Emotion

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When Feeling Good Does Not Always Help You Sleep: Cultural Moderation of the Positive Affect–Sleep Link

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Positive affect has been linked to better sleep. However, this evidence primarily comes from Western societies with a long-standing cultural tradition of prioritizing the pursuit of positivity. Here, we tested whether such benefits generalize to East Asian societies, where positive affect is less culturally valued. In these cultural contexts, individuals strive to achieve emotional balance, and thus, elevating positive emotions may not confer the same health benefits. We tested this hypothesis in two cross-cultural studies. Using large-scale surveys from American and Japanese midlife adults (N = 1,358), Study 1 examined whether culture moderates the relationship between positive affect and subjective sleep quality. As predicted, higher positive affect was associated with better subjective sleep quality among European Americans, but not among Japanese. Study 2 employed a 2-week daily diary design to examine whether European American and East Asian college students (N = 119) differ in how positive affect relates to both subjective and actigraphy-derived sleep measures. Among European Americans, higher average positive affect was associated with better subjective sleep quality and a calmer (vs. tense) mood upon awakening. By contrast, these associations were not observed among East Asians; instead, greater positive affect predicted shorter sleep duration for these individuals. Notably, these cultural differences emerged only for high-arousal (not low-arousal) positive affect. Together, these findings suggest that the restorative benefits of positive affect on sleep may be culturally contingent, depending on how positive emotions are viewed in different societies.

Keywords: culture, positive affect, folk theories of emotions, sleep, actigraphy

Supplemental materials: https://doi.org/10.1037/emo0001654.supp

Positive affect is considered a foundation of a healthy life. Individuals with higher positive affect enjoy numerous health benefits, including better cardiovascular, immune, and endocrine functioning as well as enhanced longevity (see Pressman et al., 2019, for a review). Exactly how positive emotions offer these salutary effects is less clear, but growing evidence points to sleep as a key pathway. Positive affect is consistently linked to better sleep outcomes, such as higher sleep quality and fewer sleep problems (see Ong et al., 2017, for a review). High-quality sleep, in turn, facilitates restorative processes in the body, thereby enhancing resilience while mitigating health risks (Wesensten et al., 1999).

Nonetheless, current evidence is largely based on populations from the so-called Western, educated, industrialized, rich, and democratic (Henrich et al., 2010) societies, such as North America and Western Europe. Hence, it remains unknown whether this evidence linking positive affect to better sleep generalizes to non-Western, educated, industrialized, rich, and democratic cultural contexts, such as East Asian societies. In the present research, we tested this relationship in two cross-cultural studies using complementary research designs and samples (total N = 1,477). We propose that the benefits of positive affect for sleep will be contingent on cultural contexts, depending on how positive emotions are viewed across cultures.

Cultural Folk Theories of Positive Affect

Cultures differ in folk theories of emotions—how laypeople intuitively think about various emotional states. In particular, the extent to which positive affect is viewed as desirable varies across societies, with some cultures favoring it more or less than others

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(Miyamoto et al., 2017; Yoo et al., 2017). These cultural variations are thought to stem from two different streams of philosophical traditions in the West and the East.

In Western cultural contexts, such as the United States, folk theories of emotions are grounded in a hedonic perspective. Rooted in Greek philosophical traditions and later advanced by utilitarian thinkers, such as Bentham and Mill, hedonism refers to the principle that human action is guided by desires to maximize pleasure and minimize pain (Ryan & Deci, 2001). Accordingly, positive affect is regarded as highly desirable in Western societies (Miyamoto & Ma, 2011; Miyamoto et al., 2017; Sims et al., 2015). This valuation is further reinforced by analytic thinking traditions prevalent in Western societies, which emphasize logical thinking and low tolerance for contradiction ("A" and "not A" cannot be simultaneously accepted; Peng & Nisbett, 1999). As a result, Westerners tend to view positive affect as a direct opposite of negative affect, and accordingly, their primary emotion goal is to upregulate positive emotions while downregulating negative emotions—a process referred to as hedonic emotion regulation (Miyamoto & Ma, 2011; Miyamoto et al., 2014). Moreover, recent work shows that the centrality of this principle translates into interpersonal contexts; European Americans not only strive to maximize their own positive experiences, but they also help others reach the same emotional goal (Li, Ge, et al., 2025).

By contrast, the hedonic perspective is less common in East Asian societies, where a more balanced, dialectical view of emotions prevails (Miyamoto et al., 2017). Rooted in philosophical traditions of Taoism, Buddhism, and Confucianism, dialectical thinking embraces contradiction as a natural part of life ("A" and "not A" are interconnected and, thus, can be simultaneously accepted; Peng & Nisbett, 1999). Within this framework, positive affect is seen as a transient experience with a potential to transform into its opposite end (i.e., negative affect). This awareness fosters a cautious approach toward positive affect, as positive emotions can signal a potential negative event to arrive in the future and, thus, are ambivalent in meaning. Such a view is well represented in the saying of Laozi, the founder of Taoism: "Good fortune has its roots in disaster, and disaster lurks with good fortune" (Laozi, 2015). Accordingly, the emotion goal for East Asians often centers on maintaining emotional balance, for example, by dampening rather than amplifying positive affect (Miyamoto & Ma, 2011; Uchida & Kitayama, 2009). This ironic, counter-hedonic approach even extends to relationship contexts; compared with European Americans, East Asians are more likely to help others decrease (rather than enhance) positive feelings, for example, by reminding that "most good things have their bad aspects as well" (Li, Ge, et al., 2025, p. 516).

Positive Affect and Sleep

To the extent that positive affect is valued differently across cultures, its salutary effect on sleep may also be subject to cultural variations. When one's affective style aligns with the values of their culture, this "cultural fit" tends to promote well-being, while a mismatch can be detrimental to health (Miyamoto et al., 2013; Park et al., 2020, 2025; Zhu et al., 2023). Initial evidence for this idea comes from Yoo et al. (2017), who tested positive affect as a predictor of lipid profiles among midlife adults in the United States and Japan. Consistent with the cultural fit hypothesis, they found that greater positive affect was linked to healthier lipid profiles (i.e., lower ratio of total cholesterol to high-density lipoprotein cholesterol) among American adults, but this relationship was absent among Japanese adults.

While suggestive, it remains unclear whether this evidence of cultural variation, observed for a single parameter of cardiovascular health, extends to sleep—a critical health behavior linked to a wide range of health markers, including lipid profiles (Abdurahman et al., 2020). It has been proposed that cultural fit enhances psychosocial resources, such as social support and self-efficacy, which, in turn, facilitate health-promoting behaviors by fostering a greater sense of personal control (Yoo & Miyamoto, 2018). Supporting this view, prior work has shown that individuals who fit better with their cultural environment tend to adopt healthier lifestyles (Fulmer et al., 2010; Levine et al., 2016). Accordingly, experiencing positive affect, reflecting a cultural fit in Western societies, may promote greater engagement in restorative health behaviors, such as obtaining high-quality sleep (Steptoe et al., 2008). Indeed, numerous studies conducted in Western societies found that positive affect is associated with better sleep outcomes (e.g., Fredman et al., 2014; Galambos et al., 2009; Jackowska et al., 2012).

By contrast, the foregoing cultural analysis would predict a weaker or even null effect of positive affect on sleep in East Asian societies given the ambivalent nature of positive experiences. Despite the abundance of Western-based research, only one study to our knowledge has examined the association between general positive affect and sleep among East Asians. Using ecological momentary assessment over 7 days, Takano et al. (2014) found that the experience of positive affect in the evening did *not* predict same-night sleep quality or quantity among Japanese. While this finding aligns with the cultural fit hypothesis, it is hard to conclude from a single null result based on a small sample size ($N = 46$). Moreover, most prior Western-based studies assessed trait-level positive affect at a single time point, whereas Takano et al. aggregated momentary ratings of positive affect across a week. This discrepancy underscores the need for high-powered cross-cultural research using harmonized methods to assess both positive affect and sleep, enabling direct comparisons across cultural contexts.

Present Research

The present research is the first to directly compare European Americans and East Asians in the association between positive affect and sleep in two cross-cultural studies. We hypothesized, consistent with the prior Western-based evidence, that positive affect would be linked to better sleep among European Americans. By contrast, this association was expected to be weaker or even absent among East Asians. Study 1 utilized large-scale, population-level survey data from the United States (Midlife in the United States [MIDUS]) and Japan (Midlife in Japan [MIDJA]) to test the link between positive affect and subjective sleep quality among midlife adults. Study 2 employed a daily diary design to capture the dynamic nature of emotional experiences and their relationships to sleep conditions among European American and East Asian college students. Participants reported their daily positive emotions and subjective sleep quality using online diaries over a 14-day period and also wore actigraphy watches to provide objective, behavioral measures of sleep. By separating daily fluctuations in positive affect (within-person level) from individuals' average levels

(between-person level), we sought to examine how positive affect at both levels might be related to sleep across cultural groups.

Study 1

Study 1 utilized data from large-scale health projects based on American and Japanese midlife adults. It tested whether cultural contexts moderate the relationship between positive affect and subjective sleep quality, assessed with the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989), a widely used psychometric test of sleep health.

Method

Participants

The American sample was drawn from the MIDUS survey, initiated in 1995, based on a nationally representative sample of English-speaking adults (MIDUS I; N = 7,108). A subsample of respondents participated in the second wave between 2004 and 2006 (MIDUS II; N = 4,963; retention rate = 75%). Our analysis was based on a subset of the MIDUS II sample, who provided biological data during an overnight session at one of three General Clinical Research Centers (Madison, Wisconsin; Washington, DC; or Los Angeles, California). During this session, participants completed a series of health-relevant questionnaires, including the PSQI. Following prior work (e.g., Park et al., 2020), we excluded a small number of respondents from racial minority groups to allow for a clearer cultural contrast with the Japanese sample, resulting in a final sample of 976 European Americans (532 females; M_{age} = 55.57, SD_{age} = 11.86). The Japanese sample (N = 1,027) was drawn from a parallel survey conducted in Japan, MIDJA, between 2008 and 2009, recruited from the Tokyo metropolitan area. Our analysis focused on a subgroup of this sample, who provided biological data at a medical clinic near the University of Tokyo and completed key health measures, including the PSQI (N = 382; 214 females; M_{age} = 54.24, SD_{age} = 14.11).

As we used archival data, we had no control over the sample size. A sensitivity power analysis using the "pwr" package in R (Champely et al., 2017) showed that the combined sample size (N = 1,358) allows us to detect a small-sized interaction effect between culture and positive affect (f^2 = .01) with 80% power at α = .05 (two-tailed).

Measures

Positive Affect. Following Yoo et al. (2017), positive affect was assessed with 10 items (cheerful, in good spirits, extremely happy, calm and peaceful, satisfied, full of life, enthusiastic, attentive, active, and proud). Participants rated how frequently they had felt each emotion in the past 30 days using a 5-point scale (1 = *none of the time*, 5 = *all the time*). The items were averaged to create a single index of positive affect (αs = .92 for both Americans and Japanese).[1]

Sleep Quality. The 19-item PSQI (Buysse et al., 1989) was used as a measure of subjective sleep quality over the past month encompassing seven sleep components: sleep duration, sleep disturbance, sleep latency, daytime dysfunction, habitual sleep efficiency, subjective sleep quality, and use of sleeping medications. Scores for each component were summated to create a global sleep index (range = 0–21), with higher scores indicating poorer sleep quality.

Covariates. As the MIDUS/MIDJA samples were highly heterogeneous in demographic and health profiles (see Supplemental Table S1 for descriptive statistics), we included a set of covariates that could potentially confound the relationship between positive affect and sleep. First, we controlled for gender, age, and social status, using both subjective and objective indicators (see Kitayama et al., 2015; Park et al., 2020). Subjective social status was assessed via participants' placement of themselves on a social ladder (1 = *lowest*, 10 = *highest*) to represent their relative position in their community (Adler & Ostrove, 1999). Objective social status was assessed as the level of educational attainment, after recoding the original scores (which were based on culture-specific scales) to make them comparable across cultural groups (1 = *8th grade, junior high school*, 7 = *attended or graduated from graduate school*; see Park et al., 2013). We also controlled for smoking status, alcohol consumption, and body mass index (BMI) given their established links to sleep conditions (Chakravorty et al., 2016; Muscogiuri et al., 2019; Riedel et al., 2004). Smoking status was assessed using three categories: nonsmoker, former smoker, and current smoker. We created two dummy-coded variables to compare nonsmoker with former smoker and current smoker, respectively. Alcohol consumption was assessed as the average number of alcoholic drinks consumed per week. BMI was computed using the assessments of weight and height obtained during the clinic visit (kg/m^2).

Before data analysis, we identified a small number of extreme values in alcohol consumption (exceeding three standard deviations from the mean in each culture; n = 29) and winsorized them at three standard deviations in accordance with the standard procedure in MIDUS/MIDJA (e.g., Kitayama et al., 2015; Park et al., 2020). Both alcohol consumption and BMI were log transformed to normalize their distributions (see Supplemental Tables S1 and S2 for descriptive statistics and intercorrelations among study variables, respectively).

Transparency and Openness

Study 1 involved a secondary analysis of archival data. The data, codebook, and survey files are publicly accessible at https://www.icpsr.umich.edu/icpsrweb/. The Study 2 materials are deposited at https://osf.io/ra83c/. The data and analytical codes for Study 2 will be made available upon completion of a larger study, from which these data were drawn. The studies were not preregistered.

Results

First, we tested whether the relationship between positive affect and subjective sleep quality would differ across two cultural groups. We performed a multiple regression analysis with culture (−1 = *European American*, 1 = *Japanese*), positive affect, and their

[1] When we conducted a principal component analysis in R using the principal function from the *psych* package, it revealed a one-component solution for both cultural groups, with the first component accounting for 59% of the total variance among European Americans and 58% among Japanese. Item loadings were all above .68 for European Americans and above .48 for Japanese, suggesting that these items reflected a single dimension of positive affect for both cultural groups.

interaction as predictors of the PSQI scores. We additionally included gender, age, social status, smoking status, alcohol consumption, and BMI as covariates.

The analysis showed a significant main effect of culture. Japanese reported higher sleep quality than did European Americans, $b = -1.88$, 95% confidence interval (CI) [−2.98, −0.78], $t(1166) = -3.36$, $p = .001$. The main effect of positive affect was also significant, with positive affect linked to lower PSQI scores (and hence better sleep quality) in general, $b = -1.01$, 95% CI [−1.35, −0.66], $t(1166) = -5.74$, $p < .001$. Importantly, these effects were qualified by a significant interaction effect between culture and positive affect, $b = 0.44$, 95% CI [0.12, 0.77], $t(1166) = 2.67$, $p = .008$. As predicted and also displayed in Figure 1, positive affect was significantly associated with lower PSQI scores (i.e., better sleep quality) among European Americans, $b = -1.45$, 95% CI [−1.79, −1.12], $t(1166) = -8.52$, $p < .001$. By contrast, this relationship was substantially weaker and, in fact, was not significant among Japanese, $b = -0.57$, 95% CI [−1.15, 0.02], $t(1166) = -1.91$, $p = .057$.[2]

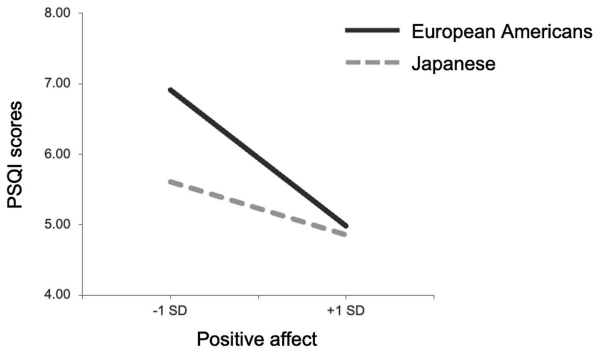
Discussion

In Study 1, we found initial support for the cultural fit hypothesis using large-scale, cross-national data of midlife adults. Consistent with prior Western-based evidence, greater experience of positive affect over the past 30 days was associated with better self-reported sleep quality among European Americans, even after controlling for various confounding variables. By contrast, this relationship was not significant among Japanese. These results suggest that the evidence of cultural differences in the salutary effects of positive affect, previously identified for lipid profiles (Yoo et al., 2017), extends to sleep, a critical restorative behavior.

Notwithstanding this initial evidence, Study 1 was limited by its reliance on single-time assessments of both positive affect and sleep. Given that emotional experiences and sleep conditions fluctuate daily, it is essential to measure these dynamics using repeated measures. This limitation was rectified in Study 2, in which we used a 2-week daily diary design to test cultural variations in the relationship between positive affect and sleep at both the between- and within-person levels.

Figure 1

The Relationship Between Positive Affect and Subjective Sleep Quality in Study 1



Note. Higher scores on the *y*-axis indicate poorer subjective sleep quality. PSQI = Pittsburgh Sleep Quality Index.

Study 2

Study 2 sought to replicate and extend the Study 1 results in three key ways. First, most prior studies, including Study 1, have focused on between-person associations between positive affect and sleep—that is, whether individuals who generally experience positive emotions more than others also sleep better (e.g., Ong et al., 2017). However, positive affect may also influence sleep at the within-person level—that is, whether people sleep better on days when they experience more positive emotions than their usual. Importantly, we hypothesized that these salutary effects of positive affect, at both the between- and within-person levels, would be more pronounced among European Americans than East Asians. We tested this hypothesis using data from a 2-week daily diary study, in which European American and East Asian college students reported their daily positive affect each evening and rated their sleep quality from the previous night each morning.

Second, we improved the assessment of sleep using both subjective and behavioral measures. As we reported in a previous study using the same data set (Zhu et al., 2023), we included two subjective measures: sleep quality and mood upon awakening. In addition, participants wore actigraphy watches throughout the 14-day period, which provided two behavioral indicators: sleep duration (total time asleep per night) and sleep efficiency (total sleep time divided by time in bed). These four parameters are well-established markers of sleep health and are closely linked to sleep problems, such as insomnia symptoms (Buysse, 2014; Sonnentag et al., 2008). For each sleep parameter, we tested its association with positive affect at both the between- and within-person levels across cultural groups.

Third, we tested a potential moderating effect of arousal level. People differ in the specific types of positive emotions they value or want to experience, which is defined as *ideal affect* (Tsai et al., 2006). Systematic evidence suggests that these ideals vary across cultures, particularly with respect to arousal (see Tsai, 2007, 2017, for reviews). For European Americans, the high value placed on positive affect is especially evident in their preference for high-arousal positive affect (HAP), such as excitement and enthusiasm. By contrast, East Asians tend to place less emphasis on positive affect overall, but when they do value it, they prefer low-arousal positive affect (LAP), such as calmness and serenity. This raises the possibility that the cultural variation observed in Study 1 could itself be moderated by arousal level, insofar as what matters for sleep health may be the alignment between the specific type of positive emotions and the emotions their culture prescribes as ideal.

We were not able to test this possibility in Study 1 because our factor analysis indicated that all of the positive affect items loaded onto a single factor (see Footnote 1). In our sample, these items

[2] When we analyzed each component of the PSQI, the key interaction between culture and positive affect was statistically significant for habitual sleep efficiency, sleep disturbance, and daytime dysfunction, $ts \geq 2.68$, $ps \leq .007$. For the remaining four components, only main effects of positive affect emerged, with higher positive affect linked to better subjective sleep quality, shorter sleep latency, longer sleep duration, and reduced use of sleep medications, $ts \geq |-2.06|$, $ps \leq .039$ (see Supplemental Materials for more details).

therefore appeared to reflect a single dimension of general positive affect rather than separable constructs distinguished by arousal level. Our approach is consistent with that of Yoo et al. (2017), who analyzed the same MIDUS/MIDJA data set to examine associations between positive emotions and lipid profiles. They also collapsed all items into a single factor, noting that the measure "mostly consisted of items that either assess highly aroused states (e.g., 'enthusiastic') or are not reflective of arousal (e.g., 'satisfied') and included only one low-arousal item (i.e., 'calm and peaceful')" (p. 1474). Thus, the limited coverage of low-arousal emotions in the MIDUS/MIDJA surveys constrained our ability to examine whether the cultural differences observed in Study 1 varied by arousal level. In particular, the absence of a positive affect–sleep link among Japanese participants may have resulted from a mismatch between the type of positive affect assessed (primarily high arousal) and their cultural ideals (primarily low arousal).

It is important to note, however, that Clobert et al. (2020) attempted to distinguish between HAP and LAP using a smaller subsample from the MIDUS/MIDJA data set.[3] By prespecifying a two-factor solution, they categorized four emotions as HAP (enthusiastic, active, proud, attentive) and four as LAP (satisfied, calm and peaceful, cheerful, in good spirits) and then examined how these categories of emotions are associated with mental, physical, and biological health outcomes, including sleep. Consistent with the moderation hypothesis above, they found that HAP was associated with better health outcomes (including better sleep) among Americans but not among Japanese. Interestingly, however, no cultural moderation emerged for LAP, which was associated with better sleep for both cultural groups. Although this pattern is intriguing, their emotion categorization rests on relative distinctions in arousal level within a constrained set of items, some of which are conceptually debatable. For example, "cheerful," one of their LAP items, is often regarded as high arousal (Reitsema et al., 2023). Likewise, the placement of "satisfied" and "in good spirits" within a specific arousal category may not be clear-cut.

Taken together, these findings highlight the need to replicate and extend prior work with a broader and more balanced set of emotion items that clearly vary in arousal. To address this gap, Study 2 included an expanded pool of emotion items that encompassed unequivocal HAP and LAP items. This allowed us not only to test the effects of general positive affect but also to test an alternative hypothesis that both cultural groups would benefit from positive affect, but the specific type of positive affect that promotes sleep may differ—HAP for European Americans and LAP for East Asians.

Method

Participants

We recruited 119 students from the University of Texas at Dallas, including 62 European Americans ($M_{age} = 21.87$, $SD_{age} = 5.56$) and 57 East Asians ($M_{age} = 24.37$, $SD_{age} = 4.54$). To be eligible, Asian participants had to be born in East Asia and had lived in the United States for less than 7 years. All American participants were of European descent, who had to be born and raised in the United States. Prior to the lab session, participants were screened for medical or life conditions that could influence sleep, including major medical illnesses (e.g., cardiovascular disease), psychiatric disorders, pregnancy, smoking, and cosleeping with a child under 5 years old.

The data for this study were collected as part of a larger project on culture and daily processes. The target sample size for the larger study was determined a priori based on a power analysis (N = 170, with 85 from each cultural group; see https://osf.io/34zwn for preregistration). Data collection began in September 2018, and we were able to recruit 119 participants before data collection was halted in March 2020 due to pandemic-related restrictions. Despite falling short of the planned sample size, the final size was deemed adequate to detect a small-to-medium effect for the hypothesized cultural moderation at both within- and between-person levels (see the Results section for more details about statistical power).

Procedure and Measures

First, participants were invited for a 1-hr lab session, during which they provided informed consent and filled out baseline questionnaires for the larger study. Participants were then informed about the daily diary period, which began on the following Sunday night. During the 14-day period, participants were asked to complete a night diary before going to bed, which included our measure of positive emotions (see Supplemental Materials for a list of additional measures). In addition, they were asked to complete a morning diary upon awakening to assess subjective feelings of their sleep from the previous night. Throughout the diary period, participants also wore an actigraphy watch to provide behavioral sleep measures. Participants were compensated $40 for the completion of both baseline and diary period. To foster compliance, they were informed that they would be entered into a $50 gift card drawing if they completed at least 95% of the diaries during the diary period (i.e., submitting their night diaries before 9 a.m. the following morning and their morning diaries by 5 p.m. on the same day). All study procedures and materials received approval from the University of Texas at Dallas's Institutional Review Board.

Daily Positive Affect. Each evening, participants rated the extent to which they experienced 16 positive emotions that day using the daily mood scale (Cohen et al., 2006, e.g., happy, enthusiastic, peaceful; 1 = *not at all*, 5 = *extremely*). These items were averaged to create a daily index of positive affect, which served as a primary predictor of sleep in our main analysis. To examine whether this scale captured meaningful changes in positive affect within each individual across the 2-week period, we calculated a within-person reliability score (R_{CN}; Shrout & Lane, 2012) and found an acceptable level of reliability for both cultural groups, with .79 for European Americans and .81 for East Asians. We also evaluated the between-person reliability (R_{KRN}) to determine if this scale reliably measured individual differences in positive affect across items and times (Shrout & Lane, 2012). The reliability was high for both European Americans (.97) and East Asians (.95).

[3] Our analysis in Study 1 included a larger sample of European Americans (n = 976) compared with 640 in Clobert et al.'s (2020) study. Moreover, whereas their sample included a small number of racial minorities, we focused exclusively on European Americans, which enhances the cultural contrast with Japanese participants (see also Kitayama et al., 2018; Park et al., 2020; Seymour, 2019, for similar approaches).

In addition, to examine whether arousal level would moderate cultural differences in the positive affect–sleep relationship, we derived two subscales from the original items. Four high-arousal items (lively, excited, cheerful, enthusiastic) were averaged to form a daily HAP index, and three low-arousal items (relaxed, calm, peaceful) were averaged to form a daily LAP index. Both indices demonstrated an acceptable range of reliability at both the within- and between-person levels (0.72–0.95 for European Americans and 0.66–0.95 for East Asians). The remaining nine items did not specify any arousal level (e.g., happy, grateful, sympathetic).[4]

Pittsburgh Sleep Diary. To assess subjective sleep quality and mood upon awakening, a revised version of the Pittsburgh Sleep Diary (Monk et al., 1994) was administered in the morning diary. Participants reported their sleep quality from the previous night on a single item (i.e., "The quality of my sleep last night was," 0 = *very bad*, 8 = *very good*). They also rated their mood upon awakening with another item (i.e., "My mood when I finally woke up this morning was," 0 = *very tense*, 8 = *very calm*). The Pittsburgh Sleep Diary also included questions about other sleep-related events, such as bedtime and wake-up time. These responses were used as auxiliary inputs for scoring actigraphy data (see below).

Actigraphy. Throughout the diary period, participants wore an actigraphy watch (Philips Actiwatch Spectrum Pro) on their nondominant hand and were instructed to press the event marker button at bedtime and upon waking. The data were scored using Actiware (Philips Respironics) software, applying a medium threshold setting to detect activity in 1-min epochs (see Zhu et al., 2023, for more scoring details). This yielded two behavioral sleep indices: (a) sleep duration (the total time spent asleep measured in minutes) and (b) sleep efficiency (the proportion of time in bed actually spent sleeping). There were a small number of outliers for both indices (*n*s = 12 and 18 out of 1,492 daily actigraphy records, respectively), exceeding three standard deviations from the mean. As we did in Study 1, we included these data after winsorizing them at three standard deviations (see Supplemental Table S3 for descriptive statistics of the study variables and see Supplemental Table S4 for intercorrelations among them).

Analytic Strategy

We conducted a multilevel linear modeling (MLM) analysis using the Mplus 8.2 software to test the hypothesis that the relationship between positive affect and sleep would differ between two cultural groups (−1 = *European Americans*, 1 = *East Asians*) at both within- and between-person levels. Before the analysis, we differentiated the within-person variance of positive affect from its between-person variance using person-mean centering and grand-mean centering, respectively. First, each participant's average of positive affect across 14 days was subtracted from the participant's daily positive affect score to create the within-person variable. Second, the overall mean for all participants across 14 days was subtracted from each person-mean score to create the between-person variable. The within- and between-person variables were then included as predictors of each sleep outcome in the MLM analysis.

At the first level, the within-person variable of positive affect was entered as a predictor of sleep (see Equation 1). At the second level, the between-person variables of positive affect, participants' culture, and their interaction were entered as additional predictors. Participants' gender, age, and BMI were additionally included as covariates at Level 2 (see Equation 2).[5] The Level 2 factors were allowed to influence the intercept and slope at Level 1. In addition, the model included a cross-level interaction term to test whether culture interacts with the within-person variable of positive affect to predict each sleep outcome. Specifically, we tested the following equations:

$$\text{Level 1}: \text{Sleep}_{ij} = B_{0j} + B_{1j}(\text{WPA}_{ij}) + r_{ij}, \tag{1}$$

$$\begin{aligned}\text{Level 2}: B_{0j} &= \gamma_{00} + \gamma_{01}(\text{BPA}_j) + \gamma_{02}\text{Culture}_j + \gamma_{03}\text{Culture}_j \\ &\quad \times \text{BPA}_j + \text{Gender}_j + \text{Age}_j + \text{BMI}_j + u_{0j} \\ B_{1j} &= \gamma_{10} + \gamma_{11}\text{Culture}_j + u_{1j},\end{aligned} \tag{2}$$

where Sleep represents each sleep outcome, WPA represents within-person variable of positive affect, BPA represents between-person variable of positive affect, B_{0j} represents intercept for each participant j, B_{1j} represents slope for participant j, r_{ij} represents residuals of each i (each day) within each person j, γ_{00} represents average intercept for all participants, u_{0j} represents random deviation of the participant's intercept from fixed population intercept, γ_{10} represents average slope for all participants, and u_{1j} represents random deviation of the participant's slope from fixed population slope.

Using this model, we tested (a) the within-person level association between daily fluctuations of positive affect and sleep and (b) the between-person level association between average positive affect and overall sleep across the 2-week period. Critically, we examined if these associations varied by culture by testing the cross-level interaction between culture and the within-person variable of positive affect (Culture × WPA) and the Level 2 interaction between culture and the between-person variable of positive affect (Culture × BPA). We ran this model using a Bayesian estimation method for significance testing. The Bayesian estimation provides a credible interval as a measure of certainty about the likelihood of a result based on posterior estimation. With $\alpha = .05$, the Bayesian estimation generates a 95% Bayesian credible interval (BCI), and an effect is statistically significant if a BCI does not encompass 0.

[4] We conducted a factor analysis to test whether these items map onto different factors. Given the nested structure of the data, we conducted multilevel factor analyses (Merz & Roesch, 2011) and compared the fits of two models: a single-factor model and a three-factor model in which items were precategorized into high-, low-, and neutral-arousal positive affect. The three-factor model fits the data significantly better than the single-factor model in both cultural groups: European Americans: $\Delta\chi^2(6) = 481.23$, $p < .001$; East Asians: $\Delta\chi^2(6) = 193.88$, $p < .001$.

[5] In Study 1, we controlled for several demographic and health-relevant variables as potential confounding variables. This adjustment was necessary given the highly heterogeneous characteristics of our study sample (with the age range of 30–84). Although Study 2 participants were relatively homogeneous (undergraduate students who are, in general, younger and, thus, healthier), we controlled for gender, age, and BMI to maintain consistency across studies. Educational attainment and smoking status were not controlled as participants were all college students and current smokers were screened out prior to participation. The only variable that was left out in Study 2 was alcohol consumption, which we did not have data for. Nonetheless, when we dropped alcohol consumption from the covariates in Study 1, this did not alter the results, with a significant Culture × Positive Affect interaction on the PSQI scores, $b = 0.44$, 95% CI [0.11, 0.77], $t(1170) = 2.65$, $p = .008$.

Results

Data Attrition and Sensitivity Power Analysis

Two East Asian participants were excluded as they failed to adhere to the study guidelines (filling out night diaries in the morning and morning diaries at night and missing over 50% of their daily reports). After these exclusions, our analysis for subjective sleep measures was based on 117 participants (62 European Americans and 55 East Asians). The compliance rate was high (92.7%), with 1,517 entries completed from possible 1,638 entries for both morning and night diaries combined. Three additional participants (two European Americans and one East Asian) were excluded due to unscorable or lost actigraphy data, which resulted in 114 participants (60 European Americans and 54 East Asians) for the analysis on behavioral sleep measures.

A sensitivity power analysis was conducted to estimate the smallest effect we could detect based on the current sample size for the interaction between culture and positive affect on each sleep outcome. Following Sicorello et al. (2020), we ran simulation-based analyses optimized for a hierarchical data structure and found that our sample size allowed us to detect the interaction effect with standardized effect sizes (r_s) ranging from 0.07 to 0.08 at the within-person level and ranging from 0.14 to 0.17 at the between-person level. In addition, we calculated a positive predictive value for each simulated effect size, representing the likelihood that a significant finding is a true positive under the current design. With an equal prior probability for the null and alternative hypotheses, the positive predictive value was above 80% for the interaction effect with effect sizes of 0.03 at the within-person level and with effect sizes of 0.06 at the between-person level (see Supplemental Materials for more details on power).

Main Analysis: How General Positive Affect Affects Sleep Across Cultures

As our main analysis, we conducted a series of MLMs to test whether culture moderates the effect of general positive affect on each sleep parameter at the within- or between-person levels after adjustment of gender, age, and BMI. This analysis was based on the general positive affect index that included all 16 items regardless of arousal level.

Subjective Sleep Quality. First, when we analyzed subjective sleep quality, there was no main effect of culture (see Table 1 for full statistics). However, the main effects of positive affect were significant at both the within- and between-person levels, $b = 0.21$, $SD = 0.09$, 95% BCI [0.04, 0.38] and $b = 0.58$, $SD = 0.16$, 95% BCI [0.28, 0.89], respectively. At the within-person level, participants reported better subjective sleep quality on days when they experienced more positive affect than their usual. This effect did not interact with culture, $b = 0.13$, $SD = 0.08$, 95% BCI [−0.04, 0.29].

Table 1
The Relationships Between Positive Affect and Sleep Measures in Study 2

	Subjective sleep quality			Mood upon awakening		
Fixed effect	Est.	*SD*	95% BCI	Est.	*SD*	95% BCI
Intercept	2.14	2.47	[−2.74, 6.97]	2.04	2.31	[−2.53, 6.52]
Level 2 (person specific)						
BPA	0.58*	0.16	[0.28, 0.89]	0.61*	0.15	[0.33, 0.90]
Culture	0.05	0.12	[−0.18, 0.29]	0.01	0.11	[−0.21, 0.23]
Culture × BPA	−0.45*	0.16	[−0.76, −0.15]	−0.40*	0.15	[−0.69, −0.11]
Gender	0.12	0.11	[−0.10, 0.33]	0.09	0.10	[−0.12, 0.30]
Age	−0.03	0.02	[−0.07, 0.01]	0.00	0.02	[−0.04, 0.04]
BMI	1.20	0.83	[−0.44, 2.84]	0.93	0.78	[−0.60, 2.47]
Level 1 (day specific)						
WPA	0.21*	0.09	[0.04, 0.38]	0.35*	0.10	[0.15, 0.54]
Culture × WPA	0.13	0.08	[−0.04, 0.29]	0.03	0.10	[−0.17, 0.22]
	Sleep duration			Sleep efficiency		
Fixed effect	Est.	*SD*	95% BCI	Est.	*SD*	95% BCI
Intercept	309.13*	108.02	[98.22, 523.24]	53.66*	10.61	[33.03, 74.63]
Level 2 (person specific)						
BPA	−10.36	6.82	[−23.74, 3.05]	−0.85	0.67	[−2.17, 0.48]
Culture	−21.01*	5.18	[−31.21, −10.87]	−0.21	0.50	[−1.19, 0.78]
Culture × BPA	−16.06*	6.87	[−29.46, −2.42]	−0.63	0.67	[−1.95, 0.70]
Gender	5.39	4.80	[−4.08, 14.78]	1.50*	0.47	[0.57, 2.43]
Age	0.36	0.95	[−1.52, 2.23]	−0.05	0.09	[−0.23, 0.14]
BMI	21.83	36.31	[−49.93, 93.10]	8.92*	3.58	[1.89, 15.92]
Level 1 (day specific)						
WPA	−1.34	4.69	[−10.47, 7.84]	0.56	0.40	[−0.22, 1.35]
Culture × WPA	−5.43	4.75	[−14.65, 3.75]	0.15	0.40	[−0.61, 0.92]

Note. Est. = estimate (partial regression coefficient estimate, unstandardized); 95% BCI = 95% Bayesian credible interval; BPA = between-person variable of positive affect (average positive affect); BMI = body mass index; WPA = within-person variable of positive affect (daily positive affect).
* Estimates denoted as significant in Mplus at $p < .05$.

At the between-person level, those who experienced higher levels of positive emotions on average across the 2-week period also reported better sleep quality. Importantly, this effect significantly interacted with culture, $b = -0.45$, $SD = 0.16$, 95% BCI [−0.76, −0.15]. As displayed in Figure 2A, greater positive affect was associated with better sleep quality among European Americans, $b = 1.03$, $SD = 0.19$, 95% BCI [0.65, 1.41], but not among East Asians, $b = 0.13$, $SD = 0.24$, 95% BCI [−0.34, 0.61].

Mood Upon Awakening. A similar pattern was observed for mood upon awakening. The culture main effect was not significant (see Table 1), but the main effects of positive affect were significant at both the within- and between-person levels, $b = 0.35$, $SD = 0.10$, 95% BCI [0.15, 0.54] and $b = 0.61$, $SD = 0.15$, 95% BCI [0.33, 0.90], respectively. Culture did not interact with the within-person effect of positive affect, $b = 0.03$, $SD = 0.10$, 95% BCI [−0.17, 0.22], but it did with the between-person effect, $b = -0.40$, $SD = 0.15$, 95% BCI [−0.69, −0.11]. As shown in Figure 2B, greater positive affect across the 2-week period was associated with feeling calmer (vs. tense) upon waking among European Americans, $b = 1.01$, $SD = 0.18$, 95% BCI [0.65, 1.37]. By contrast, there was no such association among East Asians, $b = 0.21$, $SD = 0.23$, 95% BCI [−0.24, 0.67].

Sleep Duration. The analysis on sleep duration revealed a significant main effect of culture, $b = -21.01$, $SD = 5.18$, 95% BCI [−31.21, −10.87]; European Americans had longer sleep duration than East Asians. The main effect of positive affect was not significant at either the within- or between-person level. The interaction between culture and the within-person variable of positive affect was not significant, either. However, a significant interaction was found between culture and the between-person variable, $b = -16.06$, $SD = 6.87$, 95% BCI [−29.46, −2.42]. As displayed in Figure 2C, greater positive affect was negatively associated with sleep duration among East Asians, $b = -26.29$, $SD = 10.57$, 95% BCI [−47.08, −5.52]. That is, East Asians who felt positive emotions more across 2 weeks had shorter sleep duration (with an approximately 38-min reduction) compared with those who felt positive emotions less. By contrast, there was no significant association between positive affect and sleep duration among European Americans, $b = 5.61$, $SD = 8.68$, 95% BCI [−11.56, 22.71].

Sleep Efficiency. For sleep efficiency, neither the main effects of culture and positive affect nor their interaction reached statistical significance at both the within- and between-person levels (see Table 1).

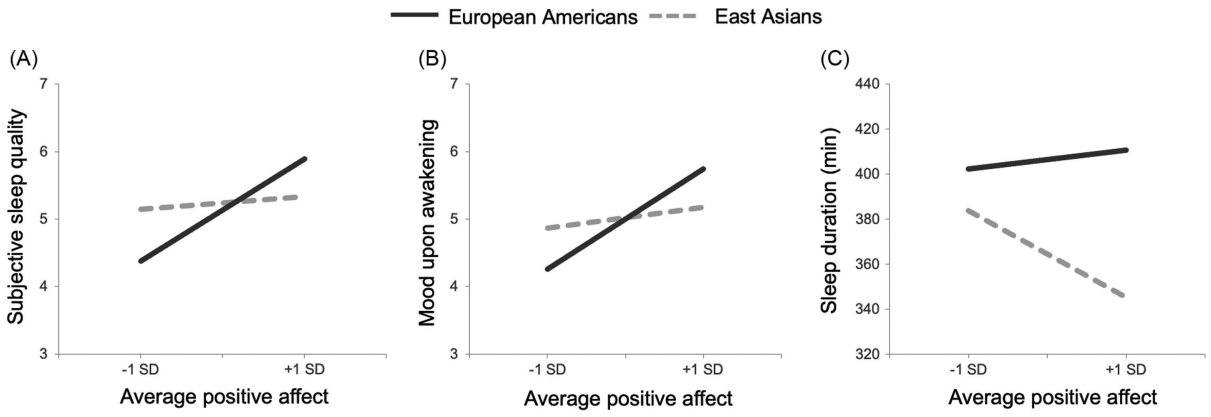
Secondary Analysis: Does Arousal Level Matter?

In addition to testing the effect of general positive affect on sleep, we further explored the role of arousal level by conducting separate analyses for HAP and LAP. For both emotion indices, we computed their within-person and between-person variables using the same approach described above for general positive affect, applying person-mean centering and grand-mean centering, respectively. The analytic approach mirrored the MLM models used for general positive affect, substituting HAP or LAP in place of the general index. This allowed us to test whether culture moderates the association between HAP (or LAP) and each sleep outcome at both the within- and between-person levels.

HAP. The effects of HAP on sleep closely mirrored those from general positive affect. A significant Culture × HAP interaction emerged for all sleep outcomes, except for sleep efficiency (see Table 2 for full statistics, including main effects). Notably, these effects were observed only at the between-person level. As shown in Supplemental Figure S1, greater average experience of HAP over the 2-week period was associated with better sleep quality and a calmer (vs. tense) mood upon awakening among European Americans, $b = 0.80$, $SD = 0.17$, 95% BCI [0.47, 1.13] and $b = 0.77$, $SD = 0.16$, 95% BCI [0.46, 1.08], respectively. By contrast, these associations were not significant among East Asians, $b = -0.03$, $SD = 0.20$, 95% BCI [−0.43, 0.36] and $b = 0.04$, $SD = 0.19$, 95% BCI [−0.33, 0.41]. Also consistent with the main analysis, East Asians who felt more HAP across the 2 weeks had shorter sleep duration (approximately 35 min less) compared with

Figure 2

The Relationships Between Positive Affect and Sleep Measures in Study 2



Note. The between-person level association between average positive affect and (A) subjective sleep quality, (B) mood upon awakening, and (C) actigraphy-derived measure of sleep duration. Higher numbers on the *y*-axis indicate (A) better subjective sleep quality, (B) greater feelings of calmness (vs. tension) upon awakening, and (C) longer sleep duration.

Table 2
The Relationships Between HAP and Sleep Measures in Study 2

	Subjective sleep quality			Mood upon awakening		
Fixed effect	Est.	*SD*	95% BCI	Est.	*SD*	95% BCI
Intercept	2.24	2.53	[−2.75, 7.17]	1.77	2.38	[−2.92, 6.40]
Level 2 (person specific)						
BHAP	0.38*	0.13	[0.13, 0.63]	0.40*	0.12	[0.17, 0.64]
Culture	−0.01	0.12	[−0.24, 0.22]	−0.05	0.11	[−0.27, 0.17]
Culture × BHAP	−0.42*	0.13	[−0.68, −0.16]	−0.37*	0.12	[−0.61, −0.12]
Gender	0.08	0.11	[−0.14, 0.30]	0.06	0.11	[−0.15, 0.27]
Age	−0.03	0.02	[−0.07, 0.02]	0.00	0.02	[−0.04, 0.05]
BMI	1.16	0.85	[−0.50, 2.84]	1.03	0.80	[−0.55, 2.60]
Level 1 (day specific)						
WHAP	0.10	0.06	[−0.02, 0.22]	0.20*	0.07	[0.07, 0.34]
Culture × WHAP	0.08	0.06	[−0.03, 0.20]	−0.02	0.07	[−0.16, 0.12]

	Sleep duration			Sleep efficiency		
Fixed effect	Est.	*SD*	95% BCI	Est.	*SD*	95% BCI
Intercept	307.64*	108.39	[95.23, 522.08]	52.96*	10.66	[32.09, 74.04]
Level 2 (person specific)						
BHAP	−8.49	5.58	[−19.41, 2.46]	−0.67	0.55	[−1.74, 0.40]
Culture	−20.36*	5.06	[−30.35, −10.45]	−0.14	0.49	[−1.08, 0.82]
Culture × BHAP	−11.49*	5.65	[−22.56, −0.32]	−0.33	0.55	[−1.40, 0.75]
Gender	4.90	4.81	[−4.60, 14.31]	1.52*	0.47	[0.60, 2.45]
Age	0.32	0.97	[−1.58, 2.23]	−0.06	0.10	[−0.25, 0.13]
BMI	23.11	36.47	[−48.72, 94.85]	9.30*	3.60	[2.21, 16.32]
Level 1 (day specific)						
WHAP	−2.08	3.46	[−8.77, 4.78]	0.49	0.29	[−0.08, 1.06]
Culture × WHAP	−3.38	3.52	[−10.31, 3.35]	0.24	0.29	[−0.34, 0.80]

Note. HAP = high-arousal positive affect; Est. = estimate (partial regression coefficient estimate, unstandardized); 95% BCI = 95% Bayesian credible interval; BHAP = between-person variable of HAP (average HAP); BMI = body mass index; WHAP = within-person variable of HAP (daily HAP).
* Estimates denoted as significant in Mplus at $p < .05$.

those who felt less HAP, $b = -19.94$, $SD = 8.49$, 95% BCI [−36.64, −3.17]. By contrast, among European Americans, no significant association was found between average HAP and sleep duration, $b = 2.99$, $SD = 7.34$, 95% BCI [−11.53, 17.52].

LAP. For LAP, no significant cultural moderation was found for any of the sleep outcomes. Instead, only main effects emerged for subjective sleep outcomes at both levels. At the within-person level, both cultural groups reported better quality of sleep and a calmer mood upon awakening on days when they experienced LAP more than usual, $b = 0.19$, $SD = 0.06$, 95% BCI [0.07, 0.30] and $b = 0.26$, $SD = 0.07$, 95% BCI [0.12, 0.39], respectively. At the between-person level, those who experienced higher LAP on average over the 2-week period reported better sleep quality and a calmer mood upon awakening, regardless of cultural backgrounds, $b = 0.65$, $SD = 0.15$, 95% BCI [0.35, 0.95] and $b = 0.74$, $SD = 0.14$, 95% BCI [0.47, 1.01], respectively. No other effects reached statistical significance (see Table 3 for full statistics).[6]

Discussion

Study 2 extended the findings of Study 1 using a daily diary design with multiple sleep parameters. This repeated-measures design allowed us to compare both daily (within-person) and average (between-person) effects of positive affect on sleep between two cultural groups. Conceptually replicating the Study 1 results, the evidence of cultural moderation emerged only at the between-person level. Specifically, higher average positive affect over the 2-week period was associated with better subjective sleep quality and a calmer mood upon awakening among European Americans, but not among East Asians. In fact, greater average positive affect appears to be detrimental to sleep health among East Asians; those who felt positive emotions more in general slept approximately 38 min less per night than those who felt positive emotions less. No such moderation was observed at the within-person level, suggesting that day-to-day fluctuations in positive affect were similarly linked to sleep across both cultural groups.

Importantly, Study 2 further demonstrated that arousal level adds critical nuance to our understanding of cultural influences on the positive affect–sleep relationship. Cultural differences were pronounced for HAP (as well as for neutral-arousal emotions; see Footnote 6), but not for LAP. Mirroring the findings from general positive affect, higher average HAP over the 2-week period was associated with better subjective sleep quality and a calmer mood upon awakening among European Americans, but not among East Asians. These results suggest that given the strong emphasis in Western societies on positive affect in general (Miyamoto & Ma, 2011;

[6] The results from the emotion items that were neutral in arousal were generally consistent with those of the HAP analysis, with greater positive affect associated with better subjective sleep quality and a calmer mood upon awakening among European Americans, but with shorter sleep duration among East Asians (see Supplemental Materials for more details).

Table 3
The Relationships Between LAP and Sleep Measures in Study 2

Fixed effect	Subjective sleep quality			Mood upon awakening		
	Est.	*SD*	95% BCI	Est.	*SD*	95% BCI
Intercept	1.63	2.46	[−3.22, 6.44]	1.62	2.24	[−2.82, 5.99]
Level 2 (person specific)						
BLAP	0.65*	0.15	[0.35, 0.95]	0.74*	0.14	[0.47, 1.01]
Culture	0.01	0.12	[−0.21, 0.24]	−0.02	0.11	[−0.23, 0.18]
Culture × BLAP	−0.21	0.15	[−0.51, 0.08]	−0.17	0.14	[−0.44, 0.11]
Gender	0.14	0.11	[−0.08, 0.36]	0.12	0.10	[−0.08, 0.32]
Age	−0.03	0.02	[−0.07, 0.02]	0.01	0.02	[−0.04, 0.05]
BMI	1.37	0.83	[−0.26, 3.01]	1.07	0.76	[−0.41, 2.56]
Level 1 (day-specific)						
WLAP	0.19*	0.06	[0.07, 0.30]	0.26*	0.07	[0.12, 0.39]
Culture × WLAP	0.05	0.06	[−0.07, 0.16]	0.04	0.07	[−0.10, 0.17]

Fixed effect	Sleep duration			Sleep efficiency		
	Est.	*SD*	95% BCI	Est.	*SD*	95% BCI
Intercept	292.76*	111.14	[75.73, 511.36]	52.45*	10.63	[31.64, 73.49]
Level 2 (person-specific)						
BLAP	−5.08	6.86	[−18.59, 8.36]	−0.51	0.66	[−1.82, 0.79]
Culture	−19.39*	5.12	[−29.43, −9.36]	−0.08	0.49	[−1.04, 0.88]
Culture × BLAP	−10.60	6.77	[−23.92, 2.70]	−0.17	0.66	[−1.45, 1.12]
Gender	5.89	4.97	[−3.93, 15.64]	1.55*	0.48	[0.61, 2.50]
Age	0.64	0.97	[−1.27, 2.56]	−0.03	0.09	[−0.21, 0.16]
BMI	25.80	37.47	[−47.69, 99.26]	9.22*	3.58	[2.18, 16.28]
Level 1 (day specific)						
WLAP	4.27	3.29	[−2.08, 10.76]	0.15	0.26	[−0.37, 0.67]
Culture × WLAP	−3.99	3.29	[−10.29, 2.34]	−0.19	0.27	[−0.70, 0.33]

Note. LAP = low-arousal positive affect; Est. = estimate (partial regression coefficient estimate, unstandardized); 95% BCI = 95% Bayesian credible interval; BLAP = between-person variable of LAP (average LAP); BMI = body mass index; WLAP = within-person variable of LAP (daily LAP).
* Estimates denoted as significant in Mplus at $p < .05$.

Miyamoto et al., 2017; Sims et al., 2015) and HAP in particular (Cachia et al., 2025; Tsai et al., 2006, 2019), the experience of HAP, reflecting a cultural fit for European Americans, may have improved subjective sleep. By contrast, for East Asians, experiencing high levels of HAP may conflict with their broader goals of maintaining emotional balance and their preference for low-arousal states in particular. This cultural misfit may help explain why East Asians who reported higher HAP across 2 weeks showed reduced sleep duration—approximately 35 min less than those who reported lower HAP.

Regarding LAP, although prior research has shown that East Asians value LAP more than European Americans (Tsai et al., 2006), our analyses did not reveal stronger benefits of LAP for East Asians. Like Clobert et al. (2020), we observed only the main effects of LAP on subjective sleep quality and mood upon awakening, indicating that LAP benefited subjective sleep equally across both cultural groups. These main effects may reflect a shared valuation of LAP, possibly influenced by a growing appreciation of LAP among European Americans, as suggested by recent findings (e.g., Cachia et al., 2025; Tsai et al., 2019). We revisit this point in the General Discussion section.

General Discussion

The Relationship Between Positive Affect and Sleep: Cultural Moderation

There is a growing consensus in the health science literature that positive emotional experiences are associated with better sleep health (Ong et al., 2017). However, our current work, based on two high-powered, multimethod studies (combined $N = 1,477$), complicates this widely accepted perspective by demonstrating that the beneficial association between positive affect and sleep is primarily evident among Western, educated, industrialized, rich, and democratic populations. Consistent with prior Western-based findings, Study 1 showed that trait-level positive affect was associated with better subjective sleep quality among European American midlife adults. This result was conceptually replicated in Study 2, where greater average positive affect across a 2-week period was linked to better subjective sleep quality and feeling calm (vs. tense) upon awakening among European American college students. In sharp contrast, these relationships were not observed among Japanese midlife adults in Study 1 and East Asian college students in Study 2. In fact, in Study 2, greater overall positive affect was linked to reduced sleep duration among East Asians, suggesting that positive affect may even be detrimental to sleep health in certain cultural contexts. Notably, these cultural differences were largely driven by HAP, whereas LAP produced similarly beneficial effects on subjective sleep across both cultural groups. As theorized, these cultural variations may stem from the extent to which the experience of positive emotions—both in general and by arousal level—aligns with cultural ideals.

Positive Affect as a Cultural Fit in Western Societies

Positive affect is seen as highly desirable in Western societies, rooted in a long-standing philosophical tradition of prioritizing the

pursuit of positivity (Ryan & Deci, 2001). Coupled with a cultural emphasis on analytical thinking (Peng & Nisbett, 1999), positive emotions are actively sought out as a crucial means to achieve well-being, with relatively little attention paid to their potential downsides (Miyamoto et al., 2017). This hedonic orientation also guides emotion regulation attempts, leading people to amplify positive emotions and decrease negative emotions (Li, Ge, et al., 2025; Miyamoto & Ma, 2011). Accordingly, when people feel various positive emotions in their life, this affective style aligns with the prevailing emotion beliefs in Western societies. This cultural fit may in turn produce salubrious effects, possibly via facilitating greater engagement in health-promoting behaviors (Yoo & Miyamoto, 2018), such as obtaining sufficient and high-quality sleep (Steptoe et al., 2008).

Supporting this hypothesis, our findings from both studies showed that more frequent experiences of positive emotions were consistently linked to better sleep outcomes among European Americans of varying age groups. Furthermore, the arousal-based analysis in Study 2 showed that this link is especially robust for HAP—emotional states that are particularly valued in Western cultural contexts (e.g., Cachia et al., 2025; Tsai et al., 2006, 2019).

Cultural Ambivalence Toward Positive Affect in East Asian Societies

By contrast, positive affect is less valued in East Asian societies, with a strong cultural legacy of Buddhism, Confucianism, and Taoism. These traditions foster a balanced, dialectical view of emotions, which acknowledges the coexistence of positive and negative elements within a single experience (Miyamoto et al., 2017). From this perspective, positive affect can be ambivalent in meaning, as it may signal the potential for future negative consequences. As a result, East Asians are less motivated to maximize their positive experiences and instead strive to maintain emotional balance, often by engaging in counter-hedonic emotion regulation strategies (Li, Ge, et al., 2025; Miyamoto & Ma, 2011). Given this outlook, frequent experiences of positive emotions may not align with the prevailing emotion beliefs in East Asian societies. This cultural misfit could diminish or even negate the potential benefits of positive emotions. In line with this analysis, our findings across two studies showed that positive affect was generally unrelated to subjective sleep measures among East Asians.

More strikingly, our analysis revealed that positive affect may in fact be detrimental to East Asians' sleep health. In Study 2, greater positive emotions—particularly high-arousal emotions—were associated with shorter sleep duration over the 2-week period, exclusively among East Asians. This finding stands in stark contrast with prior research in Western samples, where positive affect is typically linked to longer sleep duration (Fuligni & Hardway, 2006). This counterintuitive result may be explained by two possible mechanisms. First, due to the ambivalent meaning of positive affect, East Asians may be more likely to engage in positive rumination—the process to dwell heavily on positive emotional experiences (Feldman et al., 2008). Notably, recent research has shown that the effects of positive rumination on sleep depend on its regulatory focus: While upregulating positive affect is associated with better sleep, downregulating it is linked to poorer sleep (Hairston et al., 2022). For East Asians, the simultaneous desire to enjoy and dampen positive affect (especially high-arousal states) may increase cognitive load, thereby disrupting their sleep. Second, given that East Asians value social connectedness as an integral part of their happiness (Uchida et al., 2004), their positive emotions may derive primarily from social interactions. These social activities may necessitate additional processing resources, which could reduce sleep time. These speculations must be tested in future work.

Interestingly, when we examined the sleep duration component measured by PSQI in Study 1, we found only a main effect, such that positive affect was associated with longer sleep duration across cultural groups (see Footnote 2). The discrepancy in sleep duration findings across studies may be attributed to differences in how sleep duration was measured. Prior work shows that actigraphy often provides more accurate estimates of sleep duration than retrospective self-reports, which are vulnerable to recall bias (Jackson et al., 2019; Lauderdale et al., 2008). Supporting this point, when we analyzed self-reported sleep duration from the morning diaries in Study 2, the pattern diverged from the actigraphy results. Although the interaction between culture and positive affect remained significant, the simple slopes were not significant for either East Asians or European Americans.[7] This suggests that the link between positive affect and reduced sleep duration among East Asians is unique to actigraphy-derived sleep data. Future research should replicate these findings in different samples using both subjective and objective sleep measures, across cross-sectional and daily designs, to clarify their robustness and generalizability.

Altogether, the present study, along with our previous work (Park & Zhu, 2024; Park et al., 2020, 2025; Zhu et al., 2023) and related findings (e.g., Miyamoto et al., 2013; Soto et al., 2011; Yoo et al., 2017), adds to the literature showing that cultural fit in affective styles, whether in specific emotional experiences or regulation strategies, is crucial for well-being (Yoo & Miyamoto, 2018). The cultural fit perspective challenges assumptions of universal emotion–health links and highlights that the consequences of emotional processes may depend on cultural context, offering a more nuanced framework for understanding when and for whom emotions promote or undermine well-being.

Specificity of Positive Affect Across Arousal Levels

Notably, the arousal-based analysis conducted in Study 2 offers a more nuanced perspective on how positive affect influences sleep across cultures. First of all, the finding that cultural moderation emerged for HAP (but not LAP) provides further support for the cultural fit hypothesis (see also Clobert et al., 2020). Given the strong valuation of high-arousal emotional states in Western societies (Cachia et al., 2025; Tsai et al., 2006, 2019), frequently experiencing HAP in daily life may further strengthen the cultural fit for European Americans, thereby promoting sleep health. By contrast, such experiences may conflict with cultural ideals in East

[7] We conducted the same MLM analysis on daily self-report sleep duration measured by the Pittsburgh Sleep Diary. The analysis revealed a significant interaction effect between culture and the between-person variable of positive affect, $b = -14.53$, $SD = 6.90$, 95% BCI [−27.97, −0.92]. However, the simple effect of positive affect was not significant for both East Asians, $b = -16.92$, $SD = 10.75$, 95% BCI [−38.19, 4.12] and European Americans, $b = 11.85$, $SD = 8.60$, 95% BCI [−5.05, 28.74].

Asian societies, where low-arousal states are more strongly preferred. This cultural misfit may require extra effort to regulate, or adapt to, potentially compromising sleep health.

Given this perspective, it is somewhat surprising that there was no cultural moderation for LAP. Instead, only main effects were observed; individuals who experienced more LAP reported better subjective sleep, regardless of cultural backgrounds, suggesting that LAP may hold comparable significance across cultures. Indeed, recent studies indicate that the valuation of LAP is no longer culturally distinct, with similar levels of endorsement between European Americans and East Asians (Cachia et al., 2025; Li, Ishii, & Park, 2025). As Tsai et al. (2019) argued, this shift may be partly attributable to evolving sociopolitical conditions in the United States, such as growing distrust in governmental institutions and heightened threats of terrorism, which may have amplified the appeal and perceived utility of LAP. To the extent that LAP is now similarly valued across cultural groups, our finding that LAP benefited sleep equally for both cultural groups remains consistent with the cultural fit hypothesis. Future research could further investigate how long-term social and political stressors shape emotional values and whether such shifts influence the association between emotion and health outcomes, including sleep.

Within- Versus Between-Person Level Associations

As in Study 1, the evidence of cultural moderation was observed only at the between-person level in Study 2. At the within-person level, we found only the main effects of positive affect on subjective sleep outcomes. The absence of an interaction between culture and daily fluctuations in positive affect suggests that experiencing more positive affect than usual on a given day is linked to better sleep, regardless of cultural background. This finding aligns with prior research showing that daily increases in positive emotions are associated with improved sleep quality (e.g., Galambos et al., 2009; Kalmbach et al., 2014).

Still, the lack of cultural moderation at the within-person level raises an important question: Why do cultural effects emerge only at the between-person level? One possible explanation lies in methodological and conceptual distinctions between intra- and interindividual emotional experiences. Within-person analyses capture daily deviations from one's own emotional baseline, which are more likely influenced by transient contextual factors, such as the occurrence of positive events on a given day, rather than by deeply internalized cultural beliefs. By contrast, between-person analyses reflect individuals' average emotional tendencies across time and contexts, making them more susceptible to culturally shaped ideals about how one ought to feel. From this perspective, short-term elevations in positive affect may be flexibly accommodated without clashing with cultural expectations, allowing individuals across cultures to benefit similarly. By contrast, chronically high levels of positive affect, when misaligned with prevailing cultural norms, may be perceived as socially inappropriate or disruptive to relational harmony, as may be the case for East Asians (Uchida & Kitayama, 2009). Such perceived misfit may weaken individuals' sense of fulfilling culturally valued roles and responsibilities and erode social connectedness (Kitayama & Park, 2007), thereby limiting access to psychosocial resources for coping (Yoo & Miyamoto, 2018). Over time, these challenges may necessitate sustained regulatory efforts, ultimately undermining sleep. Future research could build on this distinction by testing whether event-related positive affect is broadly beneficial across cultures, while generalized positive affect may exert more culturally contingent effects on well-being. Such efforts may clarify whether positive affect functions as a universally protective resource or is conditioned by cultural norms.

Future Directions and Concluding Remarks

Before concluding, we propose several directions for future research. First, the correlational nature of both studies limits our ability to draw causal inferences. To advance this line of inquiry, it will be critical to elucidate the directional pathways linking positive affect to sleep using longitudinal designs.

Second, in Study 2, we recruited international East Asian students who had spent less than 7 years in the United States to maximize their cultural contrast with European Americans. However, acculturation processes may modulate the health effects of positive affect (Leu et al., 2011). For instance, as immigrants become more acculturated to the U.S. society, the cultural fit of positive emotional experiences may enhance, thereby allowing them to gradually accrue health benefits. Additionally, given recent theorizing that sociopolitical conditions may shift affect valuations, such as increased preference for LAP (Tsai et al., 2019), further investigations could examine how daily experience of social uncertainty or political instability shapes emotional preferences and their health consequences.

Third, growing evidence suggests that the health effects of sleep may be shaped by cultural norms. For instance, individuals who endorse cultural beliefs that normalize short sleep (e.g., "time spent sleeping is wasted, so sleep should be minimized") tend to sleep less than those without such cultural beliefs (Arslan et al., 2015). Recent large-scale evidence further shows that the amount of sleep associated with optimal health varies across countries and may reflect culturally shaped ideals of sleep duration (Ou et al., 2025). These findings suggest that the shorter sleep duration observed among East Asians who experience greater positive affect in Study 2 may not necessarily translate into worse health outcomes. Future research should examine how cultural norms shape sleep behavior and its potential protective or exacerbating effects on health.

Last, prior work has shown that positive affect is associated with better cardiovascular functioning, such as decreased cardiovascular reactivity to negative emotional arousal (Ong & Allaire, 2005) and increased nocturnal heart rate variability (Schwerdtfeger et al., 2015). These cardiovascular functions may support better sleep by facilitating relaxation before bedtime (Stein & Pu, 2012). Future research should explore whether the effects of HAP and LAP on these physiological profiles are also moderated by culture.

In conclusion, the present work is the first to test both within- and between-person associations between positive affect and multiple dimensions of sleep across cultures while also considering the arousal level of positive affect. Our findings underscore the critical

role of cultural fit in sleep health, demonstrating that when one's affective style aligns with their cultural ideals, they sleep better. These insights can inform the development of culturally tailored interventions and public health policies aimed at promoting sleep health across diverse populations.

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