Journal of Psychosomatic Research 79 (2015) 428–434

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

Bidirectional relationship between sleep and optimism with depressive mood as a mediator: A longitudinal study of Chinese working adults☆

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ARTICLE INFO

Article history:
Received 6 May 2015
Received in revised form 17 September 2015
Accepted 21 September 2015

Keywords:
Sleep quality
Attributional style
Chinese
Longitudinal study
Depression
Optimism

ABSTRACT

Objective: Sleep and optimism are important psycho-biological and personality constructs, respectively. However, very little work has examined the causal relationship between them, and none has examined the potential mechanisms operating in the relationship. This study aimed to understand whether sleep quality was a cause or an effect of optimism, and whether depressive mood could explain the relationship.
Method: Internet survey data were collected from 987 Chinese working adults (63.4% female, 92.4% full-time workers, 27.0% married, 90.2% Hong Kong residents, mean age = 32.59 at three time-points, spanning about 19 months). Measures included a Chinese attributional style questionnaire, the Pittsburgh Sleep Quality Index, and the Depression Anxiety Stress Scale.
Results: Cross-sectional analyses revealed moderate correlations among sleep quality, depressive mood, and optimism. Cross-lagged analyses showed a bidirectional causality between optimism and sleep. Path analysis demonstrated that depressive mood fully mediated the influence of optimism on sleep quality, and it partially mediated the influence of sleep quality on optimism.
Conclusion: Optimism improves sleep. Poor sleep makes a pessimist. The effects of sleep quality on optimism could not be fully explained by depressive mood, highlighting the unique role of sleep on optimism. Understanding the mechanisms of the feedback loop of sleep quality, mood, and optimism may provide insights for clinical interventions for individuals presented with mood-related problems.

Optimists sleep better than pessimists do (e.g., [20,26,49]). Three frameworks can be applied in understanding this correlation. One posits that optimism takes away worries that often interrupt sleep. Another is that sleep quality influences the way people look at the world. As one wakes up well rested, the world seems better than if one had trouble falling asleep the previous night. A third possibility is that the causation acts both ways. Since a theoretical connection between optimism and sleep has never been formulated before, in this paper we proposed a heuristic model on the possible causal relationships. We then described our attempt to verify those hypothesized relationships, as well as the potential role of depressive mood as a mediator in the optimism–sleep link.

Optimism is the generalized expectation that good things will be plentiful in the future and bad things will be scarce [46]. Pessimism, on the opposite end of the continuum, is the generalized expectation that bad things will abound in the future and good things will be rare. They can be operationalized as explanatory or attributional styles (AS) people use to explain events that occur to them [2].

As attributional styles have been associated with a number of physical and mental health outcomes, they deserve further scientific investigation and clinical attention. Pessimistic AS is related to negative outcomes such as poor physical health. Peterson, Seligman, and Vaillant [39] found that pessimistic people were more likely to experience poor health two to three decades later. This long-term effect is probably due to the pessimists' lower self-efficacy for self-care. Another explanation is that pessimists may be more at risk for social isolation, which predicts poor health [17]. On the contrary, optimism is related to positive outcomes. A meta-analysis of 84 studies showed a correlation of .17 between optimism and physical health [41].

Optimism and sleep

Optimism is associated with sleep. A recent study of several thousands of adults revealed that optimism was correlated with sleep quality and sleep sufficiency measured cross-sectionally as well as five years later [20]. The associations were attenuated after depressive symptoms were accounted for, but optimism was still associated with lowered risk

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http://dx.doi.org/10.1016/j.jpsychores.2015.09.010
0022-3999/

for self-reported sleep quality longitudinally. Another large-scale cross-sectional study also showed that optimism was negatively associated with insomnia symptoms as well as short (<6 h) and long (>9 h) sleep duration, after controlling depressive symptoms [26]. Additional empirical findings supporting the optimism-sleep link have been reported among children (e.g., [13,27]), Chinese college students [48,49], and young grandmothers [9]. The association between optimism and sleep could be understood from the widely-supported cognitive-behavioral model of insomnia. From a cognitive point of view, people who attribute bad events to causes that impact many aspects of life and that are not going to disappear would likely have negative expectations about their future; such worries or ruminations may lead to cognitive and physiological hyper-arousal at bedtime and consequently, sleep problems [16,35]. On the contrary, adopting an optimistic AS may free a person from worries, leading to better sleep. In addition, compared to pessimists, optimists may have more adaptive coping strategies, which may enhance sleep quality indirectly through effective problem-solving or directly through adaptive sleep habits. Building on previous correlational findings and the psychophysiological model of insomnia, we hypothesized and tested a causal link from optimism to sleep quality:

H1. : Optimism would be beneficial to sleep quality.

A reverse direction of causality is equally reasonable. For one thing, poor sleep has adverse impact on cognitive functions. Executive functions such as problem-solving are particularly vulnerable to the effects of poor sleep [36]. The lack of cognitive abilities in solving problems in life may lead to constant frustration and an eventual pessimistic outlook in life. For another, poor sleep has been found to result in daytime sleepiness and listlessness (e.g., [3]), which in turn may impair motivation to engage in daily activities and to overcome difficulties, hence reinforcing pessimism. A third pathway is through learned hopelessness, a primary component of pessimism [1]. A person who struggles with a seemingly untreatable chronic sleep problem may give up hope and become more pessimistic. Indeed, certain sleep quality variables predict global attribution for negative events [18]. Compared to those allowed to sleep for 8 h per night, participants allowed to sleep for only 4 h per night for 12 nights scored lower on an optimism/sociability adjective checklist [14]. While no previous studies have examined the role of sleep quality in optimism longitudinally, considering the preliminary evidence of the effects of sleep variables on optimism and the theoretical arguments above, we proposed the following for evaluation in parallel with H1 to address the research gap:

H2. : Sleep quality would strengthen optimistic AS.

Mediating role of depressive mood in the optimism–sleep link

Sleep and depressive mood

Clinical studies have shown that about three-quarters of depressed patients reported insomnia symptoms and poor sleep quality [50]. Reduced total sleep time, prolonged sleep latency, increased number of intermittent awakenings, reduced slow-wave sleep, and abnormal rapid eye movement (REM) features were reported in individuals with depression [38]. Persistent sleep abnormalities were associated with an increased risk of relapse and a negative treatment outcome in depression, suggesting the significant role of sleep in the prognosis of depressive disorders (e.g., [11]; S.X. [28]).

Epidemiological research indicates that sleep disturbances and depression are either causally related to each other or share some common causalities [50]. Riemann et al. [44] reported that isolated insomnia symptoms lasting for two weeks or longer are predictive of an increased depression risk in the following one to three years. A recent meta-analysis reported that people with insomnia had doubled chances to develop depression compared to those without insomnia [4]. Previous longitudinal studies revealed that poor sleep quality significantly predicted subsequent depressive mood [5,37,60].

Optimism/pessimism and depressive mood

Low optimism and high pessimism were associated with increased risk of depression and suicidal behavior [8] and of depressive symptoms postpartum [7]. Stable and global attributions about bad events were significant predictors of depression in a Chinese sample (Z. [29]). The association between pessimism and depression was supported in meta-analyses of adult [53] and children samples [23].

Depressive mood as a mediator between optimism and sleep

While previous studies of the associations between optimism and sleep mostly treated depressive symptoms as a potential confounding factor and therefore controlled for its effects, elucidation of the causal relationships among these three variables using a cross-lagged design can shed light on their theoretical associations and potential pathways for interventions. In view of the close relationships of depressive mood with optimism and with sleep, we specifically expected that:

H3. : Depressive mood would mediate the optimism–sleep link.

Method

Procedure and participants

The present study was part of a larger project from which several papers have been produced (authors and date masked for blind review). Participants were 8245 Chinese students and adults recruited through various channels (e.g., bulk emails through universities and churches in Hong Kong and Macau, social networks, and advertisements on social media). Although this is not a random sample, the use of different recruitment methods enhanced the variability among the participants. Data collection was approved by the Human Research Ethics Committee for Non-clinical Faculties at the University of Hong Kong. In obtaining consent, we told prospective participants that they would be invited to answer surveys on the internet during the next few years, and that they would have a 1 in 100 chance of winning a supermarket voucher that worths HK$100 (about US$12.50) each time they completed a survey. If they gave up this opportunity, HK$20 would be donated to a charity for poverty reduction. The data we used in the current study came from three waves of survey that began in February, 2010 (Wave 1), September, 2010 (Wave 2), and September, 2011 (Wave 3), respectively. To make up for participant attrition, a supplementary cohort was added a year later, using the same follow-up schedule. For the present study, the inclusion criteria were: (a) aged 18 or above; and (b) not full-time students, unemployed, retired, or homemakers during the six months prior to Wave 1 of the survey. The latter criterion was imposed because we were mindful of the possibility that students and those without employment had different sleep patterns that might confound the research results. In our sample of 987 working adults (63.4% female, 92.4% full-time workers, 27.0% married, 90.2% Hong Kong residents), the mean age was 32.59 years (SD = 9.05, range = 18 to 67) at Wave 1. About 40.3% reported a monthly household income under HK$20,000.

Measures

Optimism

The Attributional Style Questionnaire (ASQ; [40]) is one of the commonest measure of optimism vs. pessimism. It has been modified for use in different contexts (educational, sports, etc.) and cultures including Hong Kong Chinese [22] with good validity. Modestly correlated

with other measures of optimism (e.g., [42]), the ASQ was selected because of its lower transparency, and thus higher resistance to social desirability responses. The current adaptation comprises five positive and five negative events, as well as some possible explanations. (The explanations were generated in a pilot study and subsequently edited by us.) After checking as many explanations as they saw plausible, participants rated if those selected explanations were stable and global, on a 7-point scale. The averaged stability and globality ratings on the explanations for positive events were aggregated with the averaged reversed stability and globality ratings on the explanations for negative events. The theoretical range of the score was between 2 and 14, with a high value representing optimism, and a low value representing pessimism (Cronbach's alphas for positive and negative events = .86 and .87 respectively). This approach is widely adopted in previous studies (e.g., [12,19,55]).

Sleep quality

The 19-item Pittsburgh Sleep Quality Index (PSQI; [6]) was used to measure participants' subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction over one month's time. Total scores ranged from 0 to 21, with higher scores indicating poorer sleep quality. Cronbach's alphas were in the range of .59 to .63, which is not too different from what some prior researchers have found when applied to non-clinical participants (e.g., [43,52]). Validity of the Chinese version has been demonstrated [21,58].

Depressive mood

Participants' depressive mood was measured at Wave 2 with the depression subscale in the Chinese version of the Depression Anxiety Stress Scale (DASS-21; [54]). The Cronbach's alpha for the current sample was .89.

Statistical analyses

We conducted attrition analysis and computed basic descriptive statistics for a general understanding of the data. To examine H1 and H2 in the longitudinal dataset, we adopted the cross-lagged panel model. This model is usually used when two variables are measured at two different time points [30]. As shown in Fig. 1, the scores of PSQI and optimism at the second time point (Wave 3) were regressed on both optimism and PSQI scores at the first time point (Wave 1). This allows us to examine the effect of initial PSQI on subsequent optimism, controlled for initial optimism, and also the effect of initial optimism on subsequent PSQI, controlled for initial PSQI. This model is better than the cross-lagged correlation, which assumes homogenous stability of variables measures at two time points [45]. We used path analysis to examine the role of depressive mood as a mediator. In the cross-lagged analysis, we used full information maximum likelihood estimation (FIML) to handle missing data. This procedure produces relatively unbiased results [10].

Results

Attrition analysis

As compared to those who dropped out, those who stayed in the study were slightly more likely to have received university education (Table 1). The two groups were not different on gender, household income, marital status, religion, age, optimism, or sleep quality.

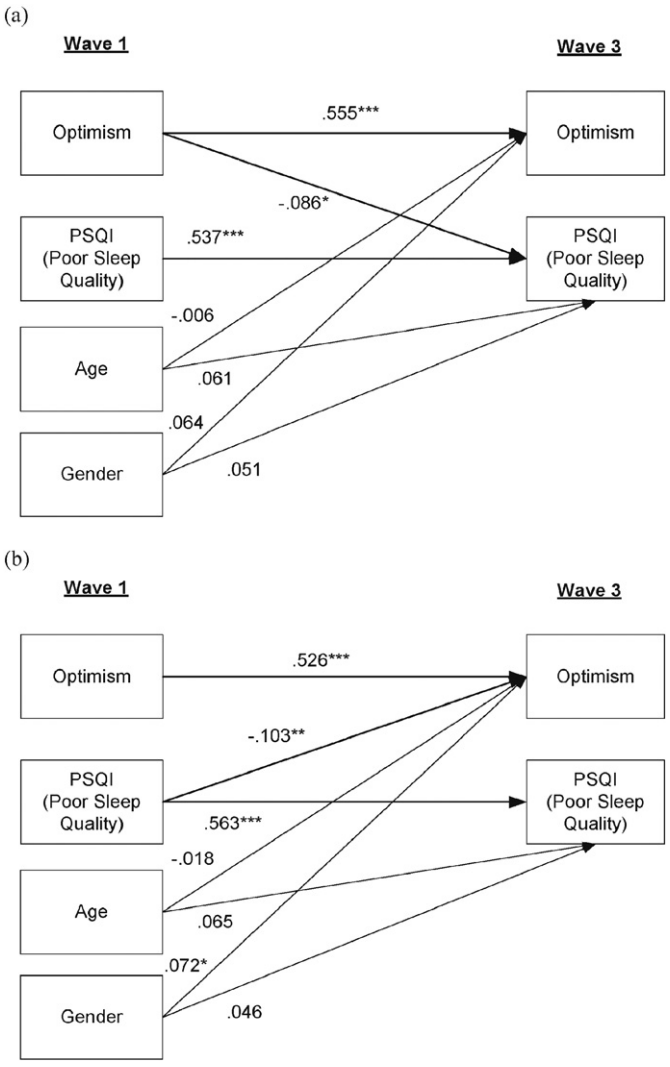

Fig. 1. Cross-lagged analysis between optimism and PSQI. Sample size was 624 in both analyses. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

Preliminary analysis

The means, *SD*s, and correlations among the study variables can be found in Table 2. The between-wave correlations for optimism and poor sleep quality ranged from .53 to .56 ($p < .01$). This somewhat moderate correlation suggested a relative malleability of the two constructs, a precondition for causal inference. The patterns of intercorrelations between optimism and depressive mood were generally similar for Waves 1 and 3 ($rs = -.21$ to $-.22$, $p < .01$). The correlations between optimism and sleep quality provided preliminary evidence that the two constructs might be causally related to one another.

Cross-lagged analysis

To understand the causality between optimism and sleep quality, we tested two models, both of which included partial stability of optimism and PSQI over time. The first model depicted, in addition, an effect of optimism measured at Wave 1 on poor sleep quality at Wave 3 (Fig. 1a), while the second model depicted an effect of poor sleep quality measured at Wave 1 on optimism at Wave 3 (Fig. 1b). In both analyses, age and gender were controlled.

For the first model, the fit to the data was marginal, $\chi^2(1, N = 624) = 8.478$, $p = .004$; RMSEA = .109 (90% CI = .051–.182), Cfit

Table 1
Demographics and psychological characteristics between individuals who dropped out from Wave 3 and those who stayed in Wave 3.

	Dropped out in Wave 3 ($n = 239$)	Stayed in Wave 3 ($n = 748$)	Significance tests	Effect sizes
	%/Mean (SD)	%/Mean (*SD*)		
Gender				
Male	32.2%	38.0%	$\chi^2(1) = 2.58$	.05
Female	67.8%	62.0%		
Household income (in HK$)				
<10,000	9.3%	12.6%	$\chi^2(5) = 4.61$	–
10,000–19,999	33.3%	26.9%		
20,000–29,999	17.1%	18.5%		
30,000–39,999	12.0%	14.0%		
40,000–49,999	11.1%	10.6%		
≥50,000	17.1%	17.4%		
Marital status				
Single	66.5%	70.6%	$\chi^2(1) = 1.41$	.04
Married/separated/divorced	33.5%	29.4%		
Education				
Secondary or below	23.0%	16.0%	$\chi^2(1) = 5.90^*$	.08
University or above	77.0%	84.0%		
Religion				
Christianity	61.3%	59.9%	$\chi^2(1) = .16$	.01
Other religions	38.7%	40.1%		
Age	33.13 (9.45)	32.42 (8.92)	$t(985) = 1.06$	.08
Optimism (W1)	8.69 (1.02)	8.70 (.95)	$t(985) = -.24$	−.01
PSQI (W1)	5.73 (2.80)	5.70 (2.49)	$t(789) = .13$	.01
Depressive mood (W2)	7.57 (7.82)	7.23 (7.84)	$t(937) = .58$	.04

For effect sizes, Cohen's *d*s and Cramer's *V*s were reported for *t* tests and one-df chi-squared tests, respectively; a high score on PSQI (Pittsburgh Sleep Quality Index) indicates poor sleep quality.
* $p < .05$.

$p = .048$; CFI = .983; TLI = .845; SRMR = .021. Nevertheless, it was still observed that optimists tended to have better sleep quality later ($b = -.086$, $p < .05$) at Wave 3 (Fig. 1a).

The second model fit the data adequately, $\chi^2(1,N = 624) = 5.046$, $p = .025$; RMSEA = .081 (90% CI = .023–.156), Cfit $p = .160$; CFI = .991; TLI = .916; SRMR = .018. People who reported better sleep quality at Wave 1 tended to be more optimistic ($b = -.103$, $p < .05$) at Wave 3 (Fig. 1b). In short, both H1 and H2 received empirical support, suggesting bidirectional relationship between optimism and PSQI.

Path analysis

Having shown that optimism and sleep quality were both cause and effect of each other, we investigated if the two causal relationships were mediated by depressive mood. To accomplish this, we first fit a model that optimism at Wave 1 predicted depressive mood at Wave 2 and PSQI at Wave 3, with depressive mood at Wave 2 also predicting PSQI at Wave 3. Before testing this path model, we conducted a measurement model to investigate the fit. The measurement model exhibited good fit, $\chi^2(26,N = 987) = 170.747$, $p < .001$; RMSEA = .061 (90% CI = .052–.069), Cfit $p = .020$; CFI = .963; TLI = .948; SRMR = .032. The path model also fit the data well, $\chi^2(26,N = 987) = 152.296$, $p < .001$; RMSEA = .070 (90% CI = .060–.081), Cfit $p = .001$; CFI = .962; TLI = .974; SRMR = .033. As shown in Fig. 2a, optimists had lower level of depressive mood ($b = -.322$, $p < .001$). Depressive mood, furthermore, were positively associated with poor sleep quality ($b = .345$, $p < .001$). A significant mediation path was found from optimism to PSQI via depressive mood ($b = -.111$, $p < .001$). We then conducted a simulation using a bootstrap with 1000 replications. Bias-corrected 95% confidence interval estimates of the mediation effect were between −.15, and −.07, which was statistically significant ($p < .05$). On the other hand, bias-corrected 95% confidence interval estimates of the direct effect from optimism to PSQI lied between −.15 and .02, which was statistically non-significant. The results implied that it was the depressive mood generated from a pessimistic AS that prevented a person from sleeping well.

We also tested if the relationship between PSQI at Wave 1 and optimism at Wave 3 might be mediated by depressive mood at Wave 2. Examination of the measurement model suggested a good fit, $\chi^2(26,N = 844) = 143.536$, $p < .001$; RMSEA = .054 (90% CI = .046–.063), Cfit $p = .207$; CFI = .970; TLI = .958; SRMR = .026. So was the path model, $\chi^2(26,N = 844) = 112.053$, $p < .001$; RMSEA = .063 (90% CI = .051–.075), Cfit $p = .038$; CFI = .970; TLI = .958; SRMR = .027. We further conducted a simulation using a bootstrap with 1000 replications. Bias-corrected 95% confidence interval estimates of the mediation effect lied between −.16, and −.08, and bias-corrected 95% confidence interval estimates of the direct effect from PSQI to optimism lied between −.17 and −.003. Both mediation and direct effect were statistically significant ($p < .05$). As shown in Fig. 2b, poor sleep quality was positively associated with depressive mood ($b = .373$, $p < .001$), and negatively associated with optimism ($b = -.082$, $p < .05$). People at a higher level of depressive mood were more likely to have more pessimistic AS ($b = -.332$, $p < .001$). There was a significant indirect effect from PSQI to optimism via depressive mood. ($b = -.124$, $p < .001$).

The above path analyses were repeated with age and gender included as control variables. The indirect and direct effects were similar to those reported above.

Table 2
Intercorrelations among study variables, with means and standard deviations.[**]

	1.	2.	3.	4.	5.
1. Optimism (W1)	1.00				
2. PSQI (W1)	−.21**	1.00			
3. Depressive mood (W2)	−.32**	.35**	1.00		
4. Optimism (W3)	.53**	−.21**	−.35**	1.00	
5. PSQI (W3)	−.18**	.56**	.36**	−.22**	1.00
Mean	8.70	5.71	7.32	8.64	6.40
SD	.96	2.56	7.83	.96	2.89

Note. Sample size ranged from 496 to 987; a high score on PSQI (Pittsburgh Sleep Quality Index) indicates poor sleep quality.
** $p < .01$.

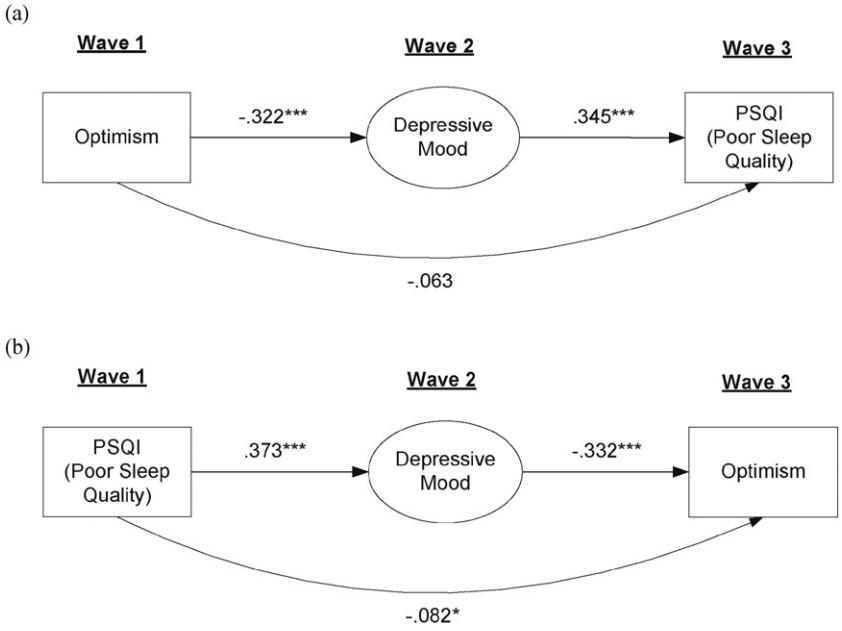

Fig. 2. Path analysis testing the mediation effect of depressive mood between optimism and PSQI. Sample size was 987 in both analyses. $^{*}p < .05$; $^{***}p < .001$.

Discussion

Theoretical contributions

This study aimed to clarify the causal relationship between optimism and sleep quality. With a cross-lagged longitudinal design, we replicated previous findings that optimists sleep better than pessimists do. More importantly, the present study provides empirical evidence for the first time that optimism improves sleep. That is, attributing good events to persisting causes that also influence other aspects of life brings more restful sleep. Furthermore, the study shows causality in a reversed direction as well: Poor sleep makes a pessimist. This study provides the first evidence of the bi-directional relationship between sleep quality and optimism.

We further demonstrated depressive mood as a mediator of the relationship between optimism and sleep quality (H3). The influence of optimism on sleep quality could be totally explained by its effects on depressive mood. Given the strong link between pessimism and depressive mood, and that poor sleep quality is often observed in individuals with depressive mood, a full mediation is not surprising. Interestingly, the effects of sleep quality on optimism could not be fully explained by the effects of sleep quality on depressive mood, which was only a partial mediator. Such findings highlight the unique and direct role of sleep quality in nurturing optimism. Fig. 3 illustrates the conceptual model of the feedback loop.

The optimism–depression–sleep link could be understood in several ways. First, optimists engage in active and effective coping such as problem-focused strategies and seeking social support, thus reducing depressive mood. Second, optimism modulates and buffers the effect of daily hassles on health outcomes, maintaining good moods for the person. Third, optimism brings hope and dispels worries, despite temporary setbacks that would otherwise disturb mood and consequently, sleep. In others words, optimism results in good sleep through its mood regulatory effects.

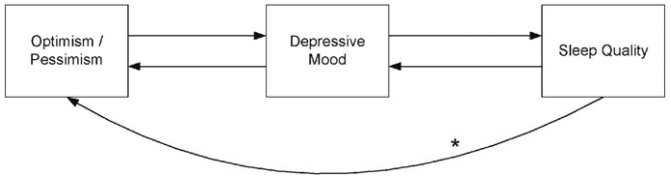

Fig. 3. The optimism/pessimism–depression–sleep link. *Potential pathways: Physical conditions, cognitive functioning.

The mechanisms of the sleep–optimism link can be understood in terms of the multifaceted impacts of sleep quality on daily functioning. First and foremost, as found in previous studies and this current one, sleep plays a critical role in our emotional functioning, which in turn impacts on optimism. The indirect effect of sleep quality on optimism via depressive mood ($b = .124$) was slightly stronger than the direct effect of sleep quality on optimism ($b = .082$), supporting the crucial role of depressive mood in the sleep–optimism link.

Besides this emotional mechanism, sleep may also exert its influence on optimism through other pathways, such as the person's physical states and cognitive functioning, as postulated above. Poor sleep quality is closely linked to illnesses, pain, tiredness, and listlessness, all of which can aggravate pessimism. Furthermore, previous studies have reported the adverse impact of poor sleep quality on various cognitive functions, including attention and executive functions, memory, and affective cognition (e.g., [33,56,59]). The effects of sleep-associated cognitive dysfunction on pessimism can be manifold. For example, with weaker problem-solving and planning skills, one may find it difficult to cope with challenges in life on a day-to-day basis, culminating in pessimistic thinking. Poor sleepers may under-perform at school or work, leading to a pessimistic outlook. Moreover, as poor sleepers attend to and remember emotional materials with negative valence more than neutral ones [51,57], they are more vulnerable to pessimistic attributions. In summary, while the feedback loop of optimism and sleep can be understood with the role of depressive mood that causes as well as induced on either end, additional mechanisms exist for the effects of sleep quality as a biophysiological variable on optimism as a belief construct.

Practical implications

From a clinical perspective, understanding the relationships among the three closely-linked variables enables us to devise appropriate intervention strategies for the right entry points. Based on our finding that sleep has direct effects on optimism, in addition to its effects through depressive mood, sleep quality is arguably the most reasonable point of entry for intervention. Like depression, there are efficacious treatments for insomnia (e.g., [34]). Recent studies have also demonstrated that sleep-focused treatments can reduce depressive symptoms, further

validating the notion of treating sleep as the primary target (e.g., [31]). In recent years, transdiagnostic sleep interventions have been suggested, in view of the increasing awareness of the role of sleep in predisposing, precipitating, and perpetuating various physical and mental conditions, such as chronic fatigue [24]. Given the diverse effects of sleep on our physical and mental health and the availability of validated treatments, it is certainly a strong contender as a primary treatment target. Furthermore, the treatments for sleep are mostly behavior-based, and hence require less intellectual capacity in the patients than the cognitive-behavioral therapy for depression or AS, both of which could be cognitively demanding. Lastly, sleep quality can be enhanced more proactively in subclinical or even healthy populations as public health promotion, for the prevention of sleep problems, depressive mood, pessimism, and a whole list of physical and mental issues.

Limitations and future research

Although cross-lagged panel model is a popular model to examine data collected with only two time points, this model has two limitations. First, we cannot adopt more sophisticated methods, such as dual change model [32] and random intercepts cross-lagged panel model (RI-CLPM; [15]), in which cross-lagged panel model is nested. We cannot assess whether an effect is stationary [25], that is, whether the effect of PSQI on optimism (or optimism on PSQI) is constant across time. Nevertheless, based on the present findings, we believe it is promising to consider examining the relationship between optimism and PSQI in three or more waves in future studies. Second, despite the use of the term "effects" in the model, compared to experimental data, results in the cross-lagged panel model are still not conclusive support for a causal relationship. This is because the data, though longitudinal, are still observational ([30]; also see [47]). (Note that other models, such as RI-CLPM and dual change model, on longitudinal observational data also have this weakness.) Nevertheless, the findings based on cross-lagged panel model are still more informative than those based on cross-sectional regression models, because the former can distinguish the effect of PSQI on optimism from that of optimism on PSQI, which are conflated in cross-sectional data. Cross-lagged panel model can provide stronger evidence than cross-sectional regression model on causal direction when experimentation is not feasible [30].

Third, the present model in Fig. 3, although parsimonious, can be further refined through more detailed investigation into the multiple pathways between sleep and optimism via depressive mood. Future research can also investigate if the causality is generalizable to a university student population (which is known to be different from the working population in terms of cognitive demands and sleeping habits). Furthermore, given that AS is part of how we see and believe about the world, and depressive mood is negatively related to desirable behaviors such as forgiveness and gratitude, future research should examine how these constructs may be linked with each other, just as optimism and sleep quality are.

Acknowledgments

This research was supported in part by a grant from the Hong Kong General Research Fund (HKU745312) to CHH and EYYL. We thank Victoria Chan, Cecilia Leung, Daryll Cheng, Tina Lau, Dino Wong, and Edith Lee for assistance in library research, Christian Chan and Sing-Hang Cheung for advice on data analysis, and the editor and two anonymous reviewers for very helpful comments. Doris Mok gave useful suggestions at the preparation phase of this research. Preliminary results were presented at the 48th Annual Conference of the Australian Psychological Society, Cairns, October, 2013, as well as the 123rd Annual Convention of the American Psychological Association, Toronto, August, 2015.

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