CITY UNIVERSITY OF HONG KONG

Psychosocial Factors and Depression:

The Mediating Role of Sleep

A Report Submitted to
Department of Applied Social Studies
in Partial Fulfillment of the Requirements for
the Bachelor of Social Sciences in Psychology

by

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Abstract

Objectives.   The purpose of the present study was to determine, if any, the mediating role of sleep in the relationship between psychosocial factors and depression.

Methods.   A sample of 529 Chinese college students participants were recruited from 4 Universities in Hong Kong, they completed a self-report questionnaire measuring their level of optimism, social support, stress, sleep problems and depression.

Results.   The mediating effect of sleep was first tested with the three psychosocial factors (Optimism, Social Support and Stress) were first test independently. Then, to test the three psychosocial factors simultaneously with sleep and depression, multiple regressions and Sobel tests were computed. Results showed optimism, social support and stress all predicted sleep problems and depression independently. But, when these variables were combined, only the interaction between optimism and social support significantly predicted depression and was mediated by sleep.

Conclusions.   Results of the present study illustrated that sleep was a significant mediator between psychosocial factors and depression. Some of these variables might interact to produce an effect on mental health of an individual. What's more, this study, consistent with previous findings, illustrated that

optimism, social support, stress all affect sleep quality and mental health of

college students. This study does shed light to sleep problem intervention and

schools intended to promote sleep hygiene among college students can also

target on these factors to help reduce the sleep problems that college student

encountered.

Acknowledgements

I am heartily thankful to my supervisor Dr. Wing S. Wong. This thesis would not have been possible without her guidance and support. I would also like to show my gratitude to Mr. Barry, K.H. Tam for his valuable advice. Thank you.

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Department of Applied Social Studies

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Chapter 1: Introduction and Literature Review

1.1 Introduction

Sleep is state of rest, individual spend one third of his/ her life sleeping

(Bonn, 2004). The optimal hour of sleep is about seven to nine hours for adults.

Sufficient sleep benefits not only memory, alertness and problem solving but also

the overall health of an individual. However, some people may suffer from

sleeping problems that hinder their daily functioning. According to the World

Health Day (2001), *"sleep problems, it means that, having difficulty in going off*

to sleep, waking up repeatedly or having difficulty in falling off to sleep if it is

once interrupted." Evidence showed that increased numbers of college students

encountered sleep problems and reported dissatisfaction in sleep (Jensen, 2003).

College is a critical period for personal growth and advancement. Many of the

college students have to strike a balance between academic demands and

part-time jobs. According to the research result reported by Murphy and Archer

(1996), the most prominent stressors experienced by college students was that

there were too many academic demands but too little time. To meet all the

demands from school and work, college students experience certain amount of

stress that may affect quality of sleep (Hawkins & Shaw, 1992).

Moreover, evidence showed that poor sleep was significantly correlated

with academic performance of college students. For example, in their study of

sleeping habits of medical students, Kelly, Kelly and Clanton (2001) revealed

that students who had longer sleep duration reported higher GPAs than those who

had shorter sleep duration.

Therefore, it was shown that poor sleep quality or shorter sleep duration

impaired cognitive functioning and overall health of an individual. With the

increasing numbers of college students being affected and the adverse

consequences it brings, it is worthwhile to investigate factors that affect sleep

quality of college students, so that school-based intervention can target on these

factors and raise the awareness of sleep problem and promote sleep hygiene in

school.

1.2 Literature Review

1.2.1 The Prevalence of Insomnia

Based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth

Edition, people with primary insomnia frequently complain about having

difficulties of initiating or maintaining sleep or having a non-restorative sleep

that lasts for at least one month. The sleep problem should be severe enough to

cause distress which is clinically significant or result in impairment in important

areas of functioning. Also, it neither happens exclusively during the course of

another sleep disorders or mental disorders nor it is resulted from any other direct

physiological effects of the use of substance or from a general medical condition.

Insomnia has been studied across different populations. In a longitudinal study of Finnish adult general population, Hublin et al (2001) found that, among the 12,423 subjects, 19.3% reported insufficient sleep in 1981 but the figure increased to 20.6% in 1991. Besides, shorter sleep duration was reported by 79.6% of the sample and 7.6% of them reported at least 1.5 hour less and women were more likely to report having shorter sleep duration. Another study conducted in Finland general population, Ohayon and Partinen (2002) found that 11.9% of the sample dissatisfied with their sleep and 37.6% of them reported having at least one of the insomnia symptoms in which, compared with other Nordic countries, the prevalence rates of insomnia was 1.5 higher. Groeger et. al. (2004) carried out a study on the sleep quantity and sleep difficulties among 2,000 nationally representative British adults. It was reported that there were no gender differences on the average reported sleep. However, 57% of the sample reported having one or more sleep difficulties and women tended to report more severe sleep difficulties.

In their cross-sectional study aimed at examining the age differences in somatic and psychiatric comorbidity, Stewart et al. (2006) revealed that, among the 8,580 subjects living in private household, 37% of them reported having insomnia symptoms, 12% reported having a moderate to severe symptoms, 13%

reported having insomnia with fatigue and 5% of them fulfilled the DSM-IV criteria of having primary insomnia. It was also found that, consistent with previous researches, females were more likely to report having sleep difficulties Stewart et al. (2006).

The prevalence rates of insomnia have also been investigated in Asian countries. Li (2002), in his study on the gender differences in insomnia in the Hong Kong Chinese population, revealed that 11.9% of the sample reported having insomnia at least three times per week. Consistent with previous findings in western countries, insomnia was more common in females than males with 14% and 9.3% respectively. In the same year, a study on the prevalence of insomnia in the South Korea revealed 17% of the 3719 participants reported having insomnia symptoms at least three nights per week. Also, women were more vulnerable to insomnia symptoms.

It was believed that not only the adult population, but also the college student populations suffer from insomnia. Jensen (2003) reviewed past literatures on sleep problems among college students. It was shown that students experienced sleep difficulties as well. Dramatic changes of sleep habits among college students were found. The average sleep hours decreased from 7.3 hours to 6.87 hours in the ten years within 1979-1989. Also, the number of students reported having sleep problems increased from 26.7% to 68.3% in 1982-1992.

Similar studies have also been reported in 2001, Buboltz et al., (2001)

investigated sleep habits and patterns among college students. It was reported

that among 191 undergraduate students, 75% of them suffer sleep problems

occasionally and 15% of them reported having poor sleep quality. Also, females

significantly reported more sleep problems than males. 18% of males and 30% of

females reported suffering from some forms of insomnia within 3 months

preceding the study. Generally, females were more likely to report having greater

difficulties in falling asleep, disturbed night sleep, frequent nocturnal awakening

and on the whole, poorer sleep quality.

Besides, in their study on sleep patterns in college sample, Tsai and Li

(2004) reported sleep problems were more likely to happen in weekdays in

which students spent significantly less time in bed, slept shorter, had less total

sleep, longer sleep latency and lower sleep efficacy and reported significantly

lower sleep quality. Consistent with previous findings, females reported

significantly more sleep problems than males.

1.2.2 The Impact of Insomnia on mental health

Insomnia has been found to correlate with the development of physical and

mental health problems, as well as subjective satisfaction towards life. In their

study of the relationship between sleep disturbances and depression, Cukrowicz

et al. (2006) found that, people suffered from sleep problems showed a higher

depression rates compared to those who have no sleeping problems. Another

longitudinal study reported a similar result, revealing that, compared with others,

those who received a diagnosis of insomnia at the baseline level were in greater

risk of developing depression at the 1 year later follow-up study (Ford et al, 1989)

and the risk was even 40 times greater when insomnia was present at both

interviews. In their 12- month prospective study of their adolescent sample,

Robert et al. (2008) reported that chronic insomnia resulted in poor outcomes

across different aspects, including the interpersonal, somatic and psychological

functioning of an individual.

Furthermore, Goldstein, Bridge and Brent (2008) carried out a study

comparing adolescent suicide completers and the community control adolescents.

It was found that those who had committed suicide had a higher rate of sleep

disturbance than that of the control group both the week preceding death and in

the current depressive episode. They also reported higher scores in depressive

severity. Therefore, it was suggested that insomnia may increase suicide risk. In

their review article of the impact of insomnia on psychological and medical

health, Taylor et al. (2003) identified that insomniacs were more likely to

develop depression, anxiety disorders and psychiatric disorders or psychic

distress. Standing at the same point with Brent's study, it was found that

insomniacs were three times more likely to have committed suicide.

Although some insomniacs may try medication to solve their sleep problems,

there were strong evidences suggesting that sleeping pill use was a significant

predictor of mortality (Taylor, 2003).

Besides, insomnia can impair immune functioning (Taylor, 2003). People

with disturbed sleep and depressed individual with disturbed sleep had a lower

level of natural killer cell (NK) activity and NK count, resulted in poorer

immune functioning.

1.2.3 Factors predicting Insomnia

As mentioned in the last paragraph, the impact of sleep on health can be

tremendous, leading to problems in physical health or even associated with

serious mental illnesses such as depression and suicide. Therefore, it is

worthwhile to study the factors predicting insomnia and how they interact to

affect sleep quality and mental status of an individual.

Optimism

Optimism is defined as an individual's generalized expectancies about the

future, people who are optimistic often expect good things rather than bad things

happen on them (Scheier & Carver, 1985). Optimism has been reported to have

its predictive power to both psychological and physical well-being in human. For example, in their study of examining the role of personality in predicting psychological and physical health among grandmothers, Francine et al. (2008) found that optimistic grandmothers reported fewer psychological health problems such as depression and hostility and sleep disorders. On the other hand, those who were less optimistic reported significantly more sleep problems and had a higher rate of hypertension and obsessive compulsive symptoms. It was suggested that less optimistic grandmothers were deficient in positive expectations about the future and as a result they inclined to worry in which leading to sleep problems.

In a similar study of affective personality, Norlander et al. (2005) revealed that those who have higher positive affect and low negative affect reported the better sleep quality, lower anxiety, lower depression and more optimistic. Moreover, it was found that those who reported higher positive affectivity and were more energetic also experienced less stress. Therefore, it was suggested that sleep quality, energy and optimism are inter-correlated. Individuals exhibit high positive affectivity, optimism and energy may develop coping strategies for mastering stressful situations and therefore achieving a better sleep.

Although evidence above showed that optimism was consistently correlated with sleep, the effects of optimism on sleep were not the fundamental aim of the

studies. Rather, they were the peripheral products. To my best knowledge, there was no study explore the direct relationship between optimism and sleep. So, the current study aimed at filling the gap.

Social Support

Social support is defined as an information from parents, friends or significant others that one is loved, valued and cared for. It can be divided into many forms such as tangible assistance, informational support and emotional support (Taylor, 2008). There were just a few studies examined the direct relationship between social support and insomnia. For example, Nordin and Knutsson (2005) reported that people with lower social network and emotional support were more likely to report poor sleep, indicating social support was a buffer in sleep problems. Similarly, in a study of a sample of Japanese daytime workers, Nakata et al. (2004) revealed that high intra-group conflicts, low employment opportunities, low co-worker support and high job dissatisfaction and high depressive symptoms were significantly correlated with insomnia, showing that good human relationships might help preventing the development of sleep problems in the workplace.

There was another study that pointed out the importance of social support on health. Chandola et al. (2007), in their study of the effect of reciprocal relationship on health, revealed that, failed reciprocity, that is, the imbalance

between the effort given and the reward return, was related to poorer health of an individual. It was reported that the higher the levels of non-reciprocity, the higher levels of sleep problems, depression and lower level of physical and mental health. It was believed that the strong emotions and stress reaction that elicited by failed reciprocity may affect individual's health. Despite the fact that social support was found to be correlated with sleep as indicated in the above studies, there was evidence showing that social support has no direct effect on sleep quality. In their study of the quality of sleep in caregiver population, Brummett et al. (2006) revealed that social support was not directly related to sleep quality, instead, it possessed a mediating role in which it interacts with negative affect to influence on the caregiver's sleep quality.

However, in a study of sleep disturbances among HIV-positive adults, Vosvick et al. (2004) found that the relationship between social support and sleep problem was rather complex. An increase social support did not guarantee a decrease in sleep problems because both the types and sources of social support were the important dimensions to be considered. So, it can be concluded that, social support influenced sleep quality, but whether the effect is direct or indirect was still unknown. Thus, this study aimed to find out the effect of social support on sleep.

Stress

Stress is defined as a negative emotional experience. It is accompanied by physiological, biological, cognitive and behavioral changes in an individual (Baum, 1990). Stress has always been reported to be correlated with insomnia. In his study of a sample of workers, Linton (2004) found that poor psychosocial work environment is the risk factor of sleep problems. The possible reason for this was that stress at work causes disruptions in an individual in which form a vicious circle between work and sleep (Linton, 2004). Vela-Bueno et al. (2008) also examined the relationship between sleep quality and burnout levels of primary physicians. They found that burnout level was strongly related with all the insomnia symptoms including difficulties falling asleep, early awakening, etc. in which the high burnout group reported significantly higher prevalence of insomnia. It was suggested that the high burnouts person have difficulties relaxing after work, they may also extensively worry about their sleep and the consequences for not getting enough sleep in which they are always in a hyperactive state, result in the activation of the HPA axis, increasing the allostatic load, again, forming a vicious circle between stress and insomnia. Another study of a sample of clinical patients also reported that, work-school stress, family and health were the precipitating factors of insomnia (Bastien et al., 2004).

1.2.4 Implications from the literature review

The above studies suggested that optimism, social support and stress

predicted sleep problem exclusively. However, a great deal of research showed that the three variables were inter-correlated.

In a preliminary study within palliative setting, Hulbert and Morrison (2006) surveyed 36 professional caregivers and volunteers. It was found that optimism was strongly correlated with higher levels of social support and lower levels of perceived stress. In their study of the role of personal and social resources in preventing adverse health outcomes among 330 uniformed professions, Oginska-bulik (2005) revealed that social support had a direct impact on perceived stress in workplace. Also, it was found that people with high level of optimism, self-efficacy and self-esteem reported significantly lower level of perceived stress. Yali and Lobel (2002), in their study of stress-resistance resources and coping among 163 pregnant women, also found that increased level of optimism was associated with lower level of distress, optimists also made less used of avoidance coping strategies. On the other hand, they found that social support was associated with higher levels of distress and greater use of avoidance and preparation coping.

It can be concluded that, optimism consistently predicted lower level of stress and higher level of social support. But the effect of social support on stress remained unclear. It was still unclear whether social support is exerting a moderating or mediating effect on stress. Nevertheless, evidence showed that

these three variables were inter-correlated and they might interact to exert an

effect on health. Therefore, in this study, it was hypothesized that these three

variables may interact to affect sleep quality and mental health of an individual.

1.3 Objectives and Hypothesis

Studies consistently showed that optimism, social support and stress were

related to sleep. However, to my best knowledge, there were no studies examined

the impact of these three variables on sleep simultaneously among Chinese

college student samples. Thus, the first objective of this study was to investigate

the effects of psychosocial factors (optimism, social support and stress) on sleep.

Moreover, as sleep was always reported to have correlated with depression.

Therefore, it is believed variables that predicted sleep problems may also help in

predicting depression. So, the second objective of the current study was to

examine the relationship among the psychosocial factors, sleep and depression.

On the basis of the theoretical perspectives and previous findings, the

following model was proposed:
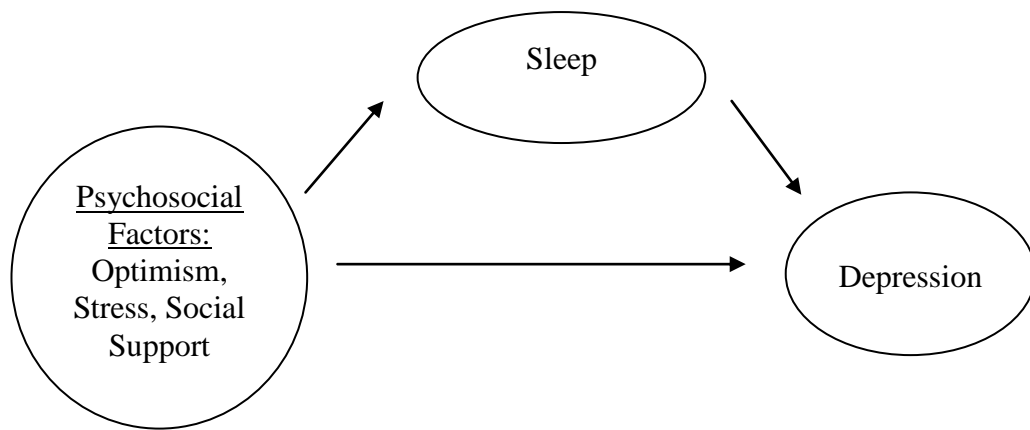
The hypotheses of the current study were:

H1: Optimism, Sleep and Depression are inter-correlated in which Sleep is a

mediator.

H2: Social Support, Sleep and Depression are inter-correlated in which Sleep is a

mediator.

H3: Stress, Sleep and Depression are inter-correlated in which Sleep is a

mediator.

H4: Optimism, Sleep and Stress interact to affect Sleep and Depression in which

Sleep play a mediating role in the relationships.

Chapter 2: Methodology

2.1 Research Design

The research design in this study was a cross-sectional one. A

cross-sectional design was chosen because the aim of this study, as noted in the

last section, was to explore the mediating role of sleep among the psychosocial

factors and its relation to depression. Therefore, as an exploring study, a

cross-sectional, correlation design was adopted. Also, a cross-sectional reached a

relatively large sample within a short period of time in which it ensured the

sample size and the generalizability of the study.

2.2 Participants

Participants were a sample of 529 undergraduates aged 18 or above. They

were chosen because there were substantial evidence showing that increased

numbers of college students are suffering from sleep problems. So, I believed

that there was a need to address the problem.

2.3 Instruments

2.3.1 Independent variables

Insomnia.

Insomnia was measured by the Pittsburgh Sleep Quality Index (PSQI).

PSQI was a self-report instrument that measures the quality and patterns of sleep of an individual. It measured an individual's sleep on seven areas, the subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the use of sleeping medication and the daytime dysfunction, in the previous month. Respondents scored on a 4-point Likert Scale (0=Not during the past month; 3=Three or more times a week) to indicate how much they agreed on the statement. The total PSQI score ranged from 0-21, with a global sum of 5 or greater indicating poor sleep quality (Smyth, 2007). The PSQI has been psychometrically validated, obtaining acceptable internal consistency, validity and test-retest reliability among either sleep-disorder patients or healthy subjects (Tsai, 2005). It was also translated into Chinese (CPSQI). The CPSQI also obtained a reliability ranged from 0.82 to 0.83 for all subjects and 0.75 for those who have primary insomnia. Moreover, it was found to be correlated with sleep quality VAS and some other sleep parameters such as SOL and SE, indicating an acceptable validity.

Stress.

The Perceived Stress Scale (PSS) was used to measure stress levels of an individual. The PSS was a self-administered tool designed by Cohen et al. in 1983 and targeted at the community sample (Taylor-Piliae et al., 2006). It was a

5-point Likert Scale (0=Never; 4=Very Often) in which higher scores indicate

more perceived stress. The PSS obtained satisfactory reliability (α= 0.89),

test-retest reliability (α = 0.85) and validity. The Chinese version of PSS obtained

a high internal consistency with α = 0.90 in a nurses sample (Lee & Crockett,

1994). Chen et al. (2000) also reported high test-retest and construct validity of

the Chinese version of PSS among Chinese women.

Optimism.

The Life Orientation Test Revised (Scheier and Carver, 1985) was a

self-reported scale assessing dispositional optimism. It was used to assess the

levels of positive outcome expectancies of an individual. It was later revised in

1994, higher reliability and validity was obtained in the revised version of LOT

(LOT-R) (Scheier, Carver, & Bridges, 1994). The Chinese version of LOT

(CLOT-R) consisted of 6 items with a test response of 5-point Likert Scale

(1=Strongly Disagree; 5= Strongly Agree). Higher mean score indicates higher

level of optimism perceived. A Cronbach's alpha of 0.76 and a test-retest

correlation of 0.79 over a 4-week period was reported (Scheier & Carver,1985) .

In his study of a Hong Kong Chinese Undergraduates and Working adult sample,

Lai (1997) also obtained a Cronbach's alpha value of 0.69, indicating a

satisfactory reliability of the CLOT-R.

Social Support.

The Multidimensional Scale of Perceived Social Support (MSPSS) was a

self-administered, subjective assessment of an individual's social support

adequacy. It was a 7-point Likert scale (1=strongly disagree; 7=strongly agree),

consisted of 12 items, measuring individual's social support from three different

subscales, family, friends and significant others. MSPSS has been

psychometrically validated, obtaining high internal consistency ($\alpha = 0.88$) and

validity. In a sample of Hong Kong Chinese, Chou (2000) found that the Chinese

version MSPSS (MSPSS-C) obtained an internal consistency reliability of 0.89.

Also, construct validity was established by an inverse correlation with depression

and anxiety subscales from the General Health Questionnaire (GHQ). Moreover,

it was found that the family and friends subscales of the MSPSS-C were

positively correlated with the Lubben Social Network Scale, indicating a high

validity of the scale.

2.3.2 Dependent variable

Depression.

The Beck Depression Inventory-II was a self-reported, 4-point Likert scale

measure composed of 21 items which was developed for assessing depressive

symptoms severity (Beck, Steer, & Garbin, 1988). The severity of the depressive

symptoms were classified into three categories based on three cut-off values: a

total scores of 0-12 indicated minimal depression; 13-18 indicated mild

depression; 19-28 indicated moderate depression and 29-63 indicated severe

depression. The English version of BDI-II has been psychometrically validated

with psychiatric and also healthy adults. It has also been translated into different

languages including the Chinese. The Chinese version of BDI (C-BDI) was

translated by Chan and Tsoi in 1984. It was found that the C-BDI has a high

internal consistency ($\alpha = 0.86$). Similar result ($\alpha = 0.85$) was found in Chan's

study comparing the psychometric properties of the Chinese and the English

versions of the BDI. Correlations with other psychological measures were also

found to be significant, showing that the C-BDI has a high validity.

Shek (1987) revealed that the Chinese BDI was correlated with the Leeds

Scales for Self-Assessment of Depression (Leeds-D) and it was strongly

correlated with the subscales of depression of the Chinese General Health

Questionnaire (GHQ-30). Chan (1991) also validated the C-BDI with other

psychological measures such as CES-D scale and the SDS scale and their

correlation coefficient were 0.73 and 0.75 respectively. It can be seen that the

C-BDI have been satisfactorily validated.

2.4 Procedure

One third of the participants (31.8%) were recruited from a Psychology

course in a University in Hong Kong. Questionnaires were distributed during

lessons and collected immediately at the end of lessons. Classroom data

collection guaranteed the response rate and the major advantage of this method

was to ensure that all participants understand what was being asked in the

questionnaire since assistance was given by interviewer whenever needed.

The remaining 68.2% of participants were recruited through snowballing

method. A snowball sampling method was a research technique that used to

develop a research sample. As its name implied, this technique relies the existing

participants recruit future subjects and these future subjects are mainly their

acquaintances, thus, the sample group appears to grow like a rolling snowball

(Goodman, 1961). The snowballing method was adopted because it was cost

effective as it can reach a relatively large number of participants at the same time

and also it can ensure the diversity of the target group in which eliminating the

potential bias from recruiting participants from only one single psychology

course at the University. Also, the questionnaire was an anonymous one, in

which guaranteed confidentiality of participants.

2.5 Statistical Analyses

Descriptive statistics were computed to assess socio-demographic and lifestyle characteristics of the sample. Reliabilities of scales were also calculated. Besides, sleep quality and pattern of the current sample was also reported. Chi-square tests and t-tests were used to examine gender differences. Multicollinearity of the predicted variables (Optimism, Social Support, Stress and Sleep) was also tested in order to ensure that the independence of the predicting variables, otherwise, the estimate of the impact of the predicting variables would be less precise. The dependent variable, Depression, was also regressed independently on all the socio-demographic and lifestyle characteristics of the sample in order to test whether it is necessary to be controlled in later mediation analysis.

According to the four criteria of establishing mediation suggested by Baron and Kenny (1986), firstly, the independent variable must influence the mediator; secondly, the independent variable should also have an effect on the dependent variable; thirdly, the mediator should have influences on the dependent variable and finally, after controlling the mediator, the effect of the independent variable on the dependent variable must have been changed.

To test the proposed mediation path, therefore, depression was first regressed on each of the psychosocial factors, optimism, social support and stress,

separately. Secondly, it was regressed on sleep. Then, Sleep was regressed on

each of the three psychosocial factors respectively. For each of the mediation

path, the fourth regression equation was computed by controlling the mediator

and regress the dependent variable on the independent variable. In testing the

interaction effects, similar procedures were computed unless the psychosocial

factors were combined rather than in isolation.

After the four multiple regressions were computed, the Sobel tests were

carried out, if the four criteria for a mediation analysis were all fulfilled, to test

for the significances of the reduction in effect of the mediation pathways.

All of the analyses were computed using SPSS version 15.0.

Chapter 3: Results

3.1 Sample characteristics

3.1.1 Socio-demographic and lifestyle characteristic of the entire sample

Table 1 shows the socio-demographic characteristics of the sample in

current study. There were 529 participants in the study, composed of 240 (45.4%)

males and 287 (54.3%) females. The mean age of participants was 21.01 years

old, with a standard deviation of 1.77. The sample composed of 414 (78.3%)

undergraduates, while 112 (21.2%) of them were junior college students

including those who were studying Associate Degree and Higher Diploma.

In the entire sample, the majority of them (n= 453, 86%) have never smoked

while about one-fourth (n = 204, 38.6%) of them have never consumed alcohol

and a large proportion of them (n= 425, 79.6%) have engaged in exercise in the 3

months prior to the study.

3.1.2 Gender differences in socio-demographic and lifestyle characteristics

As shown in Table 1, females were significantly more educated ($\chi^2 = 18.35$,

$p< 0.05$). Besides, gender differences were found significant ($p <0.05$) among all

lifestyle characteristics.

For the smoking habits, 190 (79.2%) males reported that they had never

smoked, 30 (12.5%) of them have quit smoking, 9 (3.8%) were now smoking but

tried to quit before, 3 (1.2%) were now smoking and trying to quit and finally, 8

(3.3%) reported they were currently smoking and had never tried to quit. In

contrast, a large majority of females reported not having smoking habits with 261

(90.9%) had never smoked, 18 (6.35) were now smoking but tried to quit before,

3 (1%) have quit smoking, 1 (0.3%) were now smoking and trying to quit and 4

(1.4%) were currently smoking and had never tried to quit. Gender differences

were found to be significant in which male reported significantly more smoking

habits ($\chi^2 = 15.44, p < 0.05$).

For alcohol consumptions, 40.4% of males reported having alcohol

consumptions on a regular basis which was nearly two fold of that of the females

as only 20.6% females have consumed alcohol on a regular basis. Gender

differences were, again, found to be significant in which male reported

significantly more alcohol consumption ($\chi^2 = 45.16, p < 0.05$).

Males were also found to be having more exercises than females. Only 25

(10.7%) of males reported not having any exercises within the 3 months prior to

the study, however, the figure for females was 79 (28.8%). Gender differences

were also found to be significant in which male reported significantly having

more exercise ($\chi^2 = 74.96, p < 0.05$).

In conclusion, compared with females, males were more likely to have

smoking habits, higher alcohol consumptions and having more exercises.

Table 1.
Socio-demographic, Lifestyle Characteristics and Gender differences

Socio-demographic characteristics	Entire Sample		Gender				Test of Difference
			Male (n = 240)		Female (n= 287)		
	n	%	n	%	n	%	
Sex							
Male	240	45.4					
Female	287	54.3					
Age							0.578
Mean	21.01		21.05		20.96		
SD	1.77		1.42		2.03		
Education							18.35*
Junior College	112	21.2	71	29.6	41	14.3	
College	414	78.3	168	70	245	85.4	
Lifestyle Characteristics							
Smoking habit							15.44*
Never smoked	453	85.6	190	79.2	261	90.9	
Quit smoking	48	9.1	30	12.5	18	6.3	
Smoking, tried to quit	12	2.3	9	3.8	3	1.0	
Smoking, trying to quit	4	.8	3	1.2	1	0.3	
Smoking, never quit	12	2.3	8	3.3	4	1.4	

Lifestyle Characteristics	Entire Sample		Gender				Test of Difference
			Male (n = 240)		Female (n= 287)		
	n	%	n	%	n	%	
Alcohol consumption							45.16*
Never	204	38.6	60	25	143	49.8	
Less than once a month	169	31.9	83	34.6	85	29.6	
1 – 3 times a month	101	19.1	63	26.2	38	13.2	
Once a week	21	4.0	11	4.6	10	3.5	
2 – 3 times a week	20	3.8	12	5	8	2.8	
4 – 6 times a week	4	.8	4	1.7	0	0	
Daily	4	.8	4	1.7	0	0	
Others	6	1.1	3	1.2	3	1	
Exercising habit							74.96*
Never	104	20.4	25	10.7	79	28.8	
Less than once a month	129	25.3	44	18.8	84	30.7	
1 – 3 times a month	136	26.7	61	26.1	75	27.4	
1 – 2 times a week	89	17.5	62	26.5	27	9.9	
3 – 5 times a week	39	7.7	31	13.2	8	2.9	
Daily	12	2.4	11	4.7	1	0.4	

Note: Table was reported in percentage unless specified; n = no. of participants; % = percentage; SD = standard deviation; student's *t*- test was used for comparison of age by gender, others by chi-square. *$P <.05$.

3.2 Reliability, means and standard deviations of scales

The reliabilities, means, standard deviations and gender differences of the scales scores were shown in Table 2. The Chinese version of the Life Orientation Test (CLOT), the Perceived Stress Scale (PSS), the Multidimensional Scale of Perceived Social Support (MSPSS), and the Beck Depression Inventory – II (BDI-II) showed relatively high reliability with Cronbach's alpha of 0.78, 0.79, 0.91 and 0.90 respectively while the Pittsburgh Sleep Quality Index (PSQI) showed acceptable reliability (α = 0.60).

Table 2.
Scale scores of PSQI, CLOT, PSS, MSPSS and BDI-II

Scales	α	Score Range	Entire Sample (n= 529)		Gender				*t*
					Male (n= 240)		Female (n= 287)		
			M	*SD*	*M*	*SD*	*M*	*SD*	
PSQI global score	0.60	0 – 21	6.01	2.78	5.85	2.79	6.13	2.76	-1.12
CLOT	0.78	0 – 24	13.41	3.78	13.10	3.70	13.72	3.79	-1.92
PSS	0.79	0 – 40	19.81	4.42	19.11	4.57	20.35	4.20	-3.24
MSPSS									
SO	0.88	4 – 20	14.96	3.10	14.05	3.13	15.74	2.85	-6.47*
Family	0.89	4 – 20	13.06	3.36	12.65	3.35	13.41	3.34	-2.59
Friends	0.90	4 – 20	15.01	3.11	14.09	3.29	15.78	2.73	-6.47*
Total	**0.91**	**12 – 60**	**43.02**	**7.87**	**40.79**	**8.03**	**44.93**	**7.21**	**-6.24**
BDI – II	0.90	0 – 63	9.94	8.54	10.51	9.18	9.40	7.92	1.49

Note: PSQI = The Pittsburgh Sleep Quality Index; CLOT = Life Orientation Test-Chinese version; PSS = Perceived Stress Scale; MSPSS = Multidimensional Scales of Perceived Social Support; BDI-II = Beck Depression Inventory; M = mean; SD = standard deviation; SO = Significant Others; α = Cronbach's alpha; *t* = student'*s t*-test. *p <.05

The reliability coefficients of the Multidimensional Scale of Perceived

Social Support (MSPSS) and the Beck Depression Inventory (BDI) in the present

study were consistent with previous findings. However, the reliability of the Life

Orientation Test (LOT) in the current study was relatively higher compared with

previous study. The plausible reason was that the sample in Lai's study (1997)

was composed of both undergraduates and working adults, but, the current study

composed of only college students which may account for the differences. The

reliability of the Perceived Stress Scale (PSS) was 0.79 in the current study,

which, compared with Lee and Crockett's study (1994), was relatively lower.

However, as their study was based on a nurse sample, due to the differences

between the sample populations, it was possible that different reliability

coefficients might be obtained.

The reliability of the Pittsburgh Sleep Quality Index (PSQI) was 0.60 in the

current study, compared with previous studies, it was relatively lower. However,

as Tsai et al.'s study (2005) was based on those Chinese subjects who attended to

the general practitioner clinic and psychiatric clinic, there was a potential that the

subjects might experiencing mental disorder or physical problems that may

account for the differences.

Despite the differences in the reliability coefficients between the current and

the previous studies, the reliability coefficients of the measurements used in the

present study ranged from 0.60 to 0.91, indicated that the measurements used

were reliable within the context of Chinese college student population.

3.3 Scale scores

3.3.1 Scale scores of the entire sample

As shown in Table 2, participants in the current study were poor sleepers

(*M*= 6.01; *SD*= 2.78) according to the cut-off value of 5. Compared with Carney,

Edinger, Meyer and Lindman's study (2006), the current sample reported

relatively more sleep problems. The mean score of the CLOT was 13.41 (*SD*=

3.78), revealing that participants had a moderate level of optimism. The current

sample also reported an average score of 19.81 (*SD*= 4.42) in the Perceived

Stress Scale which was relatively lower compared with the college student

sample in Cohen's study (1983). However, Cohen's study was based on a sample

of college students who were the freshman at the University, this difference in

the sample characteristic might account for the differences in mean scale score of

the PSS. The average score of the Multidimensional Scale of Perceived Social

Support (MSPSS) was 43.02 (*SD*= 7.87), indicating the sample had a satisfactory

level of perceived social support. Finally, the mean score of the Beck Depression

Inventory was 9.97 (SD= 8.54), according to the cut-off value, the current

sample reported minimal depression. Again, compared with Carney, Edinger,

Meyer and Lindman's study (2006), the current sample revealed relatively fewer

depressive symptoms.

3.3.2 Gender differences in scale scores

Among all the scales, females reported higher mean scores on PSQI, C-LOT, PSS, MSPSS and lower mean score in BDI-II than males, however, the differences were not statistically significant. Only the Significant Others and the Friends subscales of the MSPSS showed statistically significant gender differences in which females reported significantly greater support from both significant others and friends in which both have a *t*-value of -6.47 (*p* <0.05).

3.4 Correlations among study variables

Table 3 shows the correlation matrix of the five scales. It can be seen that sleep was found to be positively correlated with both stress and depression (*r* = 0.32; *r* = 0.31) Furthermore, it was negatively correlated with optimism (*r* = -0.22) and social support (*r* = -0.09). Besides, optimism was also positively correlated with social support (r = 0.36) and negatively correlated with stress (*r* = -0.55) and depression (*r* = -0.44). Both social support and depression were reported to have correlation with stress, with *r* ranged from -0.22 to 0.53. Finally, social support was found to be negatively correlated with depression where *r* = -0.37.

All of the correlations above were statistically significant ($p < 0.05$).

Although sleep was found to be significantly correlated with the other scales, the

Pearson correlation coefficients were small indicating that the correlations were

week.

Table 3.
Correlation Matrix of PSQI, CLOT, PSS, MSPSS and BDI – II

Scales	1	2	3	4	5
1. PSQI	_				
2. C-LOT	-0.22**	_			
3. PSS	0.32**	-0.55**	_		
4. MSPSS	-0.09**	0.36**	-0.22**	_	
5. BDI – II	0.31**	-0.44**	0.53**	-0.37**	_

Note: PSQI = The Pittsburgh Sleep Quality Index, C-LOT = Life Orientation Test-Chinese version, PSS = Perceived Stress Scale, MSPSS = Multidimensional Scales of Perceived Social Support, BDI-II = Beck Depression Inventory; *$p< .05$; ** $p <.01$.

3.5 Sleep quality and pattern

3.5.1 Sleep quality and pattern of the entire sample

As shown in Table 4, the mean global score was 6.01 with a standard

deviation of 2.78. According to the cut-off value of the PSQI, a global score

equal to or greater than 5 indicates poor sleep quality, therefore, revealing that

participants in the current study were generally bad sleepers. Descriptive

statistics of the PSQI components were also reported. As shown, 60.2% of the

participants reported having excellent to good subjective sleep quality while 39.8% of them had a bad or poor one.

For sleep latency, the majority of them (81.2%) reported having sleep latency of less than 30 minutes, 14.6% have a sleep latency ranged from 31-60 minutes and 4.2% of them even had sleep latency over one hour. Results also illustrated that, participants normally slept more than 6 hours with 21.9% of them reported having 6-7 hours of sleep and 56% having sleep duration more than 7 hours. Some of the participants (12.5%) sleep only 5-6 hours a day and a small portion of them (6.6%) sleep less than 5 hours. Sleep efficiency among participants were fairly good in which 456 of them having a sleep efficiency over 75%, 71 reported having a moderate sleep efficiency ranged from 65-74% and only 2 of them have sleep efficiency less than 65%.

About 86.2% of the sample revealed having no or less than once a week difficulties in falling/ staying asleep whereas 13.8% 1-2 times or more than 3 times a week. Nearly all of the participants (97.5%) reported they had never or less than once a week to use sleeping medication and only 2.5% of them had use medication. Within those who had used medication, 1.7% of them used time 1-2 times a week and 0.8% of them used more than 3 times per week. Finally, 7.4% of the sample reported having no daytime dysfunction at all. However, 92.6% reported having at least one occasion of daytime dysfunction in which 47.3%

experienced a daytime dysfunction less than once per week, 36.5% experienced

1-2 times a week and 8.9% of them experienced more than 3 times a week.

3.5.2 Gender differences in sleep quality and pattern

Chi square tests were adopted to examine if there were any gender

differences. The differences of all the PSQI components were not statistically

significant except the use of sleeping pills. As shown in Table 4, males

significantly reported having more use of medication than females with a

χ^2-value = -18.08 ($p < 0.05$).

Table 4.
Sleep Quality and Pattern of Participants

PSQI Components	Entire Sample (n= 529)	Gender		Test of difference
		Male (n = 240)	Female (n= 287)	
Subjective Sleep Quality *M, (SD)*	1.34 (0.75)	1.30 (0.79)	1.37 (0.71)	6.96
Excellent	11.2	15.1	8	
Good	49	45.6	52.3	
Bad	33.8	33.9	34.1	
Poor	5.9	5.4	5.6	
Sleep Latency *M, (SD)*	0.93 (0.78)	0.87 (0.76)	0.97 (0.80)	3.18
Less than 15 minutes	30.2	32.1	28.6	
16 – 30 minutes	51	52.5	50.2	
31 – 60 minutes	14.6	11.7	16.7	
More than 60 minutes	4.2	3.8	4.5	
Sleep Duration *M, (SD)*	0.67 (0.93)	0.66 (0.95)	0.67 (0.92)	2.45
More than 7 hours	56	60	58.5	
6 – 7 hours	21.9	21.7	22	
5 – 6 hours	12.5	10.4	13.9	
Less than 5 hours	6.6	7.9	5.6	
Sleep Efficiency *M, (SD)*	0.40 (0.81)	0.34 (0.80)	0.44 (0.82)	6.93
More than 85%	9.3	81	72.8	
75 – 84%	76.9	8.9	14.5	
65 – 74%	13.4	5.1	8.5	
Less than 65%	0.4	5.1	4.2	

(Continue)

PSQI Components	Entire Sample (n= 529)	Gender		Test of difference
		Male (n = 240)	Female (n= 287)	
Difficulties falling/ Staying asleep *M, (SD)*	1.05 (0.49)	1.0 (0.51)	1.08 (0.47)	4.64
Never	9.3	12.1	7	
<1 per week	76.9	75.8	78	
1 – 2 times per week	13.4	11.7	14.6	
>3 per week	0.4	0.4	0.3	
Use of Sleeping Medication	0.17 (0.47)	0.25 (0.54)	0.11 (0.39)	18.08*
Never	86.2	79.6	91.6	
<1 per week	11.3	17.5	6.3	
1 – 2 times per week	1.7	1.7	1.7	
>3 per week	0.8	1.2	0.3	
Daytime Dysfunction *M, (SD)*	1.47 (0.76)	1.44 (0.78)	1.49 (0.74)	3.45
Never	7.4	7.9	7	
<1 per week	47.3	50	45.3	
1 – 2 times per week	36.5	32.1	39.7	
>3 per week	8.9	10	8	
Global Score *M, (SD)*	6.01 (2.78)	5.85 (2.79)	6.13 (2.76)	-1.12
Good Sleepers	31.4	32.5	30.7	
Bad Sleepers	68.6	67.5	69.3	

Note: Table was reported in percentage unless specified; Subjective sleep quality = item 9; Sleep latency = item2 (<15min=0; 16-30 min=1; 31-60 min=2, >60 min=3) + item5a (Sum : 0=0; 1-2=1; 3-4=2; 5-6=3); Sleep duration = item 4 (>7=0; 6-7=1; 5-6=2; <5=3); Sleep efficiency = item 4 / (item 3- item 1) *100 (>85%=0, 75%-84%=1, 65%-74%=2, <65%=3); Difficulties falling asleep = sum of item 5b – 5j (0=0; 1-9=1; 10-18=2; 19-27=3); Use of sleeping medication = item 6; Daytime dysfunction = item 7 + item 8 (0=0; 1-2=1; 3-4=2; 5-6=3); Global score = sum of all components; Good sleepers = global score < 5; Bad sleepers = global score ≥ 5; n = no. of participants; M = mean; SD = standard deviation; Chi-square was used to test of differences; *p <.05.

3.6 Multcollinearity of predicting variables

Before examining the mediation effects, collinearity of the predicting

variables were tested. It was important to examine whether the predicting

variables were inter-correlated, it was because if the variables were highly

correlated, it would greatly affected the predicting value of an individual

predictor (Brien & Robert, 2007). The multicollinearity statistics were reported

in Table 5. As illustrated in the table, the tolerance value ranged from $0.64 - 0.89$

while the Variance inflation factor (VIF) ranged from $1.12 - 1.57$ in which all of

them were lower than the cut-off values suggested by Kutner et al. (2004),

indicating that the problem of collinearity was not a concern.

Table 5.
Multicollinearity statistics for independent variables

Variables	Tolerance	VIF
PSQI	0.89	1.12
C-LOT	0.64	1.57
PSS	0.65	1.53
MSPSS	0.87	1.15

Note: PSQI = The Pittsburgh Sleep Quality Index; CLOT = Life Orientation Test-Chinese version; PSS = Perceived Stress Scale; MSPSS = Multidimensional Scales of Perceived Social Support; BDI-II = Beck Depression Inventory – II. VIF = Variance Inflation Factor.

3.7 Univariate Regression of risk factor for Depression

To determine whether the socio-demographic and lifestyle characteristics

should be controlled in the mediation analysis, the univariate regressions were
computed. As illustrated in Table 6, only smoking habits ($\beta = 0.125$, $p < 0.05$)
and alcohol consumption ($\beta = 0.190$, $p < 0.01$) could significantly predicted
depression. Therefore, in subsequent mediation analysis, smoking habits and
alcohol consumption would be controlled.

Table 6.
Univariate Regression of Risk Factors for Depression

Variables	Std β	SE	95 % CI	*p* - value
Socio-demographic characteristics				
Sex	-0.065	0.745	-2.575, 0.353	ns
Age	0.022	0.212	-0.311, 0.524	ns
Education	-0.066	0.892	-3.096, 0.409	ns
GPA	0.035	1.801	-2.812, 4.311	ns
Lifestyle characteristics				
Smoking habit	0.125	0.497	0.462, 2.415	< 0.05
Alcohol consumption	0.190	0.274	0.680, 1.756	< 0.01
Exercising habit	-0.054	0.293	-0.931, 0.220	ns

Note: GPA = Grade Point Average; Std β = standardized beta coefficient; SE = standard error; ns = non-significant; CI = confidence interval;

3.8 The mediation pathways

3.8.1 Model 1- The social support, sleep and depression triangle

As revealed in Table 7, in this triangle, social support significantly predicted
depression in which increased in social support predicted decreased in depression

(β = -0.351, p<0.01). Similar effect was found in sleep and depression. Result

indicated that increased in sleep problem significantly predicted increase in

depression (β = 0.291, p<0.01). However, the relationship between social support

and sleep was still unclear whereas the present study revealed that social support

failed to predict depression (β = -0.081, p>0.05).

Since social support failed to predict depression, this violated the rules for a

mediation analysis proposed by Baron and Kenny (1986). Therefore, the

mediation analysis of the relationship between social support, sleep and

depression was excluded in later analysis. The first hypothesis of this study was

rejected.

3.8.2 Model 2- The stress, sleep and depression triangle

As illustrated in Table 7, stress significantly predicted depression with β =

0.526 ($p < 0.001$) in which increased in stress signifies increased in depression.

Sleep, as a proposed mediator in the link, also significantly predicted depression

(β = 0.291, $p < 0.001$). Moreover, increased in stress predicted increased in sleep

problem (β = 0.322, $p < 0.001$). As the above regressions were all found to be

significant, therefore, a final multiple regression was computed. In this multiple

regression, socio-demographic variables, optimism and social support were all

controlled. It can be seen that the β- value decreased from 0.526 (without control)

to 0.370 (with control), see Figure 1, indicating that the predictive value of stress

on depression was still significant even after control.

The Sobel test was then computed to test for the significant difference

between the two β – values. The Sobel test revealed that sleep significantly

mediated the relationship between stress and depression with $Z = 3.553$ at 0.01

level, as shown in figure 1. Hence, the effect of stress on depression was

mediated by sleep in which 21% of the effect went through the mediator and

79% was direct effect. This result supported the second hypothesis of the current

study.

Table 7. *Multiple Regressions for the Mediation Pathway*

Test of mediation pathway	Std β	SE	95% CI	*p* - value
Model 1. The Social Support – Depression pathway				
Social Support (IV) → Depression (DV) [a]	-0.351	0.044	-0.467, -0.295	<0.001
Sleep (Mediator) → Depression (DV) [a]	0.291	0.126	0.647, 1.144	<0.001
Social Support (IV) → Sleep (Mediator) [a]	-0.081	0.015	-0.059, 0.002	ns
Model 2. The Stress – Depression pathway				
Stress (IV) → Depression (DV) [a]	0.526	0.070	0.879, 1.152	<0.001
Sleep (Mediator) → Depression (DV) [a]	0.291	0.126	0.647, 1.144	<0.001
Stress (IV) → Sleep (Mediator) [a]	0.322	0.026	0.151, 0.253	<0.001
Stress (IV) → Depression [ac] (Sleep as mediator)	0.370	0.081	0.555, 0.874	<0.001
Sobel Test	Z = 3.553**			
Model 3. The Optimism – Depression pathway				
Optimism (IV) → Depression (DV) [a]	-0.430	0.087	-1.142, -0.800	<0.001
Sleep (Mediator) → Depression (DV) [a]	0.291	0.126	0.647, 1.144	<0.001
Optimism (IV) → Sleep (Mediator) [a]	-0.144	0.005	-0.028, -0.007	<0.001
Optimism (IV) → Depression (DV) [ad] (Sleep as mediator)	-.0123	0.096	-0.468, -0.090	<0.005
Sobel Test	Z = -3.799**			<0.001

Note: [a] Socio-demographic variables controlled; [b] Stress and Optimism controlled; [C] Social support and Optimism controlled; [d] Social Support and Stress controlled; Std β = standardized beta coefficient; SE = standard error; CI = confidence level; ns = non-significant; * <.05; **<.01.
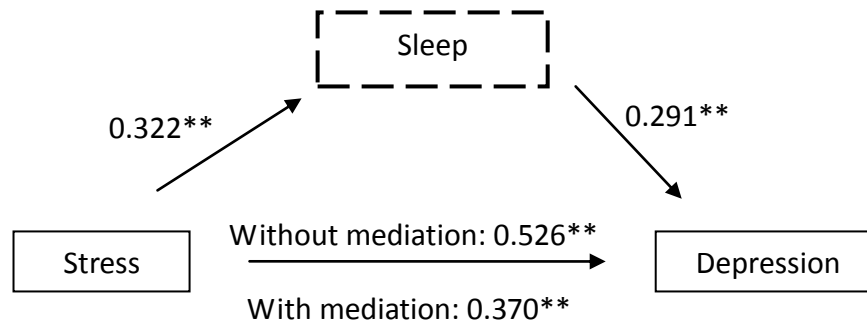
Figure 1. The Mediation analysis for the Stress, Sleep and Depression Triangle
Note: Dotted-line rectangle represented the proposed mediator; * <.05; **<.01.

3.8.3 Model 3- The optimism, sleep and depression triangle

Table 7 also shows the results obtained in the third mediation pathway. As shown, optimism significantly predicted depression with increased optimism predicted decreased depression (β = -0.430, $p < 0.001$). As stated before, sleep significantly predicted depression (β = 0.291, $p < 0.001$). Moreover, increased in optimism also significantly predicted decreased in sleep problem (β = -0.144, $p < 0.005$). In the final multiple regression, as illustrated in Figure 2, the β – value decreased by 0.307 from - 0.430 (without control) to - 0.123 (with control) in which that the predicting value of optimism on depression was still significant after controlling for stress, social support, smoking habits and alcohol consumption.

Again, the Sobel test was computed to test if the difference in the two β – values was significant. The Sobel test revealed a Z- value of -3.799 which was

significant at 0.01 level, as shown in figure 2, indicated that some of the

variances of the relationship between optimism and depression were shared by

the proposed mediator. Hence, it was revealed that sleep mediated the

relationship between optimism and depression in which about 17.2% of the

variances were indirect effect which went through the mediator and 82.8% was

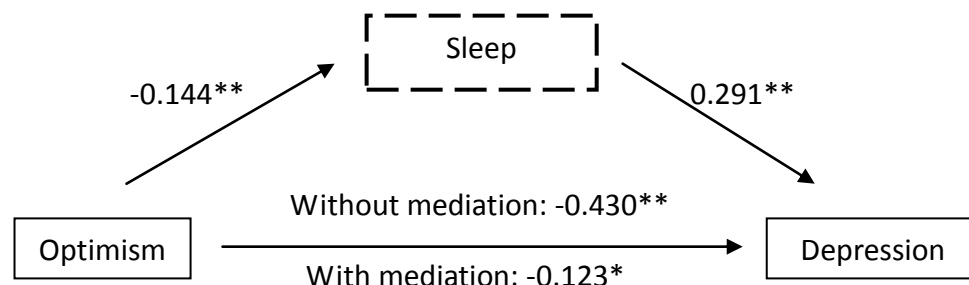direct effect. The third hypothesis of the current study was proved to be correct.

Figure 2. The Mediation analysis for the Optimism, Sleep and Depression Triangle
Note: Dotted-line rectangle represented the proposed mediator; * <.05; **<.01.

3.8.4 Model 4- The interaction model

One of the objectives of this study was to simultaneously test how optimism,

social support and stress affect sleep quality and mental health of college

students. Therefore, the independent variable involved in the last mediation

analysis was the interaction of the psychosocial factors, that is, the interaction

effect of optimism, social support and stress. These three variables all together

formed four combinations of interaction effect, they were 1) Social Support x

Stress x Optimism; 2) Social Support x Stress; 3) Optimism x Stress; 4)

Optimism x Social Support. As shown in table 8, model 4.1, 4.2 and 4.3 had all

failed to fulfill the mediation analysis criteria suggested by Baron and Kenny

(1986), therefore, in later analysis, these models would be excluded. However, as

revealed in table 8, model 4.4 fulfilled all the criteria needed for a mediation

analysis. Optimism interacted with social support and significantly predicted

depression (β = -0.466, p < 0.001) and sleep (β = -0.177, p < 0.001). As stated

before, increased in sleep problem significantly predicted increase in depression

(β = 0.309, p < 0.001). Finally, the interaction effect was found to be

significantly predicted depression even after controlling for the

socio-demographic and other variables (β = -0.266, p < 0.001).

Table 8. *Mediation analysis for interaction effects*

Test of mediation pathway	Std β	SE	95% CI	*p* - value
Model 4.1: Interaction effect – Social Support x Stress x Optimism				
Social Support x Stress x Optimism → Depression [a]	-0.227	0.000	-0.001, 0.000	<0.001
Social Support x Stress x Optimism → Sleep [a]	-0.007	0.000	0.000, 0.000	ns
Sleep → Depression [a]	0.309	0.127	0.701, 1.201	<0.001
Social Support x Stress x Optimism → Depression [a]	-0.225	0.000	-0.001, 0.000	<0.001
Model 4.2: Interaction effect – Social Support x Stress				
Social Support x Stress → Depression [a]	0.187	0.002	0.004, 0.010	<0.001
Social Support x Stress → Sleep [a]	0.220	0.001	0.002, 0.004	<0.001
Sleep → Depression [a]	0.309	0.127	0.701, 1.201	<0.001
Social Support x Stress → Depression [a b]	0.061	0.002	-0.001, 0.005	ns
Model 4.3: Interaction effect – Optimism x Stress				
Optimism x Stress → Depression [a]	-0.073	0.005	-0.019, 0.001	ns
Optimism x Stress → Sleep [a]	0.010	0.002	-0.003, 0.004	ns
Sleep → Depression [a]	0.309	0.127	0.701, 1.201	<0.001
Optimism x Stress → Depression [a c]	-0.011	0.005	-0.011, 0.008	ns
Model 4.4: Interaction effect -Optimism x Social Support				
Optimism x Social Support → Depression [a]	-0.466	0.001	-0.021, -0.015	<0.001
Optimism x Social Support → Sleep [a]	-0.177	0.001	-0.003, -0.001	<0.001
Sleep → Depression [a]	0.309	0.127	0.701, 1.201	<0.001
Optimism x Social Support → Depression [a d]	-0.266	0.002	-0.013, -0.007	<0.001
Sobel Test	Z = -3.491			<0.001

Note: [a] Socio-demographic variables controlled; [b] Sleep and Optimism controlled; [C] Sleep and Social Support controlled; [d] Sleep and Stress controlled; Std β = standardized beta coefficient; SE = standard error; CI = confidence level; ns = non-significant; * <.05; **<.01.

As shown in figure 3, the β- value decreased by 0.2 from -0.466 to -0.266.

To test whether the difference was significant, again, the Sobel test was

computed. It was reported that the Z-value was -3.491 ($p < 0.001$), indicating that

sleep significantly mediated the relationship between the interaction effect of

optimism and social support and depression.

Although not all the interaction effects were found to be significant, it

partially confirmed the hypothesis of the current study that psychosocial factors

interacted to affect sleep quality and mental health of college students. Therefore,

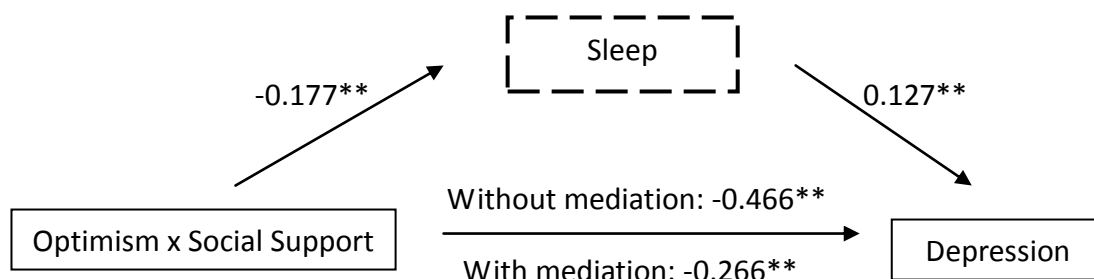the last hypothesis of the current study was found to be correct.

Figure 3. The Mediation analysis for the Optimism x Social Support x Sleep and Depression
Triangle
Note: Dotted-line rectangle represented the proposed mediator; * <.05; **<.01.

Chapter 4: Discussion and Conclusions

4.1 Discussion

To my best knowledge, this was the first study which simultaneously

examined the impact of optimism, social support and stress on sleep and their

predicting abilities on depression among Chinese college students. The major

findings of the current study were that psychosocial factors (optimism, social

support and stress) significantly predicted depression independently. Also, the

effects of optimism and stress on depression were mediated by sleep. This study

also confirmed the third hypothesis of the current study that some of these

psychosocial factors (optimism and social support) interacted to affect depression

and its effect was also mediated by sleep.

This study revealed that Chinese college students in this sample were

generally poor sleepers ($M= 6.01$, $SD= 2.78$). No gender differences were found

in the sleep quality and pattern except in the aspect of the use of sleeping

medication in which males reported significantly more use of sleeping

medication.

The Pittsburgh Sleep Quality Index (PSQI) was weakly correlated with

other measurements as shown in Table 3 in which represented that the PSQI and

the other measurements were measuring different constructs and it has a

significant but inverse relationships with optimism and social support and

positive relationships with stress and depression. These results were all

consistent with previous findings (Bastien et al., 2004; Cukrowicz, 2006; Nordin

et al., 2005; Norlander et al., 2005; Taylor et al., 2003).

The current study tested a number of hypotheses focusing on the

relationship among optimism, social support, stress, sleep and depression.

The first model of the current study examined the role of sleep in the

relationship between social support and depression. It was hypothesized that

social support, sleep and depression were inter-correlated and sleep was a

mediator in the social support – depression link. The results indicated that

increased social support significantly predicted decreased depression which was

consistent with previous findings (Bouteyre, Maurel, & Bernaud, 2007;

Eldeleklioglu, 2006; Roberts & Gotlib, 1997). There were two possible reasons.

First of all, social support might have a direct effect on depression. People with

higher perceived social support had a stronger sense of being liked and cared for

in which provide a beneficial effect on individual's psychological health (Frey &

Rothlisberger, 1996). Moreover, it might also have an indirect effect on stress

and hence reduce the probability that an individual might suffer from depressive

mood. For instance, individual's perception of the availability of social support

might influence their choices of coping strategy. In this case, social support acted

as a coping resource that affects the appraisal of stress (Schreurs & de Ridder,

1997). It was maintained that when an individual confronted with stress, he/ she undergoes primary and secondary appraisal and these appraisal processes were the important determinant of whether the event is stressful (Lazarus & Folkman, 1984). The primary appraisal involved in defining the nature of the event while secondary appraisal involved the individual's assessment of their coping abilities and resources. So, it is possible that the presence of social support affects the secondary appraisal in which provides the individual a sense that he/ she posses the ability and resource to cope with the event. Therefore, lower the level of stress and indirectly prevent the individual from the risk of developing depression.

Besides, results illustrated that there was no significant relationship found between social support and sleep. As Vosvick et al. (2004) suggested that, social support was a multi-faced construct. The Multidimensional Scale of Perceived Social Support (MSPSS) used in the current study measured the quality of perceived social support of an individual. However, the quantity of social support might also play an important role in determining its effect on stress. As Major et al. (1997) pointed out that, social relationships can be an important coping resources but it can also be a source of problems and distress. It was believed that, positivity and negativity coexist in most of the social relationships (Abbey et al., 1985). Increased in social network may result in greater social support but

it can also result in higher chance of social conflicts, criticisms and disapprovals, etc. Therefore, the quantity of social support might be an influential aspect that affects the overall predictive ability of social support on sleep.

The second model of the current study was to test the relationship among stress, sleep and depression. As hypothesized, stressed individual significantly reported poorer sleep quality. Also, poor sleepers were more likely to report having more depressive symptoms than good sleepers. The Sobel test revealed that some of the variances went through the proposed mediator, sleep, suggesting that sleep was a significant mediator between stress and depression which confirmed the second hypothesis of this study.

Evidence showed that before the onset of insomnia, there was always stressful life events happened (Healey, Kales, & Monroe, 1981). It was believed there were two processes that can be used to explain the relationship between stress and sleep. They were the sleep interfering process and the sleep interpreting process (Lundh & Broman, 2000).

The sleep interfering process advocated that body arousal interferes with the sleep of an individual. It was suggested that sleep was associated with an individual's physiological states (Monroe, 1967). In their study of primary insomniacs, Bonnet and Arand (1995) found that, the insomniacs had an elevated metabolic rate and suggested that they had a general hyperarousal disorder. It

was believed that this kind of hyperarousal disorder contributed to their sleep problems.

There were also evidence showed that insomnia was correlated with emotional (Waters, Adams, Binks, & Varnado, 1993) and cognitive arousal (Fichten et al., 1998). Lichstein and Rosenthal (1980) reported that insomniacs engaged in active thinking, worrying, planning and analyzing at bedtime. These pre-sleep cognitions were found to be correlated with sleep problems (Fichten et al., 1998). Emotional arousal might also play a role in sleep problems in an indirect way in which pre-sleep cognitions may make the individual feels anxious, remorse or dysphoric, producing an emotional arousal that interfere with sleep (Lundh & Broman, 2000).

The sleep interpreting process, on the other hand, attributed sleep problems to the different kinds of cognitions about sleep. Lundh and Broman (2000) suggested that misperceptions about sleep, such as perceptions of total sleep duration, sleep quality, thoughts about how much sleep is needed, consequences of insufficient sleep, factors that lead to good or poor sleep and cognitions about one's daily functioning were all cognitive processes that may affect sleep. It was believed that these misperceptions about sleep may interact with various kinds of sleep interfering processes (cognitive and emotional arousal) that causes sleep problems of an individual (Lundh & Broman, 2000).

Consistent with previous findings, this study also revealed increased sleep problem significantly predicted more depressive symptoms and it also played a mediating role between stress and depression. Although whether sleep problems precede depression or vice versa was still unclear, Mayers and Baldwin (2006) found that, individual's perception on sleep was an important factor in insomnia and depression. Insomniacs tend to have cognitive biases towards negativity. Nolen-Hoeksema (1991) also proposed that individuals who prone to ruminate when confronted to stress tended to focus on their negative emotional states. *"Rumination is a form of self-focused attention by its specific focus on emotional content and its repetitive nature"* (Skitch & Abela 2008). Studies also showed that rumination constantly predicted increased in depressive symptoms (Abbe, Lyubomirsky, & Tkach, 2003).

From the above studies, it can be concluded that the plausible reason for the mediating role of sleep on the link between stress and depression was that, when confronted with stress, some individuals might engage in rumination, he or she would then experience increased negative affect. This negative affect may increase individual's emotional arousal which may affect sleep or this negative affect influences the individual's cognitive processing in which hinder he or she to implement behaviors that are effective in solving the problem and hence intensify depressive symptoms (Nolen-Hoeksema 1987, 1991). As it was shown

that sleep mediated the relationship between stress and depression, therefore, the

second hypothesis of the current study was proven correct.

Results showed that the third hypothesis of the present study was also

supported. Model 3 of the current study was to investigate the role of sleep in the

relationship between optimism and depression. As shown in the table, an inverse

correlation was found between optimism and depression. Also, increased in

optimism predicted significantly fewer sleep problems. The Sobel test also

confirmed that sleep was a significant mediator between optimism and

depression.

Previous findings also confirmed the effect of optimism on depression. For

example, in their longitudinal study of protective factors of depression in an

elderly sample, Giltay, Zitman and Kromhout (2006) reported that optimism was

related to lower incidence of depressive symptoms. It was believed that

pessimists might lack positive expectation about the future and therefore, were

prone to worry which aggravate depressive symptoms (Conway, 2008).

On the other hand, optimists had a positive expectation about the future,

and this positive expectation help them to avoid engaging in negative thinking

pattern (Giltay, Zitman, & Kromhout 2006). Also, as stated before, optimists

might cope with adversity better than pessimists (Scheier et al., 2001), and the

optimistic outlook might attract more potential partners in a social network

(Carver, Kus, & Scheier, 1994), therefore, increasing the availability of social

support when needed and the individual may also perceived that he/ she has the

resources to cope with the adverse situation and hence, lower the depressive

symptoms (Giltay, Zitman, & Kromhout 2006). These were all the plausible

reasons for the inverse relationship between optimism and depression found in

the current study.

Besides, results of the current study revealed that optimism might have an

indirect effect on depression through sleep. As mentioned in the literature review,

pessimists had a higher level of worry and this worry may affect an individual's

sleep (Conway et al., 2008). So, it was believed that when a pessimist encounter

sleep problems, due to his or her propensity to engage in negative thinking

pattern, would prone to worry and ruminate about the negative consequences of

insufficient sleep and because of their less effective coping strategies(Scheier et

al., 2001), resulted in increased depressive symptoms.

The final mediation analysis of the current study involved the mediating

role of sleep in the relationship between the interaction of the psychosocial

factors and depression. Different combinations of interaction effects were put

into the mediation analysis. As reported in the result section, the only significant

mediation effect of sleep was found when optimism interacted with social

support to predict depression and sleep in which increased in the two variables

significantly predicted lower level of depression and sleep problems. Previous findings also reported that optimists were liked more (Carver, Kus, & Scheier, 1994) and people were attracted to their optimistic outlook and therefore they were more able to develop an extensive and supportive social network than pessimistic individuals (Brissette, 2002). This supportive social network, in addition to their propensity to expect the good in the future (Scheier & Carver, 1985) might interact to reduce the probability that an individual would suffer sleep problems and depression by providing he/ she a coping strategy, a sense of having coping resources or to protect the individual from engaging in rumination as explained in the previous paragraph (Abbe, Lyubomirsky, & Tkach, 2003; Giltay, Zitman, & Kromhout, 2006).

Nevertheless, the mediating role of sleep was found to be non significant in model 4.1 (the interaction between social support, stress and optimism), model 4.2 (the interaction between social support and stress), model 4.3 (the interaction between optimism and stress). It can be observed that stress, independently, could significantly predicted sleep problem and depression, but when it comes to combine with other variables, the resulting interaction effect has lost its predictive value. Also, optimism was found to be a variable that consistently predicted sleep problems and depression no matter it was examined independently or was interacted with other variables. Moreover, social support

alone could not predicted sleep problems of an individual, but when it interacted

with optimism, the resulting interaction effect significantly predicted lower level

of sleep problems and depression. Therefore, it was suspected that the perceived

level of stress experienced by an individual would be moderated when it

combined with optimism or social support or both. The effect of optimism in the

addition of the effect of social support may result in lower level of stress. This

lowered level of stress may prevent an individual suffering from sleep problems

and depressive symptoms. In fact, optimism, social support and stress were

inter-correlated as suggested by previous findings (Hulbert & Morrison, 2006;

Oginska-Bulik, 2005; Yali & Lobel, 2002). Results of the current study also

suggested that the relationship between these three variables might also be a

mediation pathway in which social support mediate the relationship between

optimism and stress. However, this mediating relationship among the three

psychosocial factors was just a speculated one since the statistical methods used

in the current study did not enable a verifying test between this speculated

mediation pathway and its relationship with sleep and depression. Therefore, the

forth hypothesis of the current study was just partially supported.

4.2 Limitations and Recommendations

Despite the success to find out the mediating role of sleep in the

relationship between psychosocial factors and depression, there were limitations

in the current study. First of all, results of the present investigation warrant

caution for causal relationship as the current study was a cross-sectional design.

Secondly, the Multidimensional Scale of Perceived Social Support (MSPSS)

used in the current study did not provide information about the quantitative

aspect of social support which maybe a factor that affects the results. Moreover,

all the measures of the present study were based on self-report in which it might

have increased measurement errors. Furthermore, due to the statistical methods

adopted in the current study, the speculated mediation relationship among

optimism, social support and stress could not be verified, it was believed that if

the relationships among these variables could be confirmed, a more precise and

accurate relationship among these psychosocial factors, sleep and depression

would be obtained.

　　　To overcome these shortcomings, further studies should employ a

longitudinal design so that a causal linkage between variables can be drawn. Also,

in order to give a more accurate result, different aspects of a variable should also

be measured, for example, in assessing social support of participants, a more

comprehensive instrument measuring both the quality and quantity of the

construct can be used. Moreover, objective instruments should be used to

measure the variables, so that both the reliability and generalizability of results

can be increased. Finally, future studies can make a greater effort in verifying the relationship among optimism, social support and stress and how they interact to predict sleep problems and depression in an individual.

4.3 Conclusions

Despite the limitations, the current study contributed in the investigation of the relationship among optimism, social support, stress, sleep and depression. It was concluded that, optimism, social support and stress were all significant predictors on mental health of college students. Moreover, their predictive values were mediated by sleep. Therefore, to alleviate the rising trend of sleep problems among college students, school-based intervention can target on these factors to raise the awareness of sleep problems and promote sleep hygiene in school.

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Appendix A

The Pittsburgh Sleep Quality Index – Chinese version

請你就過去一個月來的日常（大多數）的睡眠習慣回答下列問題：

1. 過去一個月來，你通常何時上床？　　　　　　　＿＿＿時＿＿＿分
2. 過去一個月來，你通常多久才能入睡？　　　　　＿＿＿分鐘
3. 過去一個月來，你早上通常何時起床？　　　　　＿＿＿時＿＿＿分
4. 過去一個月來，你實際每晚可以入睡幾小時？　　＿＿＿時＿＿＿分

以下問題選擇一個適當的答案打勾，請全部作答？

5. 過去一個月來，你的睡眠出現下列困擾情形，每星期約有幾次？

	從未發生	不到一次	約一兩次	三次或三次以上
（1）無法在 30 分鐘內入睡。	☐	☐	☐	☐
（2）半夜或凌晨便清醒。	☐	☐	☐	☐
（3）必須起來上廁所。	☐	☐	☐	☐
（4）覺得呼吸不順暢。	☐	☐	☐	☐
（5）大聲打鼾或咳嗽。	☐	☐	☐	☐
（6）會覺得冷。	☐	☐	☐	☐
（7）覺得躁熱。	☐	☐	☐	☐
（8）作惡夢。	☐	☐	☐	☐
（9）身上有疼痛。	☐	☐	☐	☐
（10）其他，請說明：＿＿＿＿＿＿＿＿＿	☐	☐	☐	☐

6. 過去一個月，您有多少次需要藉助藥物 (醫生處方或成藥)來幫助睡眠?

　　☐未發生　　☐不到一次　　☐一兩次　　☐三次或三次以上

7. 過去一個月，當你在開車、用餐、從事日常社交活動時，有多少次覺得難以保持清醒狀態?

　　☐未發生　　☐不到一次　　☐一兩次　　☐三次或三次以上

8. 過去一個月，要打起精神來完成您應該做的事情對您有多少困擾?

　　　　□完全沒有　　□只有很少困擾　　□有些困擾　　□有很大的困擾

9. 過去一個月，您對您自己的睡眠品質整體評價如何?

　　　　□非常好　　　　□好　　　　□不好　　　　□非常不好

Appendix B

Perceived Stress Scale – Chinese version

請回想最近一個月來，發生下列各狀況的頻率。

1. 在過去一個月內，您是否經常會因為一些突發的事情，而讓心情變得不好？

   □0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

2. 在過去一個月內，您是否經常會覺得您沒有辦法控制生活裡一些重要的事情？

   □0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

3. 在過去一個月內，您是否經常會覺得緊張而且有壓力？

   □0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

4. 在過去一個月內，您對自己處理個人問題的能力，是否經常會覺得有信心？

   □0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

5. 在過去一個月內，您是否經常會覺得一切的事情都很順心如意

   □0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

6. 在過去一個月內，您是否經常會覺得無法應付您必須要做的事？

   □0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

7. 在過去一個月內，對於生活中一些容易惹人生氣的小事情，您是否經常能夠控制得宜？

   □0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

8. 在過去一個月內，您是否經常會覺得事情都在您可以控制的範圍內？

□0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

9. 在過去一個月內，您是否經常會因為一些您無法控制的事情，而讓您感到生氣？

□0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

10. 在過去一個月內，您是否經常覺得困難已經堆積如山（太多），讓您無法克服

□0 從來不會 □1 幾乎不會 □2 有時候會 □3 常常會 □4 一直都會

Appendix C

Life Orientation Test – Chinese version

請回想最近一個月來，發生下列各狀況的頻率。

	從來不會	幾乎不會	有時候會	常常會	一直都會
1. 當前途未定的時候，我通常會預想好的結果。	0	1	2	3	4
2. 展望將來，我看不到有令我開懷的境況。	0	1	2	3	4
3. 我對前景常感樂觀。	0	1	2	3	4
4. 我很少想過事情會盡如我意。	0	1	2	3	4
5. 我很少預計好事會發生在我身上。	0	1	2	3	4
6. 總的來說，我預期發生在我身上的好事會多過壞事。	0	1	2	3	4

Appendix D

The Multidimensional Scale of Social Support

以下句子能反映我們與家人及朋友之間的關係, 請細心閱讀並選擇合適的答案:

	極不同意	不同意	極同意	同意	極同意
1. 當我有需要時, 總有一個重要的人在我身邊支持著我。	1.☐	2.☐	3.☐	4.☐	5.☐
2. 當我想與別人分享喜樂和憂愁時, 總有一個重要的人給我傾訴。	1.☐	2.☐	3.☐	4.☐	5.☐
3. 我的家人真的嘗試去幫助我。	1.☐	2.☐	3.☐	4.☐	5.☐
4. 我能夠在家庭中找到情緒上的支持。	1.☐	2.☐	3.☐	4.☐	5.☐
5. 我能找到一個重要的人, 他/她是我感到安慰的來源。	1.☐	2.☐	3.☐	4.☐	5.☐
6. 我的朋友真的嘗試去幫助我。	1.☐	2.☐	3.☐	4.☐	5.☐
7. 當我感到事事不如意時,我能倚靠我的朋友。	1.☐	2.☐	3.☐	4.☐	5.☐
8. 我可以將我的疑難向家人傾訴。	1.☐	2.☐	3.☐	4.☐	5.☐
9. 我能夠找到合適的朋友分享我的喜樂和憂愁。	1.☐	2.☐	3.☐	4.☐	5.☐
10. 在我的生命中有這樣一個重要的人, 他/她關心我的感受。	1.☐	2.☐	3.☐	4.☐	5.☐
11. 我的家人樂於幫助我作決定。	1.☐	2.☐	3.☐	4.☐	5.☐
12. 我可以將我的疑難向朋友傾訴。	1.☐	2.☐	3.☐	4.☐	5.☐

Appendix E

Beck Depression Inventory II – Chinese version

請細心閱讀以下句子, 選出最能表達你*上星期*心情的一項, 並以「√」表示。
若沒有合適的句子, 請選擇最接近的一項。

1. 0 □ 我不感到憂愁
　 1 □ 我感到悲哀, 憂愁
　 2 □ 我時常感到悲哀, 憂愁, 又不能擺脫
　 3 □ 我愁苦, 不快樂, 以至無法忍受

2. 0 □ 我對未來不不怎麼悲觀失望
　 1 □ 我對未來感到失望
　 2 □ 我感到沒有什麼可以寄望將來
　 3 □ 我感到未來毫無希望, 而事情也不會好轉

3. 0 □ 我不覺得像失敗者
　 1 □ 我覺得比別人失敗的多
　 2 □ 當我回想生命時, 只見很多錯敗
　 3 □ 我覺得自己是個完全失敗的人 (如為人父母、丈夫、妻子、兒女等)

4. 0 □ 我像以往一般享受所作的事
　 1 □ 我不享受以往作的事
　 2 □ 我再不能從任何事取得滿足
　 3 □ 我對任何事都感到不滿、煩悶

5. 0 □ 我不感到怎樣內疚
　 1 □ 我很多時間感到內疚
　 2 □ 我大部份時間感到內疚
　 3 □ 我無時無刻感到內疚

6. 0 □ 我不感到自己被懲罰
　 1 □ 我感到自己也許會被懲罰
　 2 □ 我期望自己會被懲罰
　 3 □ 我覺得自己正在被懲罰

7. 　0 ☐　我對自己不感到失望
　　　1 ☐　我對自己失望
　　　2 ☐　我討厭自己
　　　3 ☐　我憎恨自己

8. 　0 ☐　我不感到自己比別人差
　　　1 ☐　我因自己的弱點及錯失而自責
　　　2 ☐　我無時無刻都怪責自己的錯失
　　　3 ☐　我為每件發生的不如意事怪責自己

9. 　0 ☐　我沒有任何自殺的念頭
　　　1 ☐　我有自殺的念頭, 但卻不會實行
　　　2 ☐　我希望自殺
　　　3 ☐　若有機會, 我會自殺

10. 0 ☐　我沒有比平常哭得多
　　　1 ☐　我現在比以前哭得多
　　　2 ☐　我現在時常哭
　　　3 ☐　我以前是會哭的, 現在卻想哭也不能

11. 0 ☐　我沒有比前多憤怒
　　　1 ☐　我比以前容易激動、生氣
　　　2 ☐　我現在時常感到憤怒
　　　3 ☐　我連以往令我氣惱的事也感麻木了

12. 0 ☐　我沒有失去對別人的興趣
　　　1 ☐　我對別人的興趣比以前少了
　　　2 ☐　我對別人幾乎失了興趣
　　　3 ☐　我對別人完全失了興趣

13. 0 ☐　我作決定的能力如以往一樣
　　　1 ☐　我放棄作決定比以前多
　　　2 ☐　我比以前更難作出決定
　　　3 ☐　我已不能作任何決定

14. 0 □ 我不感到外貌比以前差
    1 □ 我擔心自己看來老了, 不吸引
    2 □ 我感到自己外貌有永久性的改變, 令我看來不吸引
    3 □ 我相信自己外貌醜陋

15. 0 □ 我能像以往一般的工作
    1 □ 我要份外費神才能開始作事
    2 □ 我要很辛苦迫自己才可作事
    3 □ 我什麼事也做不來

16. 0 □ 我的睡眠如平常一樣
    1 □ 我沒有睡得像以前那麼好
    2 □ 我比往常早醒一兩小時, 而很難再入睡
    3 □ 我比往常早醒數小時, 而不能再入睡

17. 0 □ 我不比以前多感疲倦
    1 □ 我比以前容易疲倦
    2 □ 我做任何事都感到疲
    3 □ 我實在太累去做任何事

18. 0 □ 我胃口沒有比以前差
    1 □ 我胃口沒有以往那麼好
    2 □ 我胃口比以往差很多
    3 □ 我完全沒有胃口

19. 0 □ 我近來沒有減輕體重
    1 □ 我體重減了 5 磅以上
    2 □ 我體重減了 10 磅以上
    3 □ 我體重減了 15 磅以上
    我正在嘗試以節食減輕體重 □ 是 □ 否

20. 0 □ 我沒有比以前多憂慮自己的健康
    1 □ 我在擔心身體的問題, 如酸軟、疼痛、腸胃不適、便秘等
    2 □ 我很擔心身體的問題, 以至很難理會其他事
    3 □ 我非常擔心身體的問題, 以至完全無法去想其他事

21. 0 □ 我近來沒有發覺對性的興趣有改變
　　 1 □ 我對性的興趣比以前減了
　　 2 □ 我現在對性大大減了興趣
　　 3 □ 我完全對性失去了興趣

Appendix F

Questionnaire

大學生睡眠健康問卷調查
香港城市大學　　應用社會科學學系

此問卷是要了解　閣下的睡眠習慣。問卷共有五個不同部份。以下資料只會作研究用途，所有資料將會絕對保密，謝謝您的合作!

第一部份
下列問題是要調查您*過去這一個月來*的睡眠習慣, 請您以*平均狀況*回答以下問題。

A1.過去一個月, 您晚上通常幾點上床睡覺? _____ 點 _____分（上午 / 下午）

A2.過去一個月, 您在上床後, 通常躺多久才能入睡? _____分

A3.過去一個月, 您早上通常幾點起床? _____ 點 _____分（上午 / 下午）

A4.過去一個月, 您每天晚上真正睡著的時間約多少
(這可能和您躺在床上所花的時間不同)? _____ 小時 _____ 分

請選擇*最適合*您的答案, 在適合的選項內畫上「 O」, 並回答所有問題。

	從未發生	每週少於一次	每週一至兩次	每週三次或以上
A5. 過去一個月，您的睡眠有多少次受到下列干擾:				
a) 無法在 30 分鐘入睡	0	1	2	3
b) 半夜或清晨醒來	0	1	2	3
c) 需要起床上廁所	0	1	2	3
d) 呼吸不順暢	0	1	2	3
e) 咳嗽或大聲打鼾	0	1	2	3
f) 感覺很冷	0	1	2	3
g) 感覺很熱	0	1	2	3
h) 作惡夢	0	1	2	3
i) 疼痛	0	1	2	3
j) 其他情況請說明: _____	0	1	2	3

	從未發生	每週少於一次	每週一至兩次	每週三次或以上
A6. 過去一個月, 您有多少次需要藉助藥物 (醫生處方或成藥) 來幫助睡眠?	0	1	2	3
A7. 過去一個月, 當你在開車、用餐、從事日常社交活動時, 有多少次覺得難以保持清醒狀態?	0	1	2	3

	完全沒有困擾	只有少困擾	有些困難	有很大的困擾
A8. 過去一個月, 要打起精神來完成您應該做的事情對您有多少困擾?	0	1	2	3

	非常好	好	不好	非常不好
A9. 過去一個月, 您對您自己的睡眠品質整體評價如何?	0	1	2	3

第二部份　　請表示您對以下句子的同意及不同意程度:

	非常不同意	-----			非常同意
B1.當前途未定的時候, 我通常會預想好的結果。	0	1	2	3	4
B2.展望將來, 我看不到有令我開懷我境況。	0	1	2	3	4
B3.我對前景常感樂觀。	0	1	2	3	4
B4.我很少想過事情會盡如我意。	0	1	2	3	4
B5.我很少預計好事會發生在我身上。	0	1	2	3	4
B6.總括來說, 我預期發生在我身上的好事會多過壞事。	0	1	2	3	4

請回想*最近一個月*來，發生下列各狀況的頻率。

	從來不會	幾乎不會	有時候會	常常會	一直都會
C1. 您是否經常會因為一些突發的事情, 而讓心情變得不好?	0	1	2	3	4
C2. 您是否經常會覺得您沒有辦法控制生活裡一些重要的事情?	0	1	2	3	4
C3. 您是否經常會覺得緊張而且有壓力?	0	1	2	3	4
C4. 您對自己處理個人問題的能力, 是否經常覺得有信心?	0	1	2	3	4
C5. 您是否經常會覺得一切的事情都很順心如意?	0	1	2	3	4
C6. 您是否經常會覺得無法應付您必須要做的事?	0	1	2	3	4
C7. 對於生活中一些容易惹人生氣的小事情, 您是否經常能控制得宜?	0	1	2	3	4
C8. 您是否經常會覺得事情都在您你控制範圍之內?	0	1	2	3	4
C9. 您是否經常會因為一些您無法控制的事情而感到生氣?	0	1	2	3	4
C10. 您是否經常會覺得困難已經堆積如山(太多), 讓您無法克服?	0	1	2	3	4

第三部份 以下句子能反映我們與家人及朋友之間的關係, 請細心閱讀並選擇合適的答案:

	極不同意	不同意	一般	同意	極同意
D1. 當我有需要時, 總有一個重要的人在我身邊支持著我。	1	2	3	4	5
D2. 當我想與別人分享喜樂和憂愁時, 總有一個重要的人給我傾訴。	1	2	3	4	5
D3. 我的家人真的嘗試去幫助我。	1	2	3	4	5
D4. 我能夠在家庭中找到情緒上的支持和幫助。	1	2	3	4	5
D5. 我能找到一個重要的人, 他/她是我感到安慰的來源。	1	2	3	4	5
D6. 我的朋友真的嘗試去幫助我。	1	2	3	4	5
D7. 當我感到事事不如意時,我能倚靠我的朋友。	1	2	3	4	5
D8. 我可以將我的疑難向家人傾訴。	1	2	3	4	5
D9. 我能夠找到合適的朋友分享我的喜樂和憂愁。	1	2	3	4	5
D10. 在我的生命中有這樣一個重要的人, 他/她關心我的感受。	1	2	3	4	5
D11. 我的家人樂於幫助我作決定。	1	2	3	4	5
D12. 我可以將我的疑難向朋友傾訴。	1	2	3	4	5

第四部份　　請細心閱讀以下句子, 選出最能表達你*上星期*心情的一項, 並以「√」表示。
若沒有合適的句子, 請選擇*最接近*的一項。

E1.　　0 ☐ 我不感到憂愁
　　　　1 ☐ 我感到悲哀, 憂愁
　　　　2 ☐ 我時常感到悲哀, 憂愁, 又不能擺脫
　　　　3 ☐ 我愁苦, 不快樂, 以至無法忍受

E2.　　0 ☐ 我對未來不怎麼悲觀失望
　　　　1 ☐ 我對未來感到失望
　　　　2 ☐ 我感到沒有什麼可以寄望將來
　　　　3 ☐ 我感到未來毫無希望, 而事情也不會好轉

E3.　　0 ☐ 我不覺得像失敗者
　　　　1 ☐ 我覺得比別人失敗的多
　　　　2 ☐ 當我回想生命時, 只見很多錯敗
　　　　3 ☐ 我覺得自己是個完全失敗的人 (如為人父母、丈夫、妻子、兒女等)

E4.　　0 ☐ 我像以往一般享受所作的事
　　　　1 ☐ 我不享受以往作的事
　　　　2 ☐ 我再不能從任何事取得滿足
　　　　3 ☐ 我對任何事都感到不滿、煩悶

E5.　　0 ☐ 我不感到怎樣內疚
　　　　1 ☐ 我很多時間感到內疚
　　　　2 ☐ 我大部份時間感到內疚
　　　　3 ☐ 我無時無刻感到內疚

E6.　　0 ☐ 我不感到自己被懲罰
　　　　1 ☐ 我感到自己也許會被懲罰
　　　　2 ☐ 我期望自己會被懲罰
　　　　3 ☐ 我覺得自己正在被懲罰

E7.　　0 ☐ 我對自己不感到失望
　　　　1 ☐ 我對自己失望
　　　　2 ☐ 我討厭自己
　　　　3 ☐ 我憎恨自己

E8.　　0 ☐ 我不感到自己比別人差
　　　　1 ☐ 我因自己的弱點及錯失而自責
　　　　2 ☐ 我無時無刻都怪責自己的錯失
　　　　3 ☐ 我為每件發生的不如意事怪責自己

E9.　　0 ☐ 我沒有任何自殺的念頭
　　　　1 ☐ 我有自殺的念頭, 但卻不會實行
　　　　2 ☐ 我希望自殺

3 ☐ 若有機會, 我會自殺

E10. 0 ☐ 我沒有比平常哭得多

1 ☐ 我現在比以前哭得多
2 ☐ 我現在時常哭
3 ☐ 我以前是會哭的, 現在卻想哭也不能

E11. 0 ☐ 我沒有比前多憤怒

1 ☐ 我比以前容易激動、生氣
2 ☐ 我現在時常感到憤怒
3 ☐ 我連以往令我氣惱的事也感麻木了

E12. 0 ☐ 我沒有失去對別人的興趣

1 ☐ 我對別人的興趣比以前少了
2 ☐ 我對別人幾乎失了興趣
3 ☐ 我對別人完全失了興趣

E13. 0 ☐ 我作決定的能力如以往一樣

1 ☐ 我放棄作決定比以前多
2 ☐ 我比以前更難作出決定
3 ☐ 我已不能作任何決定

E14. 0 ☐ 我不感到外貌比以前差

1 ☐ 我擔心自己看來老了, 不吸引
2 ☐ 我感到自己外貌有永久性的改變, 令我看來不吸引
3 ☐ 我相信自己外貌醜陋

E15. 0 ☐ 我能像以往一般的工作

1 ☐ 我要份外費神才能開始作事
2 ☐ 我要很辛苦迫自己才可作事
3 ☐ 我什麼事也做不來

E16. 0 ☐ 我的睡眠如平常一樣

1 ☐ 我沒有睡得像以前那麼好
2 ☐ 我比往常早醒一兩小時, 而很難再入睡
3 ☐ 我比往常早醒數小時, 而不能再入睡

E17. 0 ☐ 我不比以前多感疲倦

1 ☐ 我比以前容易疲倦
2 ☐ 我做任何事都感到疲倦
3 ☐ 我實在太累去做任何事

E18. 0 ☐ 我胃口沒有比以前差

1 ☐ 我胃口沒有以往那麼好
2 ☐ 我胃口比以往差很多
3 ☐ 我完全沒有胃口

E19.　₀☐ 我近來沒有減輕體重
　　　₁☐ 我體重減了 5 磅以上
　　　₂☐ 我體重減了 10 磅以上
　　　₃☐ 我體重減了 15 磅以上

E20.　我正在嘗試以節食減輕體重
　　　₀☐ 是
　　　₁☐ 否

E21.　₀☐ 我沒有比以前多憂慮自己的健康
　　　₁☐ 我在擔心身體的問題, 如酸軟、疼痛、腸胃不適、便秘等
　　　₂☐ 我很擔心身體的問題, 以至很難理會其他事
　　　₃☐ 我非常擔心身體的問題, 以至完全無法去想其他事

E22.　₀☐ 我近來沒有發覺對性的興趣有改變
　　　₁☐ 我對性的興趣比以前減了
　　　₂☐ 我現在對性大大減了興趣
　　　₃☐ 我完全對性失去了興趣

第五部份

F1. 您曾否吸煙？
　₁☐ 從來沒有吸煙
　₂☐ 曾經吸煙，但現已戒掉
　₃☐ 現有吸煙的習慣，雖曾經戒煙
　₄☐ 現有吸煙的習慣，但現正嘗試戒煙
　₅☐ 現有吸煙的習慣，亦從未試過戒煙

F2. 過去 3 個月，您飲用含酒精飲品的習慣大概怎樣？
　₁☐ 從來沒有飲用含酒精飲品
　₂☐ 每月少於 1 次
　₃☐ 每月 1-3 次
　₄☐ 每星期 1 次
　₅☐ 每星期 2-3 次
　₆☐ 每星期 4-6 次
　₇☐ 每日飲用含酒精飲品
　₈☐ 其他, 請註明：＿＿＿＿＿＿＿＿＿＿＿

F3. 在過去 3 個月內，您有幾經常做康樂運動超過三十分鐘？
　₁☐ 沒有
　₂☐ 差不多從沒有 / 每月少於 1 次
　₃☐ 有，每月約 1-3 次
　₄☐ 有，每星期約 1-2 次
　₅☐ 有，每星期約 3-5 次
　₆☐ 有，每天都有運動/差不多每天都運動

7□ 其他，請註明：＿＿＿＿＿＿＿＿＿

7□ 其他，請註明：＿＿＿＿＿＿＿＿＿

個人資料

F4. 性別:　　　　0 ☐ 男　　　　　　1☐ 女

F5. 最高學歷:　1☐ 大專 (副學士, 高級文憑, IVE)

2☐ 學位　　　年級: _____　GPA: _____

(CGPA: _____)

3☐ 碩士或以上

F5.　年齡:　　　_____

<<全卷完>>