One-factor model. The initial unidimensional model did not fit the data well either in males ($\chi^2(14) = 114.61$, $p < 0.001$, CFI = 0.855, TLI = 0.783, RMSEA = 0.132, 90% CI = [0.110, 0.155]) or in females ($\chi^2(df) = 124.49$ (14), $p < 0.001$, CFI = 0.881, TLI = 0.822, RMSEA = 0.133, 90% CI = [0.112, 0.154]). However, for males, the model fit the data well when the residual variance for sleep duration was allowed to correlate with the residual variances of subjective sleep quality and habitual sleep efficiency. Similarly, for females, the model fit the data well when the residual variance for sleep duration was allowed to correlate with those of subjective sleep quality, habitual sleep efficiency, and use of sleeping medication.

Next, as summarized in Table S1, we tested measurement invariance by gender using a series of progressively constrained models. The configural invariance model fit well, and each subsequent model showed no significant decrease in fit as compared with its predecessor. That is, the 1-factor model of PSQI showed full measurement invariance across males and females (see Figure S1 for the strict invariance model). Factor variances were also comparable between males and females (χ_{diff}^2 (1) = 0.28, $p = 0.596$). Females had a higher factor mean than males (χ_{diff}^2 (*1*) = 19.96, $p < 0.001$, factor mean difference = 0.361, $p < 0.001$, Cohen's $d = 0.37$), indicating females reported worse subjective sleep quality than males.

Table S1

Summary of Fit Indices from CFA-based Tests of Measurement Invariance by Gender of the One- and Three-factor Structures

Model	χ^2	*df*	CFI	TLI	RMSEA [90% CI]	Model comparison	χ_{diff}^2 (Δdf)	*p*
1-factor CFA (*N* = 861)								
Single-group solutions								
Males (*n* = 412)	27.61**	12	0.978	0.961	0.056 [0.028, 0.084]			
Females (*n* = 449)	34.41***	11	0.975	0.952	0.069 [0.044, 0.095]			
Measurement Invariance								
1. Configural Invariance Model	62.00***	23	0.976	0.956	0.063 [0.044, 0.082]			
2. Weak Invariance Model	63.90***	29	0.979	0.969	0.053 [0.035, 0.070]	2 vs. 1	7.64 (6)	0.266
3. Strong Invariance Model	82.49***	42	0.975	0.975	0.047 [0.032, 0.062]	3 vs. 2	21.54 (13)	0.063
4. Strict Invariance Model	86.08***	49	0.977	0.980	0.042 [0.027, 0.056]	4 vs. 3	7.41 (7)	0.387
Structural Invariance								
5. Equal Factor Variance	80.15**	50	0.981	0.984	0.037 [0.021, 0.052]	5 vs. 4	0.28 (1)	0.596
6. Equal Factor Mean	136.76***	51	0.947	0.957	0.062 [0.050, 0.075]	6 vs. 5	19.96 (1)	< 0.001
3-factor CFA (*N* = 861)								
Single-group solutions								
Males (*n* = 412)	31.85***	10	0.969	0.934	0.073 [0.045, 0.102]			
Females (*n* = 449)	30.98***	10	0.977	0.953	0.068 [0.042, 0.096]			
Measurement Invariance								
1. Configural Invariance Model	62.84***	20	0.974	0.945	0.071 [0.051, 0.091]			
2. Weak Invariance Model	56.82***	24	0.980	0.965	0.056 [0.038, 0.075]	2 vs. 1	1.07 (4)	0.899
3. Strong Invariance Model	74.57***	35	0.976	0.971	0.051 [0.035, 0.067]	3 vs. 2	19.97 (11)	0.046
4. Strong Invariance Model-adjusted	73.00***	34	0.976	0.970	0.052 [0.035, 0.068]	4 vs. 2	17.83 (10)	0.058
5. Strict Invariance Model	80.96***	41	0.975	0.975	0.048 [0.032, 0.063]	5 vs. 4	10.64 (7)	0.156
Structural Invariance								
6. Equal Factor Variances	81.76***	44	0.977	0.978	0.045 [0.029, 0.060]	6 vs. 5	3.96 (3)	0.265
7. Equal Factor Means	141.15***	47	0.942	0.948	0.068 [0.055, 0.081]	7 vs. 6	30.60 (3)	< 0.001

Note. CFA = confirmatory factor analysis, *df* = degree of freedom, CFI = comparative fit index, TLI = Tucker-Lewis index, RMSEA = root mean square error of approximation, CI = confidence interval.
**$p < .01$, ***$p < .001$.

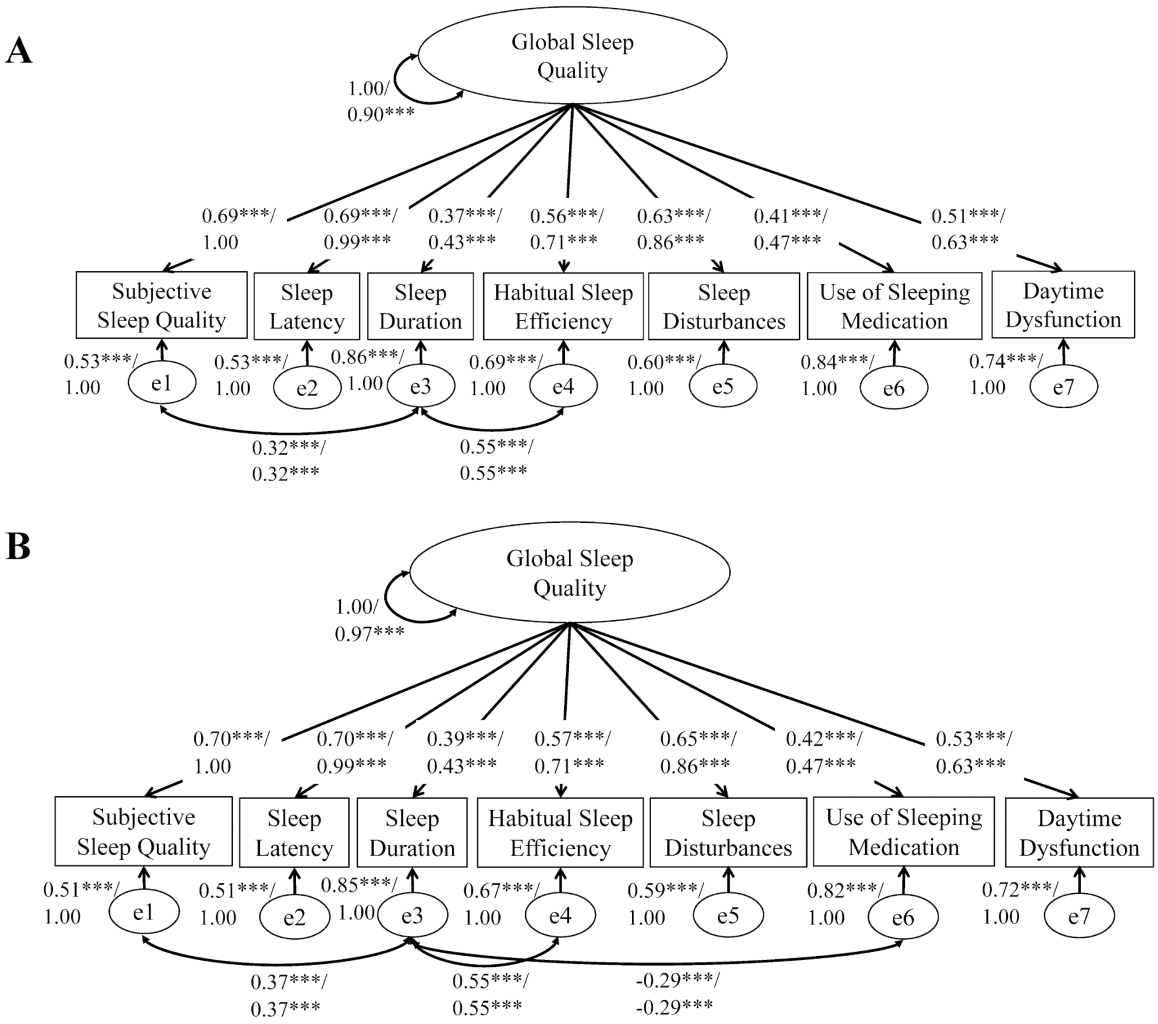

Figure S1. The one-factor structure of the Pittsburgh Sleep Quality Index in males (S1A) and females (S1B) ($N = 861$)

Note. All factor loadings, measures' thresholds, and measures' residual variances were constrained to be equal between males and females. Standardized/unstandardized coefficients are separated by a slash.

***$p < 0.001$.

Three-factor model. Using CFA, we also tested the 3-factor structure of PSQI suggested by Cole and colleagues. The three dimensions of PSQI were Sleep Efficiency (sleep duration and habitual sleep efficiency), Perceived Sleep Quality (subjective sleep quality, sleep latency, and use of sleeping medication), and Daily Disturbances (sleep disturbances and daytime dysfunction). Results for these models are summarized in Table S1. Like the one-factor structure, the fit of the initial 3-factor structure was marginal for males ($\chi^2(11) = 43.86$, $p < 0.001$, CFI = 0.953, TLI = 0.910, RMSEA = 0.085, 90% CI = [0.060, 0.112]) and for females ($\chi^2(11) = 60.14$, $p < 0.001$, CFI = 0.947, TLI = 0.899, RMSEA = 0.100, 90% CI = [0.076, 0.125]), with the TLI indices being lower and RMSEA indices being higher than desired. For males, the model fit the data well when the residual variance for sleep duration was allowed to correlate with the residual variance of sleep latency, whereas for females, the model fit the data well when the residual variance for sleep duration was allowed to correlate with that for use of sleeping medication.

Tests of measurement invariance between males and females using the 3-factor structure showed that the configural invariance model fit the data well (see Table S1), and the fit of the weak invariance model was not significantly worse (χ_{diff}^2 (4) = 1.07, $p = 0.899$). The fit worsened significantly for the strong invariance model (χ_{diff}^2 (11) = 19.97, $p = 0.046$), but was not significantly worse (χ_{diff}^2 (10) = 17.83, $p = 0.058$) when we allowed one threshold of sleep disturbances indicator to be unequal between males and females, which was suggested by the model modification indices. The strict invariance model did not fit significantly worse than the adjusted strong invariance model (χ_{diff}^2 (7) = 10.64, $p = 0.156$); parameter estimates for this model are shown in Figure S2. As with the two-factor and one-factor models, tests of structural invariance revealed that factor variances for the three factors were quite comparable between males and females (χ_{diff}^2 (3) = 3.96, $p = 0.265$). Again, females had higher factor means than

males in Sleep Efficiency (χ_{diff}^2 (1) = 8.65 (1), p = 0.003, factor mean difference = 0.338, p = 0.005, Cohen's d = 0.27), Perceived Sleep Quality (χ_{diff}^2 (1) = 15.05, p < 0.001, factor mean difference was 0.369, p < 0.001, Cohen's d = 0.35), and Daily Disturbances (χ_{diff}^2 (1) = 12.12, p < 0.001, factor mean difference = 0.362, p = 0.001, Cohen's d = 0.35). That is, as observed for the two- and one-factor structures, the latent means for the three-factor structure indicate that females reported worse subjective sleep than males.

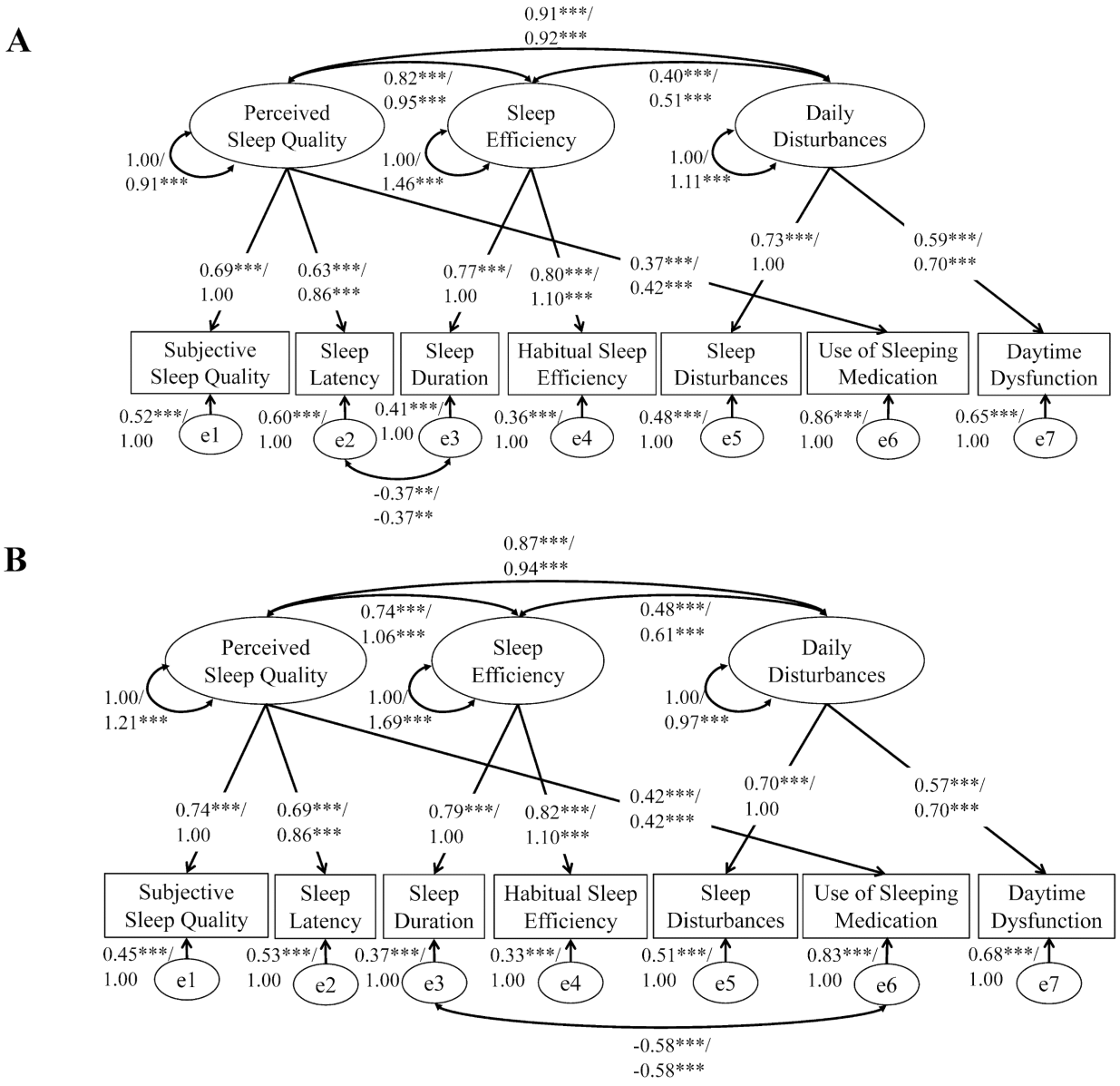

Figure S2. The three-factor structure of the Pittsburgh Sleep Quality Index in males (S2A) and females (S2B) ($N = 861$)

Note. All factor loadings, measures' thresholds (except one threshold of Sleep Disturbances), and measures' residual variances were constrained to be equal between males and females. Standardized/unstandardized coefficients are separated by a slash.

$^{**}p < 0.01$, $^{***}p < 0.001$.