure and measures administered, as well as demographic profiles, are similar across all four subsamples, we combined all the data in the current work. The collection of data for each wave was approved by a local Institutional Review Board.

The total sample consisted of 1010 unique young adults (261 from the first sample, 253 from the second sample, 237 from the third sample, and 259 from the fourth sample) in Singapore. Two participants had only partial data on the depression measure; they were retained in all analyses. The remaining participants provided full data. A summary of sample descriptive statistics is reflected in Table 1. All participants gave informed consent prior to their participation in the study.

2.2.2. US sample

The US sample comprises a combination of two independent subsamples drawn from the Midlife in the United States (MIDUS) projects: the MIDUS 3 sample (Ryff et al., 2015) and the MIDUS Refresher subsample (Ryff et al., 2017; Weinstein et al., 2019). Both subsamples underwent a baseline portion (MIDUS 3: 2013 to 2014; MIDUS Refresher: 2011 to 2014), involving the collection of their demographic and optimism data, and then a subset of each subsample was invited to their respective biomarker sub-projects (MIDUS 3: 2017 to 2021; MIDUS Refresher: 2012 to 2016), involving the collection of their age, sleep, depression, and anxiety. Thus, only participants who completed the self-administered questionnaire at baseline and were part of the biomarker sub-project were analysed in the current work.

The original sample leading to the US sample consisted of 1390 adults from the US. Of the 1390 individuals, 9 did not provide their race, 3 did not provide their marital status, 56 did not provide their income, 15 did not provide their subjective socioeconomic status, 3 did not provide any data on any of the optimism items, 1 did not provide any data on any of the depression items, and 1 did not provide any data on any of the sleep items, and were thus removed, leaving a final sample of 1302 participants. All of the remaining 1302 participants had full demographic information and provided at least partial responses on the remaining measures. Of note, only 742 participants provided data on the objective sleep measures, and as such only these 742 participants were included when analysing the objective sleep outcomes. A summary of sample descriptive statistics of the 1302 participants is reflected in Table 2.

Table 1
Descriptive statistics in Singapore sample.

	M (*SD*) or %		Observed range	Theoretical range
Race (% Chinese)	78.51 %			
Sex (% female)	72.67 %			
Age (in years)	21.93	(1.81)	18–30	
Monthly household income	3.16	(1.46)	1–6	1–6
Subjective socioeconomic status	6.13	(1.33)	2–10	1–10

Note. $N = 1010$.

2.3. Measures

2.3.1. Dispositional optimism

Dispositional optimism was assessed using the Life Orientation Test Revised (LOT-R; Scheier et al., 1994), with the exclusion of the filler items in both studies due to time constraints. Participants rated how much they agreed or disagreed with items relating to positive and negative expectancies (e.g., "I'm always optimistic about my future") on a 5-point scale (1 = *Disagree a lot*, 5 = *Agree a lot*). The unidimensional measure consists of three items worded such that higher scores reflect higher levels of optimism, and three items worded such that higher scores reflect lower levels of optimism.

2.3.2. Subjective sleep indices

Subjective sleep indices were obtained using the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989). The PSQI is a self-rated scale assessing sleep quality and related disturbances over a one-month period. Due to an administrative error with the first subsample from Singapore, one item ("Other reason(s), please describe", referring to

Table 2
Descriptive statistics in US sample.

	M (*SD*) or %		Observed range	Theoretical range
Race (% White)	85.41 %			
Sex (% female)	52.15 %			
Marital status (% married)	66.44 %			
Age (in years)	59.46	(13.61)	26–94	
Highest education	8.29	(2.34)	2–12	1–12
Annual household income (in thousands)	92.29	(68.56)	0–300	0–300
Subjective socioeconomic status	6.59	(1.76)	1–10	1–10

Note. $N = 1302$.

reasons for sleep disturbances) was not shown to participants during data collection. While collected with the remaining samples, the item was removed from the analyses for the Singapore sample to enable comparability with the first sample. The remaining 24-item scale (Singapore sample) and full 25-item scale (US sample) examined sleep quality through seven components, with each component scored from 0 (best) to 3 (worst): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and sleep deprivation-induced daytime dysfunctions (Buysse et al., 1989).

2.3.3. Objective sleep indices

In the US sample only, objective sleep indices were obtained via motion-sensor using the Actiwatch system (Models 64 and 2; Philips Corporation, Andover, MA) over seven days during the biomarker subproject. The Actiwatch captures rest, sleep, and active periods through data points, such as average sleep bout, percentage wake time, total activity count, among many others. Information from these data points were computed into summary statistics spanning four domains: sleep onset latency (in minutes), sleep efficiency (in percentage), wake after sleep onset (in minutes), and total sleep time (in minutes). The first three variables were divided by 10 and the fourth variable was divided by 100 to prevent model convergence failures due to scaling issues.

2.3.4. Depression

Depression was assessed using the 20-item Centre for Epidemiologic Studies Depression Scale (CES—D; Radloff, 1977). Participants were asked to respond to a "list of the ways you might have felt or behaved [...] during the past week" (e.g., "I talked less than usual"). Items were rated on a 4-point scale (0 = *Rarely or none of the time*, 3 = *Most or all of the time*). The measure consists of 16 items worded such that higher scores reflect higher levels of depression, and four items worded such that higher scores reflect lower levels of depression.

2.3.5. Anxiety

Anxiety was measured using the seven "pure trait anxiety" items (STAI-T-A; Bieling et al., 1998) of the State Trait Anxiety Inventory (Spielberger, 1983). Each of the seven items (e.g., "Some unimportant thought runs through my mind and bothers me") was rated on a 4-point scale (1 = *Almost never*, 4 = *Almost always*). All seven items were worded such that higher scores reflected higher levels of anxiety.

2.3.6. Covariates

Due to their associations with sleep, the following variables were used as covariates in both samples: Age (Kim et al., 2021; Ohayon et al., 2004), sex in terms of male or female (Madrid-Valero et al., 2017; Meers et al., 2019; Suh et al., 2018), race in terms of majority or minority group (Carnethon et al., 2016; Grandner et al., 2016; Mezick et al., 2008), and socioeconomic status (Friedman et al., 2007; Gellis et al., 2005; Mezick et al., 2008). In both samples, we attempted to capture both objective and subjective assessments of socioeconomic status. Subjective socioeconomic status was measured using a 10-point ladder scale (1 = *Lowest status*, 10 = *Highest status*), in line with Adler et al. (2000). Due to the different natures[2] in the Singapore and US sample, objective socioeconomic status was captured differently.

In the Singapore sample, objective socioeconomic status was operationalised as monthly household income measured using a 6-point scale (1 = *less than $2000*, 2 = *$2000–$5999*, 3 = *$6000–$9999*, 4 = *$10,000–$14,999*, 5 = *$15,000–$19,999*, 6 = *more than $20,000*). In the US sample, objective socioeconomic status was operationalised as annual household income and highest education. Annual household income was measured as a total derived from wage, pension, social security, and other sources, and was top-coded at US$300,000 to preserve anonymity. To prevent convergence failures during model estimation due to magnitude, annual income was divided by 1000. Highest education was rated on a scale of 1 (*No school*) to 12 (*Ph.D, ED. D, MD, LLB, LLD, JD*, or *other professional degree*). In addition, marital status (married or non-married) was added as an additional demographic factor.

2.4. Analytic plan

2.4.1. Model fit indices and model comparison criteria

For every model that was estimated, we examined its fit to the current data in terms of its RMSEA, SRMR, CFI, and TLI. Models were considered to have good fit if RMSEA < 0.08, SRMR < 0.08, CFI > 0.95, and TLI > 0.95 (Hu & Bentler, 1999).[3] Where pairs of alternative models were estimated, we conducted model comparisons in order to examine which was more appropriate for the current data. Every relevant pair of models was compared based on their AIC and BIC (Chakrabarti & Ghosh, 2011; Huang, 2017; Lin et al., 2017; Lu et al., 2017; Vrieze, 2012); the model with the lower AIC and BIC was considered to exhibit better fit, and was retained for subsequent analyses, if any. We detail the pairs of models which were compared where relevant.

2.4.2. Measurement models

Two confirmatory factor analyses were first run to examine the underlying factor structure of the four variables of interest (Fig. 1a and b). In the first model, each variable was modelled as a function of its theorised factor structure based on previous literature. Specifically, in both studies (Fig. 1a), optimism was unidimensionally manifested by the six items of the LOT-R (Scheier et al., 1994); sleep was modelled as having three factors manifested by the seven components of the PSQI (Dunleavy et al., 2019); depression was modelled as having four factors manifested by the 20 items of the CES—D[4] (Cosco et al., 2017); and anxiety was unidimensionally manifested by the seven items of the STAI-T-A (Bieling et al., 1998). The latent constructs of optimism, overall sleep, overall depression, and anxiety were allowed to freely inter-correlate. In the US sample where objective sleep indices were also available, the latent sleep construct was manifested by the four objective sleep indices (i.e., sleep onset latency, wake time after sleep onset, sleep efficiency, total sleep time; Fig. 1b).

In the second model, two residual correlations were added in order to more accurately capture and de-bias the latent associations between the ultimate variables of interest. Of note, artificial inflation of correlations between optimism (LOT-R) and depression (CES—D) as well as between depression (CES—D) and sleep (PSQI) are highly probable due to overlapping item content caused by "I felt hopeful about the future" on the CES-D and "My sleep was restless" on the CES-D respectively (also see Chen, 2021). Thus, a residual correlation was allowed between the "hope" item of the CES-D and the latent optimism variable, and between the "sleep" item of the CES-D and the latent overall sleep variable. The two models were compared in order to select the model (i.e., without residual correlations vs. with residual correlations) which would form the basis for further analyses.

[2] While the Singapore sample featured exclusively undergraduates, the US sample consisted of midlife to older adults recruited through a national probability sample of adults in the United States. Given the diversity of participants in the US sample, and with existing literature suggesting the influence of marital status and education on the variables of interest (e.g., August, 2022; Stamatakis et al., 2007), marital status and education were considered to be two important covariates for the US sample.

[3] If any variances were estimated to be negative, but model fit was still acceptable, we continued to interpret the model, treating negative variances as zero.

[4] In the Singapore sample, two participants were missing data on one item of the CES-D each; these missing values were handled using full-information maximum likelihood.

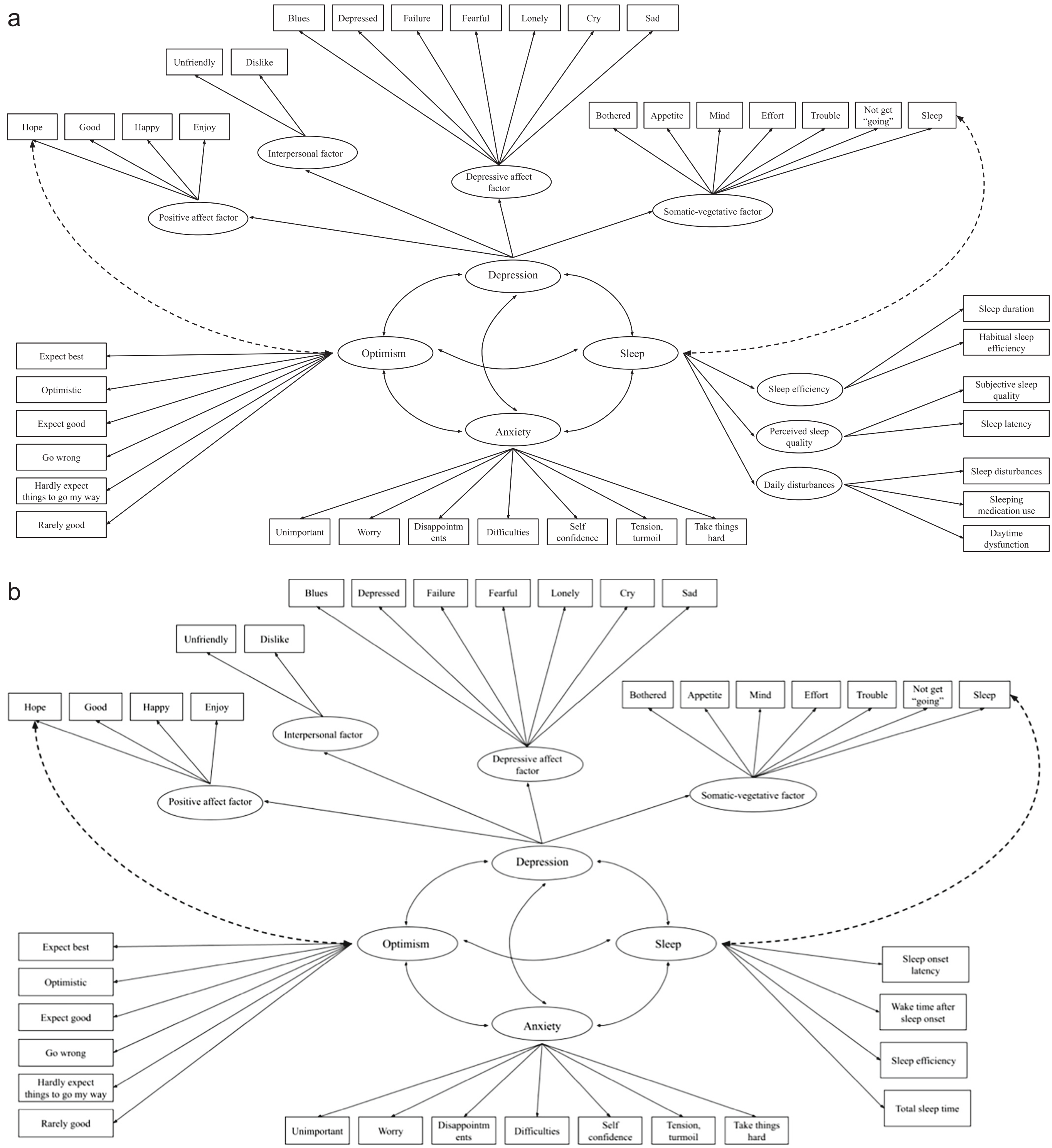

Fig. 1. a. Measurement models for subjective sleep.
Note. The two residual correlations shown (in dotted lines) were only included in the second model.
b. Measurement models for objective sleep.
Note. The two residual correlations shown (in dotted lines) were only included in the second model.

2.4.3. Structural models

After establishing the measurement model with better fit, two sets of structural equation models (Figs. 2 and 3) were estimated to examine the hypotheses that (1) higher levels of dispositional optimism are associated with better sleep, (2a) depression mediates the association of optimism on sleep, (2b) depression continues to mediate the association of optimism on sleep even after adjusting for anxiety as a parallel mediator, and (3) anxiety additionally mediates the association of optimism on sleep, even after accounting for depression. In the models involving anxiety, a latent correlation between overall depression and anxiety was included in the model to account for their shared variance not caused by dispositional optimism.

Statistical significance of the three (without anxiety) or four (with anxiety) main paths involved in the models (i.e., the total path from

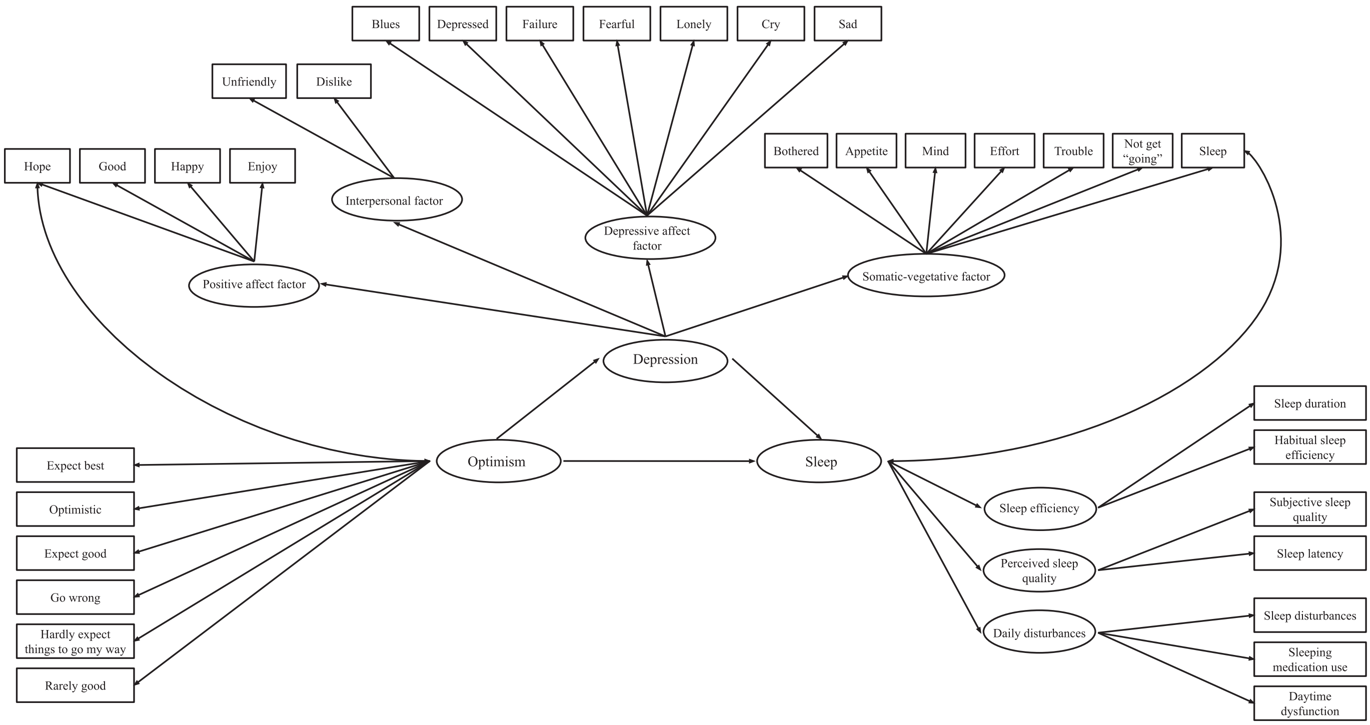

Fig. 2. Depression as a mediator of optimism-sleep association.

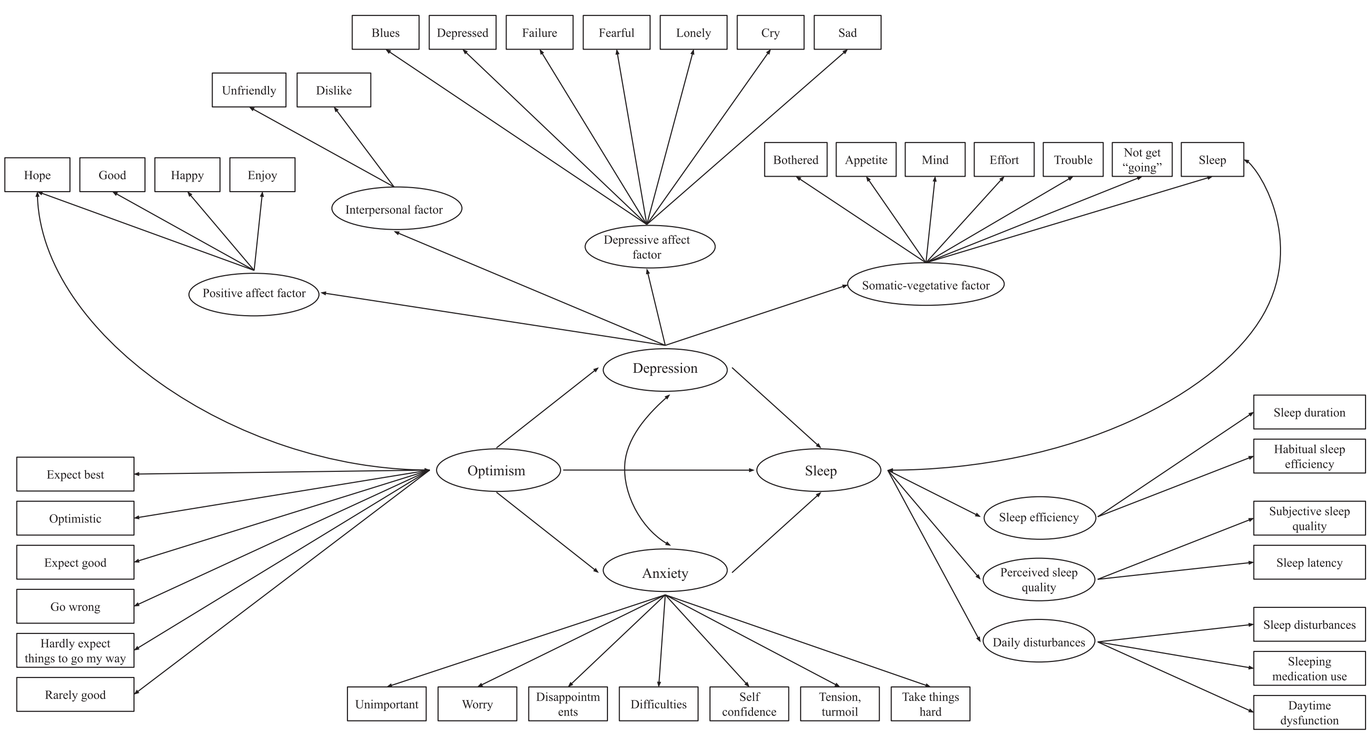

Fig. 3. Depression and anxiety as parallel mediators of optimism-sleep association.

optimism onto overall sleep, the indirect path from optimism through overall depression onto overall sleep, the indirect path from optimism through anxiety onto overall sleep, and the residual path from optimism onto overall sleep) was tested by examining the 95 % Monte Carlo confidence intervals (95 % CIs); if the 95 % CI included zero, the path was deemed non-significant. Significance was inferred based on unstandardised estimates.

Initially, unadjusted analyses were conducted for each model, with only the specified variables included. Subsequently, adjusted analyses incorporated covariates[5] across all regression paths to investigate whether the associations were robust against demographic factors

[5] The analytic plan in the US sample was identical to that in the Singapore sample, except for one difference, where additional covariates of marital status and highest education attained were added due to the nature of the sample.

hinted to be potential confounds (Hall et al., 2008; Mezick et al., 2008; Uchino et al., 2017; Weitzer et al., 2021). Model comparisons were conducted to compare pairs of unadjusted and adjusted models to examine whether the inclusion of the covariates was useful in the modelling process.

2.4.4. Sensitivity analysis

To further explore whether the pattern of results was consistent across the three factors of subjective sleep and the four indicators of objective sleep, we additionally re-ran the final models (i.e., the structural models with anxiety, both unadjusted and adjusted) with either the three subjective factors as the final outcomes or the four objective indicators as the final outcomes, rather than overall sleep. This analysis allowed us to examine the direct and indirect associations between optimism and each facet of sleep (i.e., subjective: sleep efficiency, sleep quality, and sleep disturbance; objective: wake after sleep onset, total sleep time, sleep onset latency, and sleep efficiency) separately. In the sensitivity model, we allowed the three subjective factors or the four objective indicators to freely inter-correlate.

3. Results for subjective sleep indices

3.1. Measurement models

In both samples, both the initial measurement model (without any residual correlations) and the second measurement model (with two residual correlations) displayed good fit according to RMSEA and SRMR, and close to good fit according to CFI and TLI (Table 3). Model comparisons by AIC and BIC were consistent in suggesting that the model with residual correlations was more appropriate, and thus this model was retained for further analyses. In both samples, all factor loadings and latent inter-correlations were all statistically significant with all *ps* < 0.001 (Fig. 4a and b).

3.2. Structural models

With the measurement model with residual correlations as a starting point, we tested our hypotheses in both samples through a series of structural equation models (Table 3). In the Singapore sample, all models displayed good fit according to RMSEA and SRMR, and close to good fit according to CFI and TLI. Model comparisons between the respective adjusted and unadjusted models were inconsistent; AIC values were lower for adjusted models, which BIC values were lower for unadjusted models. In the US sample, the unadjusted models displayed good fit according to RMSEA and SRMR, and close to good fit according to CFI and TLI. However, the adjusted models faced convergence failures and thus were discarded from current analyses.

3.2.1. Total association between dispositional optimism and sleep

We found that the total association between dispositional optimism and overall sleep was statistically significant and generally large in size (Singapore: $\beta = -0.36$, *b* [95 % CI] = −0.25 [−0.34, −0.17]; US: $\beta = -0.29$, *b* [95 % CI] = −0.20 [−0.26, −0.15]) before adjusting for covariates, and large in size (Singapore: $\beta = -0.34$, *b* [95 % CI] = −0.34 [−0.32, −0.16]) after adjusting for covariates (Table 4). Higher levels of optimism were consistently associated with lower scores on overall sleep (i.e., better subjective sleep quality) in both samples, consistent with our hypothesis.

3.2.2. Depression as a sole mediator

First, we found that the indirect pathway from optimism through overall depression onto overall sleep (Fig. 2) was statistically significant and medium in magnitude (Singapore: unadjusted $\beta = -0.29$, *b* [95 % CI] = −0.95 [−1.17, −0.75]; adjusted $\beta = -0.29$, *b* [95 % CI] = −0.20 [−0.28, −0.14]; US: $\beta = 0.23$, *b* [95 % CI] = 0.16 [0.12, 0.20]; Table 4). The trend was such that higher levels of optimism were associated through overall depression with lower overall sleep scores (i.e., better subjective sleep quality), both before and after accounting for potential demographic confounds. This suggests that depression mediates the association of dispositional optimism with sleep, consistent with our hypothesis.

Table 3
Model fits and model comparisons.

Model	RMSEA	SRMR	CFI	TLI	AIC	BIC
Singapore, subjective sleep (N = 1010)						
Measurement models						
Without residual correlations	0.052	0.051	0.865	0.855	91,301	91,956
With residual correlations	0.050	0.050	0.877	0.868	91,122	91,786
Structural models without anxiety						
Unadjusted	0.053	0.048	0.885	0.874	75,673	76,219
Adjusted	0.050	0.051	0.869	0.858	75,637	76,232
Structural models with anxiety						
Unadjusted	0.050	0.051	0.877	0.867	91,130	91,794
Adjusted	0.048	0.053	0.863	0.853	91,074	91,812
Sensitivity model						
Unadjusted	0.050	0.049	0.880	0.870	91,083	91,786
Adjusted	0.047	0.050	0.868	0.855	91,029	91,855
US, subjective sleep (N = 1302)						
Measurement models						
Without residual correlations	0.052	0.055	0.849	0.838	100,812	101,500
With residual correlations	0.048	0.054	0.874	0.864	100,387	101,085
Structural models without anxiety						
Unadjusted	0.046	0.049	0.901	0.892	83,435	84,009
Adjusted						
Structural models with anxiety						
Unadjusted	0.048	0.054	0.874	0.865	100,381	101,079
Adjusted						
Sensitivity model						
Unadjusted	0.046	0.047	0.882	0.872	100,254	100,994
Adjusted						
US, objective sleep (N = 742)						
Measurement models						
Without residual correlations	0.050	0.057	0.882	0.873	53,723	54,281
With residual correlations	0.050	0.057	0.883	0.873	53,718	54,285
Structural models without anxiety						
Unadjusted	0.048	0.054	0.913	0.905	44,221	44,677
Adjusted						
Structural models with anxiety						
Unadjusted	0.050	0.057	0.883	0.874	53,715	54,282
Adjusted						
Sensitivity model						
Unadjusted	0.049	0.051	0.891	0.880	53,647	54,278
Adjusted						

Note. Adjusted models for the US sample did not converge, thus values are not available.

3.2.3. Depression and anxiety as parallel mediators

Upon including anxiety as a parallel mediator in the model (Fig. 3), we found that depression remained a significant albeit small pathway (Singapore: unadjusted $\beta = -0.28$, *b* [95 % CI] = −0.01 [−0.05, 0.02]; adjusted $\beta = -0.18$, *b* [95 % CI] = −0.02 [−0.06, 0.02]; US: $\beta = 0.26$, *b* [95 % CI] = 0.18 [0.13, 0.24]; Table 4), such that higher levels of

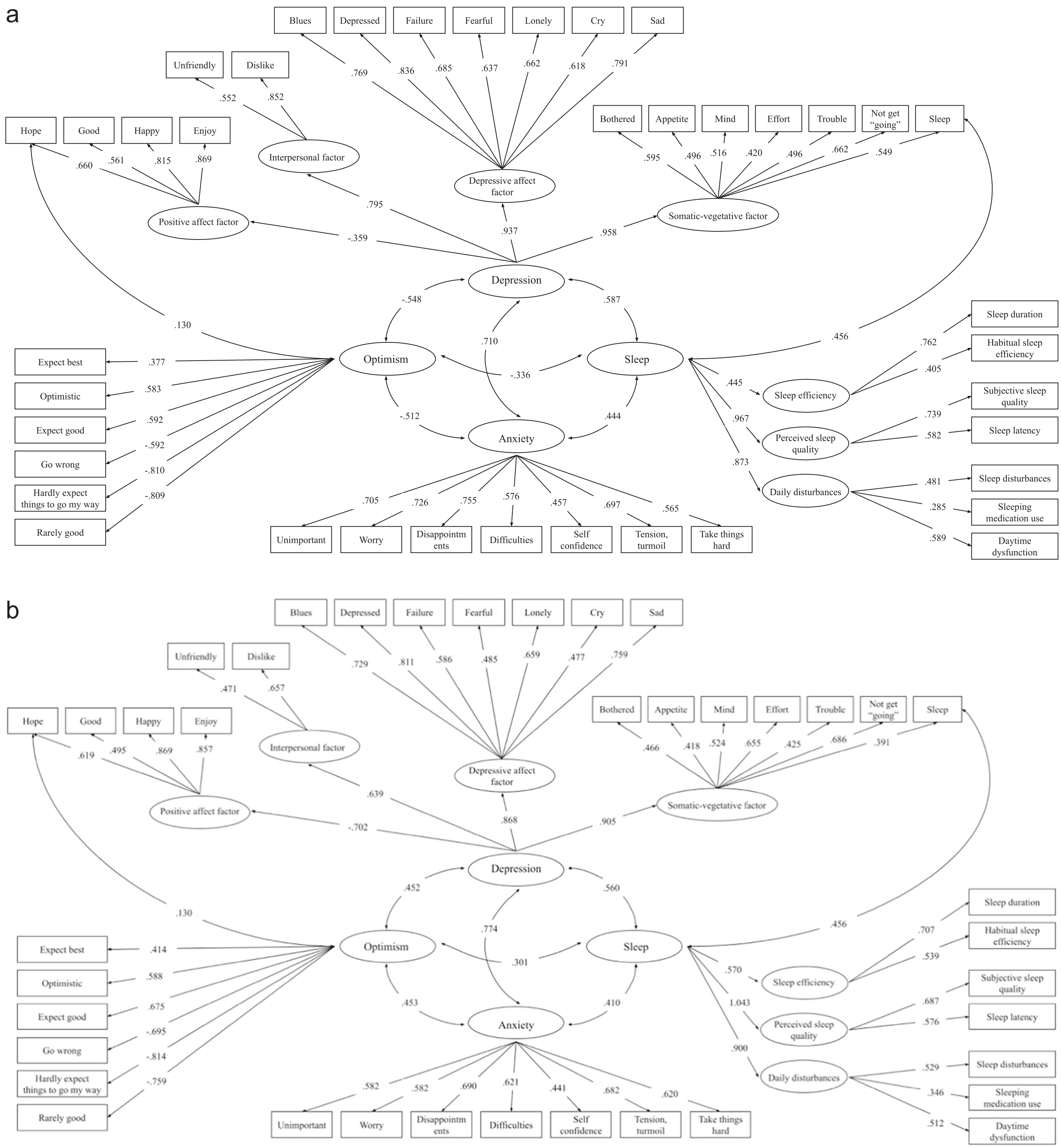

Fig. 4. a. Measurement model with residual correlations in Singapore sample.
Note. $N = 1010$. All estimates refer to standardised estimates. All estimates were statistically significant with $ps < .001$.
b. Measurement model with residual correlations in US sample.
Note. $N = 1302$. All estimates refer to standardised estimates. All estimates were statistically significant with $ps < .001$.

optimism were associated with better overall sleep, consistent with previous results. These results also imply that the depression pathway remains relevant even after accounting for shared variance with anxiety, consistent with our hypothesis.

More importantly, the pathway through anxiety was statistically non-significant (Table 4). These results suggest that the inclusion of the anxiety pathway does not provide significant incremental explanatory power of the optimism-sleep association above and beyond depression.

3.3. Sensitivity analyses

When probing the three sleep factors (Fig. 5), results differed slightly between the Singapore and US samples. In the Singapore sample, both the unadjusted and adjusted models displayed good fit according to

Table 4
Results of main mediation analyses on subjective sleep.

Pathway	Singapore (unadjusted) $N = 1010$		Singapore (adjusted) $N = 1010$		US (unadjusted) $N = 1302$	
	β	*b* [95 % CI]	β	*b* [95 % CI]	β	*b* [95 % CI]
Without anxiety						
Depression	**−0.29**	**−0.95 [−1.17, −0.75]**	**−0.29**	**−0.20 [−0.28, −0.14]**	**0.23**	**0.16 [0.12, 0.20]**
Residual direct	**−0.07**	**−0.05 [−0.11, −0.01]**	−0.05	−0.03 [−0.09, 0.03]	0.07	0.05 [0.00, 0.09]
Total	**−0.36**	**−0.25 [−0.34, −0.17]**	**−0.34**	**−0.34 [−0.32, −0.16]**	**0.29**	**0.20 [0.15, 0.26]**
With anxiety						
Depression	**−0.28**	**−0.20 [−0.27, −0.13]**	**−0.18**	**−0.28 [−0.27, −0.13]**	**0.26**	**0.18 [0.13, 0.24]**
Anxiety	−0.02	−0.01 [−0.05, 0.02]	−0.02	−0.02 [−0.06, 0.02]	−0.04	−0.03 [−0.06, 0.01]
Residual direct	−0.06	−0.04 [−0.10, 0.01]	−0.04	−0.03 [−0.09, 0.04]	**0.07**	**0.05 [0.01, 0.10]**
Total	**−0.37**	**−0.26 [−0.34, −0.17]**	**−0.34**	**−0.24 [−0.33, −0.16]**	**0.30**	**0.21 [0.15, 0.26]**

Note. β = standardised coefficient. *b* [95 % CI] = unstandardised coefficient [95 % Monte Carlo confidence interval of the unstandardised coefficient]. Bolded values reflect statistically significant pathways. Sleep measures were coded such that higher scores reflect poorer sleep quality.

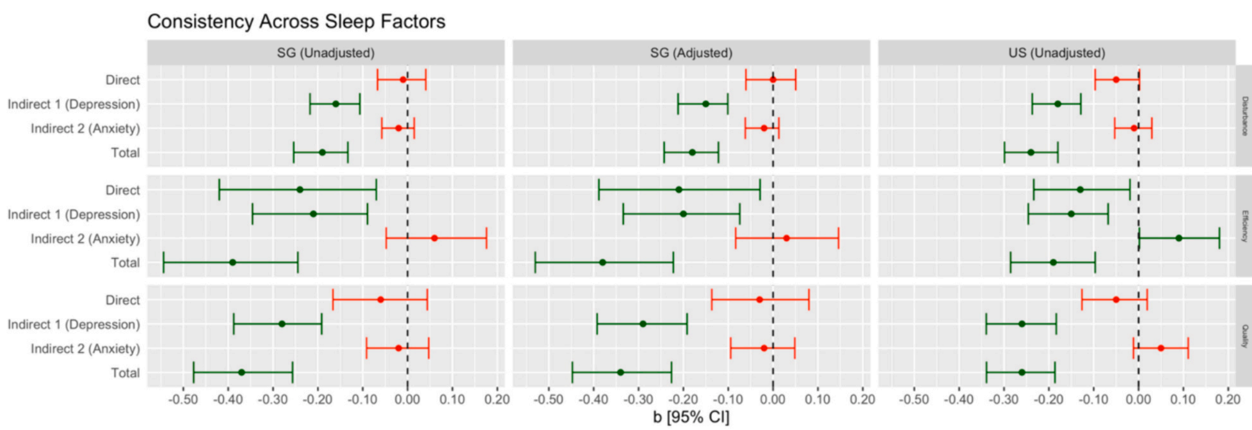

Fig. 5. Consistency of results across subjective sleep factors.
Note. $N_{\text{Singapore}} = 1010$, $N_{\text{US}} = 1302$. Plot reflects unstandardised estimates. Sleep measures were coded such that lower scores indicate better sleep.

RMSEA and SRMR, and close to good fit according to CFI and TLI (Table 3). Model comparisons between the two models were inconsistent; AIC was lower for the adjusted model, which BIC values were lower for unadjusted model (Table 3). In the US sample, as with previous models, the unadjusted model displayed good fit according to RMSEA and SRMR, and close to good fit according to CFI and TLI (Table 3), while the adjusted model failed to converge.

Mediation pathways through depression were congruent across the three sleep factors and across both samples: we consistently found evidence that depression was a significant mediator to a small to large extent (Singapore βs = [−0.32, −0.12]; US βs = [−0.32, −0.13]), such that as levels of optimism increased, scores on all three sleep factors decreased (i.e., sleep was better) through the association with depression. Mediation pathways through anxiety were inconsistent across the three sleep factors and across both samples: we consistently failed to find evidence for any mediation through anxiety in the Singapore sample, but found that anxiety did mediate the optimism-sleep relationship for one factor of sleep (Fig. 5). Of note, the residual direct association between optimism and each sleep factor was not consistent across the three sleep factors across both samples; the patterns are illustrated in Fig. 5.

3.4. Interim discussion

In line with the existing literature, we found that dispositional optimism and subjective measures of sleep were consistently related—with magnitudes ranging from small to large depending on how sleep was operationalised—such that participants who were higher in optimism reported better sleep than participants who were lower in optimism. We also found that depression, but not anxiety, robustly mediated the relationship from optimism onto sleep. In light of potential discrepancies between subjective and objective measures of sleep quality (Grandner et al., 2006; O'Donnell et al., 2009), we sought to further examine the mediating pathways using objective measures of sleep.

4. Results for objective sleep indices

4.1. Measurement models

Like for subjective sleep, both the initial measurement model (without any residual correlations) and the second measurement model (with two residual correlations) displayed good fit according to RMSEA and SRMR, and close to good fit according to CFI and TLI (Table 3). Model comparisons by AIC and BIC were consistent in suggesting that the model with residual correlations was more appropriate, and thus this model was retained for further analyses. All factor loadings and latent inter-correlations were all statistically significant with all $ps < 0.001$ (Fig. 6).

4.2. Structural models

With the measurement model with residual correlations as a starting point, we tested our hypotheses on objective sleep through a series of structural equation models (Table 3). Both the unadjusted models—without and with anxiety—displayed good fit according to RMSEA and SRMR, and close to good fit according to CFI and TLI. However, the adjusted models faced convergence failures and thus were discarded from current analyses. We found that all paths relating dispositional optimism to overall sleep were not statistically significant (Table 5), inconsistent with our hypotheses.

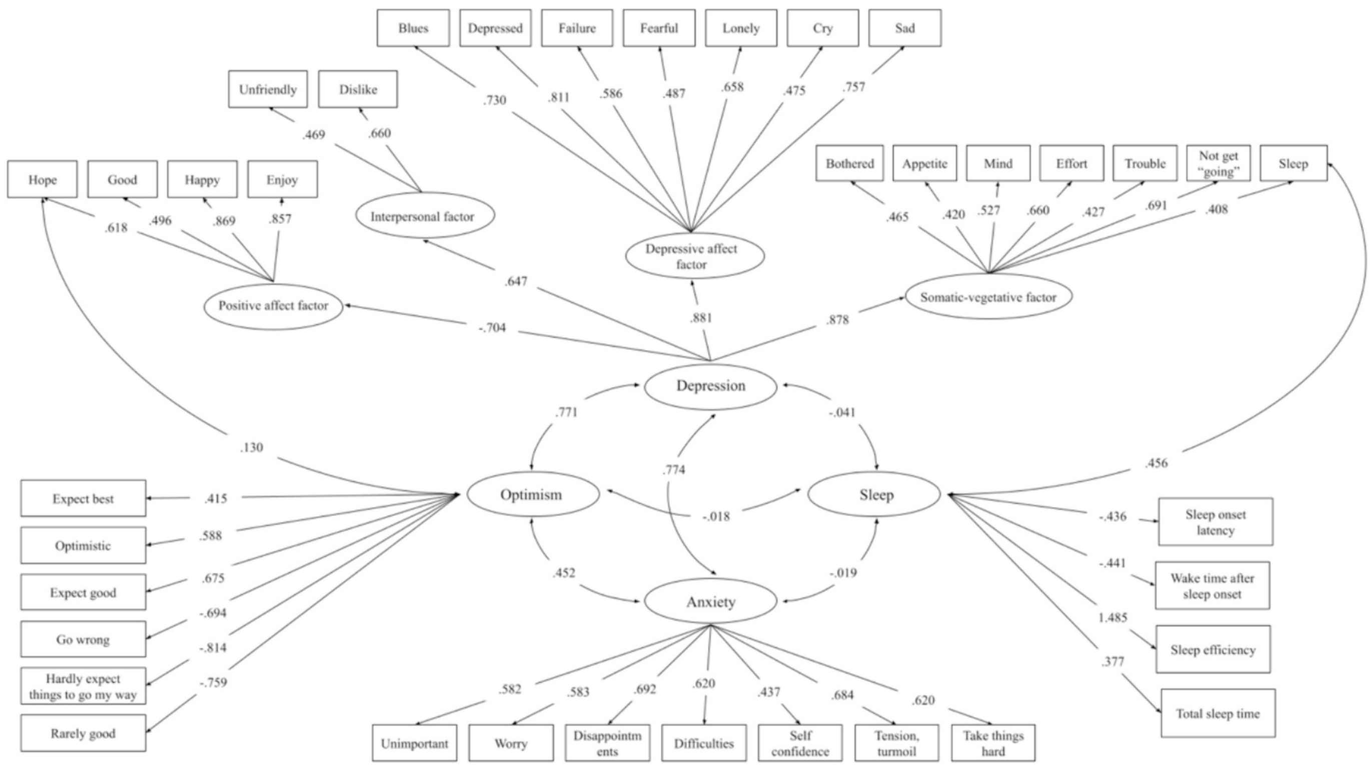

Fig. 6. Measurement model with residual correlations in US sample.
Note. $N = 742$. All estimates refer to standardised estimates. All estimates were statistically significant with $ps < .001$.

Table 5
Results of main mediation analyses on objective sleep in US sample.

Pathway	US (unadjusted) $N = 742$	
	β	b [95 % CI]
Without anxiety		
Depression	0.02	0.05 [0.00, 0.10]
Residual direct	0.00	0.00 [−0.11, 0.10]
Total	0.02	0.05 [−0.05, 0.14]
With anxiety		
Depression	0.03	0.08 [0.00, 0.17]
Anxiety	−0.01	−0.04 [−0.14, 0.05]
Residual direct	0.00	0.01 [−0.10, 0.12]
Total	0.02	0.05 [−0.05, 0.14]

Note. β = standardised coefficient. b [95 % CI] = unstandardised coefficient [95 % Monte Carlo confidence interval of the unstandardised coefficient]. Sleep measures were coded such that higher scores reflect poorer sleep quality.

4.3. Sensitivity analyses

When probing the four sleep indicators (Fig. 7), the unadjusted model displayed good fit according to RMSEA and SRMR, and close to good fit according to CFI and TLI (Table 2). Consistent with the main analysis, the unadjusted model faced convergence failures.

We observed no evidence for any associations between optimism and objective total sleep time, whether in totality, or in terms of the indirect or residual direct associations. In contrast, the total association and residual direct association between optimism and each of the remaining objective sleep indicators consistently showed that higher levels of optimism were associated with better objective sleep (i.e., higher efficiency, lower onset latency, and lower wake after sleep onset), as well as through depression. In contrast, we also consistently observed that the indirect association through anxiety was in the opposite condition; that is, higher levels of optimism were associated with poorer, not better, objective sleep through anxiety. The exact patterns are illustrated in Fig. 7.

5. General discussion

Previous studies have consistently found a small to large positive relationship between dispositional optimism and subjective sleep (Hernandez et al., 2020; Lau et al., 2015, 2017; Uchino et al., 2017). Nonetheless, comprehensive empirical works investigating the underlying mechanisms remain limited, in addition to a notable reliance on subjective sleep measurements. Additionally, there was the issue of content overlap in measures relevant to the variables in question. Thus, we sought to address the highlighted theoretical and methodological issues by introducing trait anxiety as an additional mediator, incorporating an objective sleep measure, and employing latent variable analysis to address content overlap.

Across two studies, we examined the associations between dispositional optimism and sleep through a sample of 1010 young adults in the Singapore sample and 1302 midlife and older adults in the US sample. In line with prevailing research on dispositional optimism and subjective sleep (Hernandez et al., 2020; Lau et al., 2015, 2017; Lemola et al., 2011; Uchino et al., 2017), we found that individuals higher in dispositional optimism reported better subjective sleep from both the Singapore young adult (β = −0.31) and US adult samples (β = −0.23) suggesting that the relationship is consistent across the two cultures and across age groups spanning adulthood. In other works, dispositional optimism has been found to be associated with better subjective sleep in a sample of adults from Hong Kong (cross-lagged $r = -0.18$; Lau et al., 2015), middle to older-aged adults in the US (zero-order $r = -0.45$, covariate-adjusted β = −0.41; Uchino et al., 2017), young adults in the

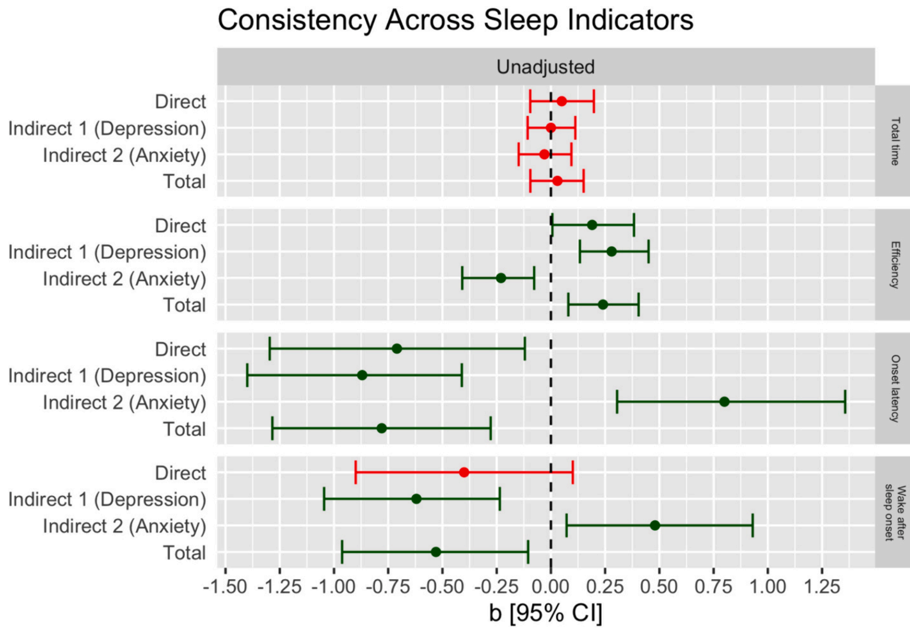

Fig. 7. Consistency of results across objective sleep indicators.
Note. Plot reflects unstandardised estimates. Higher total sleep time, higher efficiency, lower onset latency, and lower wake after sleep onset are indicative of better sleep.

US (cross-sectional OR = 3.58, longitudinal OR = 1.73; Hernandez et al., 2020), and Finnish children (optimism-sleep latency β = −0.15[6]; Lemola et al., 2011). These consistent findings, combined with our observations in both Singapore young adults and US midlife and older adults, underscore the potential pervasiveness of the positive association between dispositional optimism on sleep across a diverse range of samples.

A noteworthy finding of our study was the mediating role of depression in the relationship between dispositional optimism and sleep. This mediation was consistent across both Singapore and US samples in the current study. Earlier empirical studies align with this observation: it has been suggested that elevated dispositional optimism is inversely associated with depression, which in turn has a positive association with improved sleep (Lau et al., 2015, 2017; Uchino et al., 2017). The mechanism postulated is that individuals with higher levels of dispositional optimism tend to employ proactive coping strategies and are more likely to seek social support during stressful events, which can potentially mitigate depressive symptoms (Ironson et al., 2005; Tindle et al., 2012). In contrast, reduced dispositional optimism is associated with negative cognitive patterns that can accentuate depressive symptoms. Given the well-documented association between depression and sleep disturbances (Harvey, 2002), the robustness of depression as a mediator in our study, across two distinct samples, further underscores its role as the mechanism underlying the relationship between optimism and sleep.

More importantly, the mediating role of depression remained robust even after accounting for item content overlap in our structural equation model, conferring greater confidence that the depression mediation supported in previous studies (e.g., Uchino et al., 2017) was not simply due to confounds in measurement scales. While we attempted to control for the conceptual overlap between optimism and the optimism item in the CES—D, we acknowledge that optimism is, to an extent, integrated within the CES-D due to the optimism item overlapping partly with the common factor.

In both the Singapore and US sample, trait anxiety did not significantly mediate the relationship between dispositional optimism and subjective sleep. Trait anxiety is primarily characterized by physiological hyperarousal, as noted by Clark and Watson (1991). Since dispositional optimism involves a generalized expectation of positive outcomes, it may not significantly alter the physiological arousal that comes with trait anxiety. Therefore, while trait anxiety can disrupt sleep through physiological mechanisms, optimism might not sufficiently modulate these physiological responses to affect sleep markedly. On the other hand, depression is characterized by a lack of positive affect, and dispositional optimism could likely act as a buffer by increasing levels of positive affect as have been shown in previous studies (Schütz & Baumeister, 2017; Segerstrom et al., 2017). However, it is also essential to recognize that the absence of statistical significance in one pathway does not automatically infer a greater or lesser importance compared to the other pathway. Further research exploring the nuances of these associations is warranted to provide a comprehensive understanding of the complex interplay between depression and anxiety.

A striking contrast between the objective and subjective sleep results was also observed in the current study. While our results found support for the dispositional optimism and subjective sleep association, this was inconsistent with objective sleep findings. The incongruent results reflected are in line with previous literature suggesting that the constructs of objective and subjective sleep do not correlate well with each other (e.g., Grandner et al., 2006; O'Donnell et al., 2009). More importantly, this raises concerns regarding the robustness of the dispositional optimism and sleep association. This discrepancy suggests that dispositional optimism may be linked to perceptual or cognitive evaluations of sleep, rather than inducing tangible physiological changes that improve sleep. A possible explanation is that individuals with higher levels of dispositional optimism may employ cognitive mechanisms, such as positive reinterpretation of events (Fontaine et al., 1993), that allow them to perceive their sleep as more restful or satisfactory, even when objective measures suggest otherwise. While subjective sleep assessments provide insight into the sleeper's personal perception of their rest, and objective assessments offer data free from personal bias, both types of measures are valid nonetheless and should be used in conjunction for a holistic assessment of sleep.

Our study is not without limitations. The analyses in both samples

[6] The association between optimism and sleep efficiency was non-significant (β = 0.07, p = 0.265).

utilised a cross-sectional analytic design, which not only limits causal interpretation of our findings, but also allows for possible bidirectional relationships as suggested in previous studies (e.g., Lau et al., 2015). Therefore, future studies can employ longitudinal or lagged designs where each variable is measured over a span of time or measured at different time points respectively, to establish temporal precedence. Nevertheless, the current work builds upon the growing body of evidence supporting the association between optimism and sleep. We identified depression as an important mechanism underlying the association between dispositional optimism and subjective sleep. More importantly, we found that the association between dispositional optimism and subjective sleep does not translate to similar results with objective sleep. In conclusion, while our findings elucidate the interplay between dispositional optimism, depression, and subjective sleep, there remains a need for further temporal investigations and the usage of objective sleep measures to deepen our understanding.

CRediT authorship contribution statement

Nicole R.Y. Chen: Writing – review & editing, Writing – original draft, Supervision, Investigation, Conceptualization. **Nadyanna M. Majeed:** Writing – review & editing, Supervision, Methodology, Formal analysis, Data curation, Conceptualization, Writing – original draft. **Adalia Y.H. Goh:** Formal analysis, Methodology, Validation, Writing – review & editing. **Paye Shin Koh:** Writing – review & editing, Methodology, Formal analysis. **Jonathan L. Chia:** Writing – review & editing, Methodology. **Andree Hartanto:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization.

Declaration of competing interest

Data collection for Study 1 was supported by grants awarded to Andree Hartanto by the Singapore Management University through research grants from the Ministry of Education Academy Research Fund Tier 1 (20-C242-SMU-001; 21-SOSS-SMU-023; 22-SOSS-SMU-041) and Lee Kong Chain Fund for Research Excellence. Data collection for the MIDUS Refresher Project (P01AG020166) and the MIDUS Refresher Biomarker Project (5P01AG020166) were supported by the National Institute on Aging. The MIDUS 3 Baseline Project (P01AG020166) and the MIDUS 3 Biomarker Project (U19AG051426) were supported by the National Institute on Aging. The MIDUS 3 Biomarker Project was further supported by the NIH National Center for Advancing Translational Sciences Clinical and Translational Science Award (1UL1RR025011; UL1TR001881; UL1TR001409). The funding bodies had no role in the design of the study and collection, analysis, and interpretation of data and in writing the manuscript.

Data availability

Data is shared in the publicly available Researchbox, and the link is provided in the Methods section.

References

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy white women. *Health Psychol., 19*(6), 586–592. https://doi.org/10.1037//0278-6133.19.6.586

Andrews, P. W., & Thomson, J. A. (2009). The bright side of being blue: Depression as an adaptation for analyzing complex problems. *Psychol. Rev., 116*(3), 620–654. https://doi.org/10.1037/a0016242

Anthony, E. J. (1987). Risk, vulnerability, and resilience: An overview. In *The invulnerable child* (pp. 3–48). The Guilford Press.

Aspinwall, L. G., & Taylor, S. E. (1997). A stitch in time: Self-regulation and proactive coping. *Psychol. Bull., 121*(3), 417–436. https://doi.org/10.1037/0033-2909.121.3.417

Assad, K. K., Donnellan, M. B., & Conger, R. D. (2007). Optimism: An enduring resource for romantic relationships. *J. Pers. Soc. Psychol., 93*(2), 285–297. https://doi.org/10.1037/0022-3514.93.2.285

August, K. J. (2022). Marital status, marital transitions, and sleep quality in mid to late life. *Research on Aging, 44*(3–4), 301–311. https://doi.org/10.1177/01640275211027281

Bieling, P. J., Antony, M. M., & Swinson, R. P. (1998). The State–Trait Anxiety Inventory, Trait version: Structure and content re-examined. Behav. Res. Ther., 36(7–8), 777–788. doi:https://doi.org/10.1016/S0005-7967(98)00023-0.

Birrell, P. C. (1983). Behavioral, subjective, and electroencephalographic indices of sleep onset latency and sleep duration. *J. Behav. Assess., 5*(3), 179–190. https://doi.org/10.1007/BF01322146

Bollen, K. A., & Long, J. S. (Eds.). (1993). *Testing structural equation models*. Sage Publications.

Bradley, A. (2016). *Trait and state anxiety: Assessment, predictors and outcomes*. Nova Science Publishers, Inc.

Buysse, D. J., Reynolds, C. F., 3rd, Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research, 28*(2), 193–213. https://doi.org/10.1016/0165-1781(89)90047-4

Calhoun, P. S., Wiley, M., Dennis, M. F., Means, M. K., Edinger, J. D., & Beckham, J. C. (2007). Objective evidence of sleep disturbance in women with posttraumatic stress disorder. *J. Trauma. Stress., 20*(6), 1009–1018. https://doi.org/10.1002/jts.20255

Carnethon, M. R., De Chavez, P. J., Zee, P. C., Kim, K.-Y. A., Liu, K., Goldberger, J. J., … Knutson, K. L. (2016). Disparities in sleep characteristics by race/ethnicity in a population-based sample: Chicago Area Sleep Study. *Sleep Med., 18*, 50–55. https://doi.org/10.1016/j.sleep.2015.07.005

Carpenter, J. S., & Andrykowski, M. A. (1998). Psychometric evaluation of the Pittsburgh Sleep Quality Index. *J. Psychosom. Res., 45*(1), 5–13. https://doi.org/10.1016/S0022-3999(97)00298-5

Chakrabarti, A., & Ghosh, J. K. (2011). AIC, BIC and recent advances in model selection. In *Philosophy of statistics* (pp. 583–605). Elsevier. https://doi.org/10.1016/B978-0-444-51862-0.50018-6.

Chan, D. (2009). So why ask me? Are self-report data really that bad?. In *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences* (pp. 309–336). Routledge/Taylor & Francis Group.

Chen, K. (2021, May). A network analysis of the Pittsburgh Sleep Questionnaire Index and Center for Epidemic Survey Depression. In *2021 APS Virtual Convention*.

Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *J. Abnorm. Psychol., 100*(3), 316–336. https://doi.org/10.1037/0021-843X.100.3.316

Cohler, B. J. (1987). Adversity, resilience, and the study of lives. In *The invulnerable child* (pp. 363–424). The Guilford Press.

Cole, J. C., Motivala, S. J., Buysse, D. J., Oxman, M. N., Levin, M. J., & Irwin, M. R. (2006). Validation of a 3-factor scoring model for the Pittsburgh Sleep Quality Index in older adults. *Sleep: Journal of Sleep and Sleep Disorders Research, 29*(1), 112–116. https://doi.org/10.1093/sleep/29.1.112

Conway, F., Magai, C., Springer, C., & Jones, S. C. (2008). Optimism and pessimism as predictors of physical and psychological health among grandmothers raising their grandchildren. *J. Res. Pers., 42*(5), 1352–1357. https://doi.org/10.1016/j.jrp.2008.03.011

Cosco, T. D., Prina, M., Stubbs, B., & Wu, Y.-T. (2017). Reliability and validity of the Center for Epidemiologic Studies Depression Scale in a population-based cohort of middle-aged U.S. *adults. Journal of Nursing Measurement, 25*(3), 476–485. https://doi.org/10.1891/1061-3749.25.3.476

Danner, D. D., Snowdon, D. A., & Friesen, W. V. (2001). Positive emotions in early life and longevity: Findings from the nun study. *J. Pers. Soc. Psychol., 80*(5), 804–813.

Dunleavy, B., Tonon, C., Cheung, S., Christopoulos, V., & Car.. (2019). Examining the factor structure of the Pittsburgh Sleep Quality Index in a multi-ethnic working population in Singapore. *Int. J. Environ. Res. Public Health, 16*(23), 4590. https://doi.org/10.3390/ijerph16234590

Ebrecht, M., Hextall, J., Kirtley, L.-G., Taylor, A., Dyson, M., & Weinman, J. (2004). Perceived stress and cortisol levels predict speed of wound healing in healthy male adults. *Psychoneuroendocrinology, 29*(6), 798–809. https://doi.org/10.1016/S0306-4530(03)00144-6

Edinger, J. D., Fins, A. I., Glenn, D. M., Sullivan, R. J., Jr., Bastian, L. A., Marsh, G. R., … Vasilas, D. (2000). Insomnia and the eye of the beholder: Are there clinical markers of objective sleep disturbances among adults with and without insomnia complaints? *J. Consult. Clin. Psychol., 68*(4), 586–593. https://doi.org/10.1037/0022-006X.68.4.586

Eysenck, M. W., & Fajkowska, M. (2018). Anxiety and depression: Toward overlapping and distinctive features. *Cognit. Emot., 32*(7), 1391–1400. https://doi.org/10.1080/02699931.2017.1330255

Fischer, I. C., Cripe, L. D., & Rand, K. L. (2018). Predicting symptoms of anxiety and depression in patients living with advanced cancer: The differential roles of hope and optimism. *Support. Care Cancer, 26*(10), 3471–3477. https://doi.org/10.1007/s00520-018-4215-0

Fontaine, K. R., Manstead, A. S. R., & Wagner, H. (1993). Optimism, perceived control over stress, and coping. *Eur. J. Personal., 7*(4), 267–281. https://doi.org/10.1002/per.2410070407

Forbes, E. E., Bertocci, M. A., Gregory, A. M., Ryan, N. D., Axelson, D. A., Birmaher, B., & Dahl, R. E. (2008). Objective sleep in pediatric anxiety disorders and major depressive disorder. *J. Am. Acad. Child Adolesc. Psychiatry, 47*(2), 148–155. https://doi.org/10.1097/chi.0b013e31815cd9bc

Fredrickson, B., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognit. Emot., 12*(2), 191–220. https://doi.org/10.1080/026999398379718

Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philos. Trans. R. Soc. Lond. Ser. B Biol. Sci., 359*(1449), 1367–1378. https://doi.org/10.1098/rstb.2004.1512

Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychol. Sci., 13*(2), 172–175. https://doi.org/10.1111/1467-9280.00431

Fredrickson, B. L., Mancuso, R. A., Branigan, C., & Tugade, M. M. (2000). The undoing effect of positive emotions. *Motiv. Emot., 24*(4), 237–258. https://doi.org/10.1023/A:1010796329158

Friedman, E. M., Love, G. D., Rosenkranz, M. A., Urry, H. L., Davidson, R. J., Singer, B. H., & Ryff, C. D. (2007). Socioeconomic status predicts objective and subjective sleep quality in aging women. *Psychosom. Med., 69*(7), 682–691. https://doi.org/10.1097/PSY.0b013e31814ceada

Funder, D. C., & Ozer, D. J. (2019). Evaluating effect size in psychological research: Sense and nonsense. *Adv. Methods Pract. Psychol. Sci., 2*(2), 156–168. https://doi.org/10.1177/2515245919847202

Gangwisch, J. E., Malaspina, D., Boden-Albala, B., & Heymsfield, S. B. (2005). Inadequate sleep as a risk factor for obesity: Analyses of the NHANES I. *Sleep, 28*(10), 1289–1296. https://doi.org/10.1093/sleep/28.10.1289

Gellis, L. A., Lichstein, K. L., Scarinci, I. C., Durrence, H. H., Taylor, D. J., Bush, A. J., & Riedel, B. W. (2005). Socioeconomic status and insomnia. *J. Abnorm. Psychol., 114*(1), 111–118. https://doi.org/10.1037/0021-843X.114.1.111

Goh, A. Y. H., Chia, S. M., Majeed, N. M., Chen, N. R. Y., & Hartanto, A. (2023). Untangling the additive and multiplicative relations between natural scenery exposure and human-animal interaction on affective well-being: Evidence from daily diary studies. *Sustainability, 15*(4), 2910. https://doi.org/10.3390/su15042910

Grandner, M. A., Kripke, D. F., Yoon, I.-Y., & Youngstedt, S. D. (2006). Criterion validity of the Pittsburgh Sleep Quality Index: Investigation in a non-clinical sample. *Sleep Biol. Rhythms, 4*(2), 129–136. https://doi.org/10.1111/j.1479-8425.2006.00207.x

Grandner, M. A., Williams, N. J., Knutson, K. L., Roberts, D., & Jean-Louis, G. (2016). Sleep disparity, race/ethnicity, and socioeconomic position. *Sleep Med., 18*, 7–18. https://doi.org/10.1016/j.sleep.2015.01.020

Grupe, D. W., & Nitschke, J. B. (2013). Uncertainty and anticipation in anxiety: An integrated neurobiological and psychological perspective. *Nat. Rev. Neurosci., 14*(7), 488–501. https://doi.org/10.1038/nrn3524

Hall, M., Buysse, D. J., Nofzinger, E. A., Reynolds, C. F., Thompson, W., Mazumdar, S., & Monk, T. H. (2008). Financial strain is a significant correlate of sleep continuity disturbances in late-life. *Biol. Psychol., 77*(2), 217–222. https://doi.org/10.1016/j.biopsycho.2007.10.012

Harvey, A. G. (2002). A cognitive model of insomnia. *Behav. Res. Ther., 40*(8), 869–893. https://doi.org/10.1016/S0005-7967(01)00061-4

Hawkley, L. C., & Cacioppo, J. T. (2004). Stress and the aging immune system. *Brain Behav. Immun., 18*(2), 114–119. https://doi.org/10.1016/j.bbi.2003.09.005

Hernandez, R., Vu, T.-H. T., Kershaw, K. N., Boehm, J. K., Kubzansky, L. D., Carnethon, M., … Liu, K. (2020). The association of optimism with sleep duration and quality: Findings from the coronary artery risk and development in young adults (CARDIA) study. *Behav. Med., 46*(2), 100–111. https://doi.org/10.1080/08964289.2019.1575179

Ho, M. Y., Cheung, F. M., & Cheung, S. F. (2010). The role of meaning in life and optimism in promoting well-being. *Personal. Individ. Differ., 48*(5), 658–663. https://doi.org/10.1016/j.paid.2010.01.008

Horváth, A., Montana, X., Lanquart, J.-P., Hubain, P., Szűcs, A., Linkowski, P., & Loas, G. (2016). Effects of state and trait anxiety on sleep structure: A polysomnographic study in 1083 subjects. *Psychiatry Res., 244*, 279–283. https://doi.org/10.1016/j.psychres.2016.03.001

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Model. Multidiscip. J., 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Huang, P.-H. (2017). Asymptotics of AIC, BIC, and RMSEA for model selection in structural equation modeling. *Psychometrika, 82*(2), 407–426. https://doi.org/10.1007/s11336-017-9572-y

Ironson, G., Balbin, E., Stuetzle, R., Fletcher, M. A., O'Cleirigh, C., Laurenceau, J. P., … Solomon, G. (2005). Dispositional optimism and the mechanisms by which it predicts slower disease progression in HIV: Proactive behavior, avoidant coping, and depression. *International Journal of Behavioral Medicine, 12*(2), 86–97. https://doi.org/10.1207/s15327558ijbm1202_6

Jiménez-Genchi, A., Monteverde-Maldonado, E., Nenclares-Portocarrero, A., Esquivel-Adame, G., & de la Vega-Pacheco, A. (2008). Reliability and factorial analysis of the Spanish version of the Pittsburg Sleep Quality Index among psychiatric patients. *Gaceta Medica De Mexico, 144*(6), 491–496.

Johnson-laird, P. N., & Oatley, K. (1989). The language of emotions: An analysis of a semantic field. *Cognit. Emot., 3*(2), 81–123. https://doi.org/10.1080/02699938908408075

Jorgensen, T., Pornprasertmanit, S., Schoemann, A., & Rosseel, Y. (2022). semTools: Useful tools for structural equation modeling (R package version 0.5-6). https://CRAN.R-project.org/package=semTools (computer software).

Kim, A., Lee, J. A., & Park, H. S. (2018). Health behaviors and illness according to marital status in middle-aged Koreans. *J. Public Health, 40*(2), e99–e106. https://doi.org/10.1093/pubmed/fdx071

Kim, M., Um, Y.-H., Kim, T.-W., Kim, S.-M., Seo, H.-J., Jeong, J.-H., … Hong, S.-C. (2021). Association between age and sleep quality: Findings from a community health survey. *Sleep Medicine Research, 12*(2), 155–160. https://doi.org/10.17241/smr.2021.01158

Kobayashi, I., Huntley, E., Lavela, J., & Mellman, T. A. (2012). Subjectively and objectively measured sleep with and without posttraumatic stress disorder and trauma exposure. *Sleep, 35*(7), 957–965. https://doi.org/10.5665/sleep.1960

Lau, E. Y. Y., Harry Hui, C., Cheung, S.-F., & Lam, J. (2015). Bidirectional relationship between sleep and optimism with depressive mood as a mediator: A longitudinal study of Chinese working adults. *J. Psychosom. Res., 79*(5), 428–434. https://doi.org/10.1016/j.jpsychores.2015.09.010

Lau, E. Y. Y., Hui, C. H., Lam, J., & Cheung, S.-F. (2017). Sleep and optimism: A longitudinal study of bidirectional causal relationship and its mediating and moderating variables in a Chinese student sample. *Chronobiol. Int., 34*(3), 360–372. https://doi.org/10.1080/07420528.2016.1276071

Lemola, S., Ledermann, T., & Friedman, E. M. (2013). Variability of sleep duration is related to subjective sleep quality and subjective well-being: An actigraphy study. *PLoS One, 8*(8), Article e71292. https://doi.org/10.1371/journal.pone.0071292

Lemola, S., Räikkönen, K., Scheier, M. F., Matthews, K. A., Pesonen, A.-K., Heinonen, K., … Kajantie, E. (2011). Sleep quantity, quality and optimism in children: Sleep and optimism in children. *J. Sleep Res., 20*(1pt1), 12–20. https://doi.org/10.1111/j.1365-2869.2010.00856.x

Lichstein, K. L., Hoelscher, T. J., Eakin, T. L., & Nickel, R. (1983). Empirical sleep assessment in the home: A convenient, inexpensive approach. *J. Behav. Assess., 5*(2), 111–118. https://doi.org/10.1007/BF01321443

Lin, L.-C., Huang, P.-H., & Weng, L.-J. (2017). Selecting path models in SEM: A comparison of model selection criteria. *Struct. Equ. Model. Multidiscip. J., 24*(6), 855–869. https://doi.org/10.1080/10705511.2017.1363652

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behav. Res. Ther., 33*(3), 335–343. https://doi.org/10.1016/0005-7967(94)00075-U

Lu, Z.-H., Chow, S.-M., & Loken, E. (2017). A comparison of Bayesian and frequentist model selection methods for factor analysis models. *Psychol. Methods, 22*(2), 361–381. https://doi.org/10.1037/met0000145

Madrid-Valero, J. J., Martínez-Selva, J. M., Ribeiro Do Couto, B., Sánchez-Romera, J. F., & Ordoñana, J. R. (2017). Age and gender effects on the prevalence of poor sleep quality in the adult population. *Gac. Sanit., 31*(1), 18–22. https://doi.org/10.1016/j.gaceta.2016.05.013

Magee, C. A., Caputi, P., Iverson, D. C., & Huang, X.-F. (2008). An investigation of the dimensionality of the Pittsburgh Sleep Quality Index in Australian adults. *Sleep Biol. Rhythms, 6*(4), 222–227. https://doi.org/10.1111/j.1479-8425.2008.00371.x

Majeed, N. M., Kasturiratna, K. T. A. S., Li, M. Y., Chia, J. L., Lua, V. Y. Q., & Hartanto, A. (2023a). COVID-19 stress and cognitive failures in daily life: A multilevel examination of within- and between-persons patterns. *Journal of Pacific Rim Psychology, 17*. https://doi.org/10.1177/18344909231208119

Majeed, N. M., Kasturiratna, K. T. A. S., Lua, V. Y. Q., & Hartanto, A. (2023b). Discrimination and cognitive failures in Singapore and the US: An investigation of between- and within-persons associations through multilevel modelling. *International Journal of Intercultural Relations, 94*, 1–12. https://doi.org/10.1016/j.ijintrel.2023.101805

Majeed, N. M., Tan, J. J. X., Tov, W., & Hartanto, A. (2021). Dispositional optimism as a buffer against emotional reactivity to daily stressors: A daily diary approach. *J. Res. Pers., 93*, Article 104105. https://doi.org/10.1016/j.jrp.2021.104105

Manzar, M. D., BaHammam, A. S., Hameed, U. A., Spence, D. W., Pandi-Perumal, S. R., Moscovitch, A., & Streiner, D. L. (2018). Dimensionality of the Pittsburgh Sleep Quality Index: A systematic review. *Health Qual. Life Outcomes, 16*(1), 89. https://doi.org/10.1186/s12955-018-0915-x

Meers, J., Stout-Aguilar, J., & Nowakowski, S. (2019). Sex differences in sleep health. In *Sleep and health* (pp. 21–29). Elsevier. https://doi.org/10.1016/B978-0-12-815373-4.00003-4.

Mezick, E. J., Matthews, K. A., Hall, M., Strollo, P. J., Jr., Buysse, D. J., Kamarck, T. W., … Reis, S. E. (2008). Influence of race and socioeconomic status on sleep: Pittsburgh SleepSCORE Project. *Psychosom. Med., 70*(4), 410–416. https://doi.org/10.1097/PSY.0b013e31816fdf21

Mohanty, M. S. (2010). Effects of positive attitude and optimism on employment: Evidence from the US data. *J. Socio-Econ., 39*(2), 258–270. https://doi.org/10.1016/j.socec.2009.12.004 (psyh).

Mohanty, M. S. (2012). Effects of positive attitude and optimism on wage and employment: A double selection approach. *J. Socio-Econ., 41*(3), 304–316. https://doi.org/10.1016/j.socec.2012.01.004 (psyh).

Neff, L. A., & Geers, A. L. (2013). Optimistic expectations in early marriage: A resource or vulnerability for adaptive relationship functioning? *J. Pers. Soc. Psychol., 105*(1), 38–60. https://doi.org/10.1037/a0032600

Ng, M. H. S., Lua, V. Y. Q., Majeed, N. M., & Hartanto, A. (2022). Does trait self-esteem serve as a protective factor. maintaining daily affective well-being? Multilevel analyses of daily diary studies in the US and Singapore. *Personality and Individual Differences, 198*, 1–9. https://doi.org/10.1016/j.paid.2022.111804

O'Donnell, D., Silva, E. J., Münch, M., Ronda, J. M., Wang, W., & Duffy, J. F. (2009). Comparison of subjective and objective assessments of sleep in healthy older subjects without sleep complaints. *J. Sleep Res., 18*(2), 254–263. https://doi.org/10.1111/j.1365-2869.2008.00719.x

Ohayon, M. M., Carskadon, M. A., Guilleminault, C., & Vitiello, M. V. (2004). Meta-analysis of quantitative sleep parameters from childhood to old age in healthy individuals: Developing normative sleep values across the human lifespan. *Sleep, 27*(7), 1255–1273. https://doi.org/10.1093/sleep/27.7.1255

Ostir, G. V., Markides, K. S., Black, S. A., & Goodwin, J. S. (2000). Emotional well-being predicts subsequent functional independence and survival. *J. Am. Geriatr. Soc., 48*(5), 473–478. https://doi.org/10.1111/j.1532-5415.2000.tb04991.x

R Core Team. (2023). R: A language and environment for statistical computing (4.3.1). R Foundation for Statistical Computing. https://www.R-project.org/ (Computer software).

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Appl. Psychol. Meas., 1*(3), 385–401. https://doi.org/10.1177/014662167700100306
Revelle, W. (2021). *psych: Procedures for psychological, psychometric, and personality research (2.1.6) [R]*. Northwestern University.
Robles, T. F., & Carroll, J. E. (2011). Restorative biological processes and health: Restorative biological processes. *Soc. Personal. Psychol. Compass, 5*(8), 518–537. https://doi.org/10.1111/j.1751-9004.2011.00368.x
Rosseel, Y. (2012). lavaan: An *R* package for structural equation modeling. *J. Stat. Softw., 48*(2). https://doi.org/10.18637/jss.v048.i02
Ryff, C., Almeida, D., Ayanian, J., Binkley, N., Carr, D. S., Coe, C., … Williams, D. (2015). *Midlife in the United States (MIDUS 3), 2013-2014: Version 7 (Version v7) [dataset]*. https://doi.org/10.3886/ICPSR36346.V7 (object Object).
Ryff, C., Almeida, D. M., Ayanian, J. Z., Binkley, N., Carr, D. S., Coe, C., … Williams, D. R. (2017). Midlife in the United States (MIDUS Refresher 1), 2011-2014: Version 3 (Version v3) [dataset]. In *ICPSR - Interuniversity Consortium for Political and Social Research*. https://doi.org/10.3886/ICPSR36532.V3
Sadigh, M., Himmanen, S., & Scepansky, J. (2014). An investigation of the prevalence of insomnia in college students and its relationship to trait anxiety. *Coll. Stud. J., 3*(10), 397–406.
Scheier, M. F., & Carver, C. S. (1988). A model of behavioral self-regulation: Translating intention into action. In *, Vol. 21*. *Advances in experimental social psychology* (pp. 303–346). Elsevier. https://doi.org/10.1016/S0065-2601(08)60230-0.
Scheier, M. F., & Carver, C. S. (2018). Dispositional optimism and physical health: A long look back, a quick look forward. *Am. Psychol., 73*(9), 1082–1094. https://doi.org/10.1037/amp0000384
Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67*(6). https://doi.org/10.1037//0022-3514.67.6.1063. doi:1063-1078/.
Scheier, M. F., Matthews, K. A., Owens, J. F., Magovern, G. J., Lefebvre, R. C., Abbott, R. A., & Carver, C. S. (1989). Dispositional optimism and recovery from coronary artery bypass surgery: The beneficial effects on physical and psychological well-being. *J. Pers. Soc. Psychol., 57*(6), 1024–1040. https://doi.org/10.1037/0022-3514.57.6.1024
Scheier, M. F., Matthews, K. A., Owens, J. F., Schulz, R., Bridges, M. W., Magovern, G. J., & Carver, C. S. (1999). Optimism and rehospitalization after coronary artery bypass graft surgery. *Arch. Intern. Med., 159*(8), 829. https://doi.org/10.1001/archinte.159.8.829
Scheier, M. F., Weintraub, J. K., & Carver, C. S. (1986). Coping with stress: Divergent strategies of optimists and pessimists. *J. Pers. Soc. Psychol., 51*(6), 1257–1264. https://doi.org/10.1037/0022-3514.51.6.1257
Schütz, A., & Baumeister, R. F. (2017). Positive illusions and the happy mind. In M. D. Robinson, & M. Eid (Eds.), *The happy mind: Cognitive contributions to well-being* (pp. 177–193). Springer International Publishing. https://doi.org/10.1007/978-3-319-58763-9_10.
Segerstrom, S. C. (2007). Optimism and resources: Effects on each other and on health over 10 years. *J. Res. Pers., 41*(4), 772–786. https://doi.org/10.1016/j.jrp.2006.09.004
Segerstrom, S. C., Carver, C. S., & Scheier, M. F. (2017). Optimism. In M. D. Robinson, & M. Eid (Eds.), *The happy mind: Cognitive contributions to well-being* (pp. 195–212). Springer International Publishing. https://doi.org/10.1007/978-3-319-58763-9_11.
Spielberger, C. (1966). Theory and research on anxiety. In *Anxiety and behaviour* (pp. 3–16). Academic Press Inc.
Spielberger, C. D. (1983). State-trait anxiety inventory for adults. *APA PsychTests*. https://doi.org/10.1037/t06496-000
Stamatakis, K. A., Kaplan, G. A., & Roberts, R. E. (2007). Short sleep duration across income, education, and race/ethnic groups: Population prevalence and growing disparities during 34 years of follow-up. *Ann. Epidemiol., 17*(12), 948–955. https://doi.org/10.1016/j.annepidem.2007.07.096
Suh, S., Cho, N., & Zhang, J. (2018). Sex differences in insomnia: From epidemiology and etiology to intervention. *Current Psychiatry Reports, 20*(9), 69. https://doi.org/10.1007/s11920-018-0940-9
Swinkels, C. M., Ulmer, C. S., Beckham, J. C., Buse, N., the VA Mid-Atlantic MIRECC Registry Workgroup, & Calhoun, P. S. (2013). The association of sleep duration, mental health, and health risk behaviors among U.S. Afghanistan/Iraq era veterans. *Sleep, 36*(7), 1019–1025. https://doi.org/10.5665/sleep.2800
Sysoeva, Y. Y., & Verbitsky, E. V. (2015). Characteristics of sleep-related arousals depend on trait anxiety. *Dokl. Biol. Sci., 461*(1), 73–75. https://doi.org/10.1134/S0012496615020064
Tindle, H., Belnap, B. H., Houck, P. R., Mazumdar, S., Scheier, M. F., Matthews, K. A., … Rollman, B. L. (2012). Optimism, response to treatment of depression, and rehospitalization after coronary artery bypass graft surgery. *Psychosom. Med., 74*(2), 200–207. https://doi.org/10.1097/PSY.0b013e318244903f
Tryon, W. W. (1996). Nocturnal activity and sleep assessment. *Clin. Psychol. Rev., 16*(3), 197–213. https://doi.org/10.1016/0272-7358(95)00059-3
Tryon, W. W. (2004). Issues of validity in actigraphic sleep assessment. *Sleep, 27*(1), 158–165. https://doi.org/10.1093/sleep/27.1.158
Uchino, B. N., Cribbet, M., de Grey, R. G. K., Cronan, S., Trettevik, R., & Smith, T. W. (2017). Dispositional optimism and sleep quality: A test of mediating pathways. *J. Behav. Med., 40*(2), 360–365. https://doi.org/10.1007/s10865-016-9792-0
Van Den Berg, J. F., Van Rooij, F. J., Vos, H., Tulen, J. H., Hofman, A., Miedema, H. M., … Tiemeier, H. (2008). Disagreement between subjective and actigraphic measures of sleep duration in a population-based study of elderly persons. *Journal of Sleep Research, 17*(3), 295–302. https://doi.org/10.1111/j.1365-2869.2008.00638.x
Vrieze, S. I. (2012). Model selection and psychological theory: A discussion of the differences between the Akaike information criterion (AIC) and the Bayesian information criterion (BIC). *Psychol. Methods, 17*(2), 228–243. https://doi.org/10.1037/a0027127
Weeks, P., Hayley, A., & Stough, C. (2019). Do individual differences in state and trait anxiety predict sleep difficulties in healthy older adults? *Personal. Individ. Differ., 144*, 141–146. https://doi.org/10.1016/j.paid.2019.03.004
Weinstein, M., Ryff, C. D., & Seeman, T. E. (2019). Midlife in the United States (MIDUS Refresher 1): Biomarker project, 2012-2016. *Inter-university Consortium for Political and Social Research*. https://doi.org/10.3886/ICPSR36901.v6
Weitzer, J., Papantoniou, K., Lázaro-Sebastià, C., Seidel, S., Klösch, G., & Schernhammer, E. (2021). The contribution of dispositional optimism to understanding insomnia symptomatology: Findings from a cross-sectional population study in Austria. *J. Sleep Res., 30*(1). https://doi.org/10.1111/jsr.13132
Werner, E. E., & Smith, R. S. (1992). *Overcoming the odds: High risk children from birth to adulthood* (p. xiv, 280). Cornell University Press.
Whinnery, J., Jackson, N., Rattanaumpawan, P., & Grandner, M. A. (2014). Short and long sleep duration associated with race/ethnicity, sociodemographics, and socioeconomic position. *Sleep, 37*(3), 601–611. https://doi.org/10.5665/sleep.3508
Wrosch, C., & Scheier, M. F. (2003). Personality and quality of life: The importance of optimism and goal adjustment. *Qual. Life Res., 12*(1suppl), 59–72. https://doi.org/10.1023/A:1023529606137
Zavecz, Z., Nagy, T., Galkó, A., Nemeth, D., & Janacsek, K. (2020). The relationship between subjective sleep quality and cognitive performance in healthy young adults: Evidence from three empirical studies. *Sci. Rep., 10*(1), 4855. https://doi.org/10.1038/s41598-020-61627-6