

DETERMINANTS OF SELF-RATED PHYSICAL HEALTH AND SELF-RATED
MENTAL HEALTH OF MIDDLE SCHOOL STUDENTS IN THE PEOPLE'S
REPUBLIC OF CHINA

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ปัจจัยที่ส่งผลต่อสุขภาพกายและสุขภาพจิตที่ประเมินด้วยตนเองของนักเรียนระดับมัธยมต้นใน
ประเทศสาธารณรัฐประชาชนจีน



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ลิลลี่ ไชว : ปัจจัยที่ส่งผลต่อสุขภาพกายและสุขภาพจิตที่ประเมินด้วยตนเองของนักเรียนระดับมัธยมต้นในประเทศสาธารณรัฐประชาชนจีน (DETERMINANTS OF SELF-RATED PHYSICAL HEALTH AND SELF-RATED MENTAL HEALTH OF MIDDLE SCHOOL STUDENTS IN THE PEOPLE'S REPUBLIC OF CHINA) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ผศ. ดร. ชันทาล แสร์เบอร์โฮลส์, 77 หน้า.

การศึกษานี้ได้ทำการวิเคราะห์ปัจจัยกำหนดการประเมินสุขภาพตนเองด้านร่างกาย (self-rated physical health) และ การประเมินสุขภาพตนเองด้านจิตใจ (self-rated mental health) ของกลุ่มนักเรียนระดับมัธยมศึกษาตอนต้น (middle school students) ในสาธารณรัฐประชาชนจีน ตัวแปรต้นได้แก่ การรับรู้สถานะทางเศรษฐกิจ, ความสัมพันธ์ต่อผู้ปกครอง และ ความกดดันจากผู้ปกครองด้านความสำเร็จทางการศึกษา โดยใช้ข้อมูลทุติยภูมิจากผลการสำรวจข้อมูลการศึกษาระดับชาติปี พ.ศ.2556-2557 มหาวิทยาลัยเรนมินและ มหาวิทยาลัยจังหวัดอื่นๆ ในสาธารณรัฐประชาชนจีน ประกอบด้วย ข้อมูลของนักเรียนระดับมัธยมศึกษาปีที่ 1 และปีที่ 3 จำนวนทั้งหมด 11,857 คน และใช้การวิเคราะห์ด้วยวิธีการถดถอยโลจิสติกทวิ (Binary logit regressions)

ผลการประเมินสุขภาพตนเองด้านร่างกายและจิตใจอยู่ในเกณฑ์ค่อนข้างมีนัยสำคัญทางสถิติ แปรผันตรงกับการรับรู้สถานะทางเศรษฐกิจของครอบครัวดี ความสัมพันธ์ต่อผู้ปกครองดี และ ความกดดันด้านความสำเร็จทางการศึกษาต่ำ ค่าสัมประสิทธิ์ส่วนใหญ่เป็นไปทิศทางที่คาดหวังไว้และ มีนัยสำคัญทางสถิติและยังพบว่ามี ความแตกต่างเพียงเล็กน้อยระหว่างกลุ่มนักเรียนมัธยมศึกษาปีที่ 1 และ ปีที่ 3

จากผลการศึกษา นี้ รัฐบาลควรเพิ่มเงินสนับสนุนและส่งเสริมความสัมพันธ์ที่ดีในสังคมให้กับนักเรียนกลุ่มที่มีฐานะยากจน เพื่อพัฒนาการประเมินสุขภาพตนเองด้านร่างกายและจิตใจของนักเรียนในกลุ่มนี้ให้ดีขึ้นและควรสนับสนุนให้มีที่ปรึกษาสำหรับนักเรียน เพื่อแนะแนวและฝึกทักษะการแก้ปัญหา การรับมือกับความกดดันจากความคาดหวังของผู้ปกครอง รวมทั้งยังควรจัดอบรมการวิธีการพัฒนาความสัมพันธ์ในครอบครัวให้แก่ผู้ปกครองด้วย

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This study analyzes the determinants of self-rated physical health (SRPH) and self-rated mental health (SRMH) of middle school students in the People's Republic of China. The primary explanatory variables of interest are perceived economic status, parent-child relationship and pressure from parental expectations for children's academic attainment.

The secondary data comes from the China Education Panel Survey, a nationally representative survey conducted by the Renmin University of China and other provincial universities in 2013-2014. The data set used in this study comprises data from 7th graders and 9th graders (11,857 observations in total). Binary logit regressions were estimated to analyze the data.

The SRPH and SRMH of 7th and 9th grade students are relatively good and the key determinants of interest are statistically significant. Higher perceived economic status, better parent-child relationship and less pressure from parental expectations for children's academic attainment are positively related with SRPH and SRMH. The coefficients for most control variables have the expected sign and are statistically significant. The sub-sample analyses revealed some differences between 7th graders and 9th graders.

Governments could increase the subsidy for poor students, and also encourage socially warm-hearted people to support poor students. Besides, comprehensive school counseling should be promoted and new subjects for life-coping skills could be offered to help students deal with parental pressures. Also, the government could organize counseling for parents on how to improve the relationship with their children.

Field of Study: Health Economics and Student's Signature

Health Care Management Advisor's Signature

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LIST OF ABBREVIATIONS

BMI	Body mass index
PPS	Probability proportional to size sampling
PSU	Primary Sampling Unit
SRPH	Self-rated physical health
SRMH	Self-rated mental health
SSU	Secondary Sampling Unit
TSU	Tertiary Sampling Unit
WB	World Bank
WHO	World Health Organization



CHAPTER I

INTRODUCTION

1.1 Motivation

WHO defines health as a “*state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*” (World Health Organization, 1948). Health can hence be divided into three parts physical, mental and social well-being, and these three parts can be measured in two ways objectively and subjectively. The objective comes from the medical or psychological doctor diagnosis, and the subjective means self-rated. This study is going to study the health of the middle school students, which are 7th to 9th grade students, focusing on the physical and mental health, and both of them using the subjective method to measure. The self-rated physical health often was measured by asking single item question: “In general, how would you rate your health? with response options of ‘excellent, very good, good, fair, or poor’.” (DeSalvo, 2006). Eriksson they evaluate functional mental health using the single item question, “Do you suffer from anxiety, nervousness or depression which entails that you cannot, or must exert yourself to be able to, have contact with others?” (Eriksson, 2001).

Middle school students are an important group, as they are during the period of adolescence, which is very important in one's life, it can influence the future development not only for the physical health part but also the mental health. Physical health problems during the adolescents' period will affect their future health when they arrive middle age over 45 years old. Adolescent obesity, respiratory and cardiovascular system function decline will cause a variety of deadly diseases after over 45 years old such as diabetes, coronary heart disease. Therefore, if the physical health status of teenagers does not get improvement, it will greatly reduce the quality of life of people

who over 45 years old; and for the social and economic, it will greatly increase the future state of health and pension funds (NIES, 2012).

And the physical health of Chinese adolescent student aged 10 to 19 also has some problems, such as lung capacity/body mass index is not good, the rate of not reach the country standard is 22.54 %, and underweight male and female students accounted for 38.88% and 35.89% respectively, statistics show that in 2010, overweight and obesity increased to 5.05% and 9.41% respectively (NIES, 2012).

Some studies have been done, and there are several factors influencing the self-rated physical health. Showing good child-parent relationship, proxied by a variable for having no difficulty talking with mom and dad, has positive effect on the self-rated physical health (Vingilis, 1998; Richter 2011; Meireles, 2015). The lower perceived family wealth leads to the worse self-rated physical health (Eunsook Choi, 2013; Rueden, 2006; Jovic-Vranes, 2011). The reason for focusing on these key variables are as follows; for the perceived economic status, because there are some unbalance between poor people and rich people, poor people cannot access resource like the rich people, such as, less job opportunity, the better and safety food; and the children will have different social status, so it may reflect some problems; for the child-parent relationship, more and more mother get into labor market and they will do not have enough time to take care or see their children, because mothers take care children more than fathers in China, and father work more in outside; for the pressure from parental expectations for children's academic attainment, parents always want to their children have a higher educational level, they can earn more money and live a better life, so they will exert a lot of pressure on children.

A survey conducted at Shenyang Liaoning province of China included 4,593 students from 7th grade to 12th grade, and there were 26.3% of these students suffered the mental health problem, and serious mental health problems account for 5 % of these students (Yu, 2007). And Robinson found students who have a difficulty meeting

parents' expectation or perceived pressure from the expectations will lead to the children having more clinical symptoms, such as, somatic complaints, aggression, delinquency (Robinson, 1991).

In addition, middle school students have the psychological inversion and they are prone to suicide when they get in trouble, and there is a study showing a high proportion of suicides suffered from mental illness (Cheng, 1995). As Sohu News which is an internet platform to spread information, it has reported that many middle school students committed suicide because the pressure from family or having a bad relationship with their classmates or teachers. And they showed that starting from the sixth grade, suicide rates began to rise, and the highest one is 7-9th grade school, followed by higher than 9th grade school. Boy students' suicide phenomenon is more prominent in primary and middle school stage, and proportion is higher than the girls (21stCERI, 2014).

And China students afford a lot of stress from the study, because that their parents want them get a better grade and go to a better university, and they can do more for our country as well as they can have a better life. 55.8% of the urban middle school study time every day more than the standard time 9 school hours prescribed by country, 42.5% of the grade 9 students think that schoolwork burden is heavy (China's Statistical Information Network, 2004). 78.3% of the senior high school students usually study more than 8 hours every day in China, South Korea has a 57.2% are the same, however, the United States, Japan, almost do not have this kind of situation (People news, 2009), and this influence their health a lot. One platform Qimeng consists of the national professors they did another report, they found the middle school account for 51% of all the suicide students by the grade, they collected 79 primary and middle students committed suicide in 2013, and they also found there 75% student committed suicide due to the study stress (21stCERI, 2015).

WHO published that more than 25% students feel low for all over the world students (WHO, 2000).

Some studies, using the depressive emotion represent the mental health, find that fulfill more parents' expectations has more depressive symptoms (Sunita, 1999). Closer relationship with parents and lower parents' expectation of academic rank lead to less depressive emotion (Guo, 2003). High family income has lower depression symptoms (Tracy, 2008) there are many factors influencing the self-rated mental health, but in this study, as in the case of self-rated physical health, we only focusing on child-parent relationship, the perceived economic status and pressure from parental expectations for children's academic attainment.

This study will include key independent variables for self-rated physical health which are from literature review, that is gender and hospitalization (Mikolajczyk, 2008), exercise and BMI (Page, 2008), sleeping time (Steptoe, 2006), perceived economic status (Eunsook Choi, 2013), parental education level (Rueden, 2006), number of friends and parent-child relationship (talk with parents) (Richter, 2011), higher school achievement (Vingilis, 1998).

And for the self-rated mental health will include these key independent variables which are from literature review, gender (Jovic-Vranes, 2011), BMI (Wang, 2007), living in dorm (Yang, 2010), exercise (Lawlor, 2001), parent-child relationship or talk with parents and fulfill parents' expectations and hospitalization (Sunita, 1999), perceived economic status and parental education attainment (Eunsook Choi, 2013), family member relationship and sleep quality (Wu, 2015), number of friends and grade rank (Guo, 2003).

And most of literatures in Chinese are not focus on the self-rated physical health of the middle school students; but of adults such as, Li research on the perceived health status and its affecting factors among rural residents (Li, 2008). However, there are a few studies that look at the difference between university students and the middle

school students about the self-rated physical health (Wang, 2007), and a lot of study the mental health about the middle school students, but they only target one school one class or one province middle school students (Yu, 2007), so the existing researches cannot represent the whole country, however, this study can represent the whole country as it uses secondary data from a nationally representative survey.

This study is going to study factors affecting the self-rated physical health and self-rated mental health of the middle school students. And the data has not been used for these topics, there is only one study using this dataset, and they study the Chinese students' academic achievement differentiation and its affecting factors (Chen, 2013), so for the data this study is different.

1.2 Research questions

- 1) What are the factors affecting the self-rated physical health of the middle school students in China?
- 2) What are the factors affecting the self-rated mental health of the middle school students in China?

1.3 Research objectives

The main research objective of this study is:

- 1) To examine the determinants of self-rated physical health and self-rated mental health of the middle school students in China.

The specific research objectives of this study are:

- 1) To find whether perceived economic status is related with self-rated physical health and self-rated mental health?
- 2) To find whether parent-child relationship is related with self-rated physical health and self-rated mental health?
- 3) To find whether pressure from parental expectations for children's academic attainment is related with self-rated physical health and self-rated mental health?

1.4 Scope of the study

This study will analyze factors affecting the self-rated physical health and self-rated mental health of the middle school students in China. The secondary data was collected by China Survey and Data Center under Renmin University of China in 2013-2014 (one academic year). The nationally representative dataset comprises 19,487 seventh grade and ninth grade middle school students, who were surveyed using multi-stage sampling design

1.5 Hypotheses

The hypotheses of this study are:

- 1) Better perceived economic status leads to better self-rated physical health and self-rated mental health.
- 2) More pressure from parental expectations for children's academic attainment results in the worse self-rated physical health or worse self-rated mental health?
- 3) Worse parent-child relationship leads to worse self-rated physical health and self-rated mental health.

1.6 Possible benefits

There are a few studies about factors affecting self-rated physical health among middle school students, so this study can tell us the factors affecting self-rated physical health of Chinese middle school students. Some studies study the how the learning stress influence students' health, and some study the stress from parents expectation for higher grade and score, but there is no study focus on the pressure from parental expectations for children's academic attainment. And the reason for studying the pressure from parental expectations for children's academic attainment as follows, parents always want their children to get a higher education level in China, such as master degree or PHD, thus they can earn more money and do more for the society, and this pressure will be with children for a long term until they get that degree, so this

pressure will have more effect on the children than the study stress of one year or one semester.

Therefore the result of this study maybe could help policy-maker and parents to make or formulate new decisions. For example, if the pressure from parental expectations for children's academic attainment affects the self-rated physical health or self-rated mental health, and more pressure worse self-rated physical health or self-rated mental health, which means parents put more pressure on the students, parents should reduce pressure, maybe school can set new subjects for life-coping skills could be offered to help students deal with parental pressures. If worse parent-child relationship can lead to worse self-rated physical health and self-rated mental health, government could organize counseling for parents on how to improve the relationship with their children. If better perceived economic status leads to better self-rated physical health and self-rated mental health, the government can give poor students scholarship to improve the physical health and mental health status.



CHAPTER II

BACKGROUND

2.1 General information about China

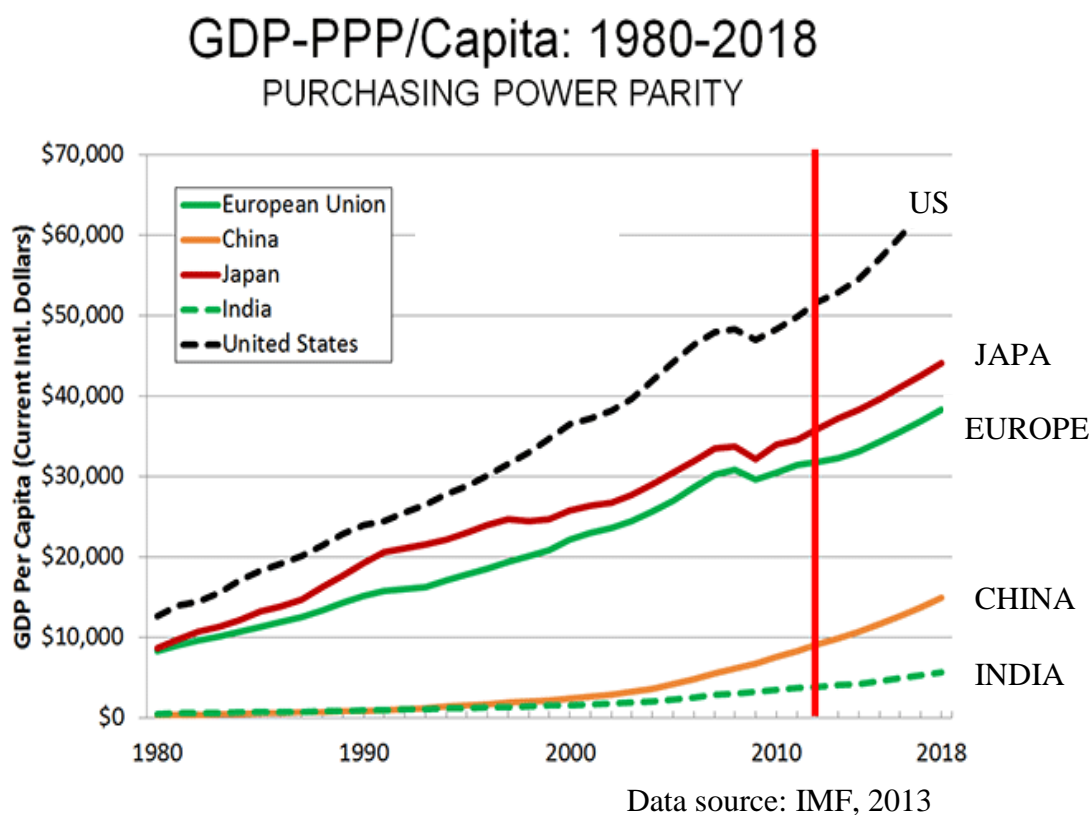
China (Full Country Name: People's Republic of China) is located in eastern of Asia, bounded by the Pacific in the east. The third largest country in the world, next to Canada and Russia, it has an area of 9.6 million square kilometers (mainland) And China have 1.3 billion (mainland) population, it is the largest population in the world at present (NBSC, 2010).

The capital city is Beijing has 13.8 million population, China officially recognizes 56 distinct ethnic groups, the largest of which are Han, which account for 91.51% of the total population in 2010 (NBSC, 2010). Ethnic minorities (such as Meng, Man, Hui, Zang, Zhuang, Wei,) make up 8.49% or 113.8 million of China's population in 2010 (NBSC, 2010). The official language is Putonghua or Mandarin, and China has many religions such as Confucianism, Buddhism, Taoism, Muslim, and Christian (HPRC, 2009).

When it comes to the GDP, China Central Government want to ensure the growth rate stable as 8%, however, it is quite difficult, in 2013, growth rate is 7.7%, and GDP is 16.162 trillion US dollars, GDP per capita: 3,619.44 US dollars, GDP per capita PPP 11,805.08 US dollars (IMF,2013).

According to World Bank China belong to the upper middle income country, (WB, 2010), but compared with other three countries except for India, China still has a low GDP per capita. And this maybe can influence China students or parents cognizance about their economic status.

Figure 1 GDP-PPP/Capita: 1980-2018

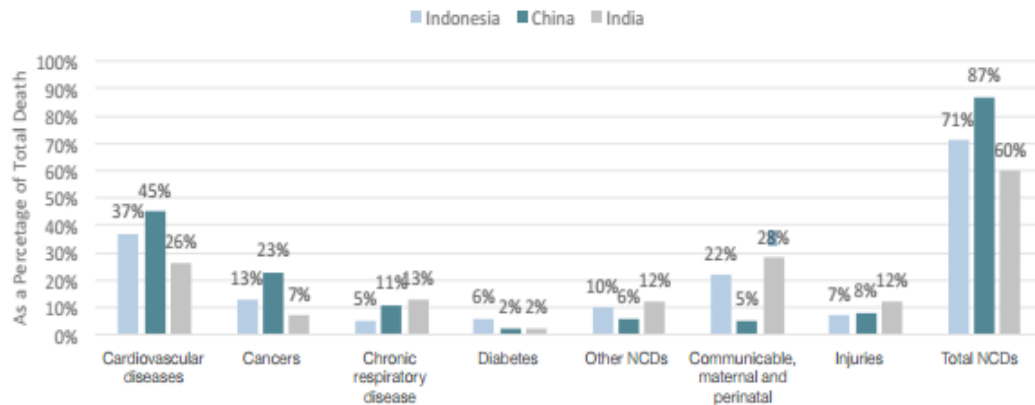


2.2 Health status of China's population

There is a report about China population current physical health status in 2015 from National Health and Family Planning Commission of the People's Republic of China, report said China population become more overweight and obese than 10 years ago, the overweight rate and obesity rate of adult is 30.1% 11.9% respectively at present and the overweight rate and obesity rate of children is also rising. Chronic disease is more serious, and it has become a major cause of death (NHFPCPRC, 2015). And more than 70% of Chinese suffer from "sub-health" problem, only 15% of Chinese people live in health, which is the definition of WHO, in 2011(China Central Television News)

The life expectancy of Chinese people is increased, male from 72 in 2010 to 74 years old in 2013 , female is the same 77 years old in 2010 and 2013(WHO, 2013)

Figure2 Proportional mortality due to NCDs in Indonesia, India and China, 2014



And we can see the NCDs is the big part causing the death, among Indonesia, China and India, and China is the highest, the reasons for choosing these two countries are because they are Asia countries, and they also have a lot of populations, and also India is the neighboring country of China,. And several years ago economic growth rate of China and India are the fastest.

In 2012, the hypertension prevalence rate of 18 and older adult was 25.2%, diabetes prevalence was 9.7%, compared with 2002, and prevalence is increasing. According to a 2013 national cancer registration results analysis, cancer incidence is 235/100000, lung cancer and breast cancer has the highest incidence for men and women respectively. Chronic disease mortality rate per 533/100000, 2012 national residents accounted for 86.6% of all deaths. Cardio-cerebrovascular disease, cancer and chronic respiratory diseases are the main cause of death accounting for 79.4% of the total death.

Smoking is a risk factor for all disease, Existing number of smokers in China more than 300 million; smoke people over 15 years old account for 28.1% and men smoking rates is 52.9%, nonsmokers exposed to secondhand smoke with the proportion of 72.4%. 18 years old and older adults across the country in 2012 per capita annual alcohol intake of 3 liters, harmful drinking rate 9.3% among drinkers.

Adults often doing exercise rate is 18.7%.Smoking, over-drinking, lack of physical activity and high salt, high fat not a healthy diet are the main risk behavior factors for chronic disease occurrence and development (Chinese Residents of Nutrition and Chronic Disease Status Report, 2015).

To understand the health of China's population, data of Chinese General Social Survey (CGSS), collected in 2013, by China Survey and Data Center under Renmin University of China are presented. It is a nationally representative survey, and for the data of CGSS in 2013, they interviewed 11,438 individuals based on a multi-stage stratified sampling procedure. And following are simply analyzed.

Table 1 SRPH of China population

SRPH	Freq.	Percent
Refuse to answer	2	0.02
Poor	334	2.92
Not good	1,534	13.41
Fair	2,225	19.45
Better	4,349	38.02
Excellent	2,994	26.18
Total	11,438	100.00

(Source: Author)

Table 1 shows the frequency and percent of self-rated physical health of China population using the data Chinese General Social Survey in 2013, they also use the single item question to measure the self-rated physical health, how do you think of your current physical health status, as this study classify the self-rated physical health, so combined poor, not good and fair account for 35.78%, combined better and excellent make up for 64.20%, 0.02% people refuse answer the question.

Table 2 SRMH of China population

SRMH	Freq.	Percent
Refuse to answer	19	0.17
Do not know	2	0.02
Always	116	1.01
Often	833	7.28
Sometimes	2,384	20.84
Seldom	4,508	39.41
Never	3,576	31.26
Total	11,438	100.00

(Source: Author)

Table 2 shows the frequency and percent of self-rated mental health of China population using the data Chinese General Social Survey in 2013, they also use the single item question to measure the self-rated mental health, how often you feel depression and upset; as this study classify the self-rated mental health, combined always, often and sometimes accounts for 30.14%, combined seldom and never make up for 70.67%, 19 people refuse answer the question, 2 people answer do not know.

So self-rated physical health of China population is relatively good, however, when we compared these two percentages, the self-rated physical health of China population is not good as well as self-rated mental health.

Maybe because Chinese students afford a lot of study stress, and also some pressure from parent's expectation, which can influence self-rated mental health of students. There is a survey investigating pressure from expectations of study among middle school students, they surveyed 302 South Korea and 302 Chinese students, the Results show that the pressure from parents' expectation of Chinese students were significantly higher than that of Korean students (Zhang, 2010).

The situation of parents expected children to get higher education level is quite common, about 33.8% of Chinese high school students parents want their children have a master degree in the future, 50.7% hope that the child has a bachelor's degree, 12.6% for their kids to have a college degree, only 2.9% want their children have a high school education level, which including school of technical secondary school, ability, and secondary education (Xinhua news, 2009).

The parent-child relationship of China is not good as other countries. China Youth and Children Research Center conducted a survey, and results show that 93.4% of Japanese mother often chat with my children, followed by South Korea's mother (83.7%), the United States (92.4%), Chinese mother 74.2% column in the end, is. And 91.2% of the Japanese high school students are willing to take the initiative to talk with their mother, South Korea is 88.9%, with 84.2% in America, Chinese high school students are listed in the end, just 72.6% (China Youth and Children Research Center, 2006).

2.3 Education system of China

In china, primary and secondary education takes 12 years to complete, divided into primary, middle and senior high school secondary stages. Primary education last either 5 or 6 years, and when students finish the primary education, they should pass the exam and enter the middle schools from 7th grade to 9th grade, but no matter how many score students get, they can enter the middle school, because the 9-year schooling in primary and middle schools belongs to the compulsory education. And at middle school stage, most of schools have 3 years education and small part schools last for 4 years, and when the students finish the middle school stage education, they need to participate in the exam and enter the senior high schools from 10th grade to 12th grade, they will enter the schools according to their grades, good grades good schools, so for the middle school they will feel some stressful about their future senior high school.

General senior secondary education last 3 years, and for the third year students they will enter university according to their grades, good grades good schools, and some cannot go to the university, because they do not meet the lowest grade line (glObserver website,2015).

For Chinese education process is quite different with the other countries, the education idea of parents and the teachers are tend to give students more workload, so the study stress is very high. Under the pressure of enters a higher school and exams, adolescent students study time in the school considerably more than the relevant standard provided by country, country provide standard study time is no more than 7 hours per day. The basic situation investigation shows that more than 60% of primary school students study time in the school more than 7 hours as stipulated by the country, more than 60% of middle school students study time in the school more than 9 hours stipulated by the country from Sports Health Art Education Research Center (SHAERC, 2008). Due to heavy schoolwork burden, the time students finish their homework every day also greatly exceed the provisions of the country. And about 50% of primary school lower grade students spend time doing homework every day more than 30 minutes stipulated by the country; About 30% of the primary school higher grades students spend time doing homework every day more than 60 minutes stipulated by the country; About 20% of middle school students to finish their homework every day for more than 1.5 hours as stipulated by the country.10% of the primary and middle school students homework time even more than three hours every day (SHAERC,2008).

Primary and secondary school students not only bear the school learning tasks, but also complete learning tasks arranged by the parents. Basic situation of the survey shows that 75% of primary and secondary school students to participate in all kinds of talents training, subject classes or tutor. In the regulations of the country about the rest time, most of this time spent on learning and finish the homework (SHAERC, 2008).

CHAPTER III

LITERATURE REVIEW

3.1 Measurement of self-rated health

3.1.1 Measurement of self-rated physical health

Self-rated physical health also called self-reported physical health or subjective health status, and the respondents often was asked, "take all things into consideration, would you say your health is excellent, very good, good, fair, or poor?" (DeSalvo, 2006), and (Jylhä, 2009) they built a contextual frameworks, and said when the respondents answer the questions, they review of their medical diagnoses, functional status, also think about what is ill, and ask themselves, how is my health status, and compare with their earlier health status, and the expected development of health, after above process, so they can evaluate the health status of themselves, and the results is reliable as well. And Boardman did a survey to identify the validity of self-rated physical health for adolescent, finally they demonstrate self-rated physical health is found to be moderately stable over repeated observations (Boardman, 2005).

3.1.2 Measurement of self-rated mental health

Mental health is defined as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community. (World Health Organization)

But Eriksson they evaluate functional mental health using the question, 'Do you suffer from anxiety, nervousness or depression which entails that you cannot, or must exert yourself to be able to, have contact with others?' and Ahmad demonstrated that self-rated mental health is associated with multi-item measures of mental health, self-rated health, health problems (Ahmad, 2014).

3.2 Previous research on the determinants of self-rated health

3.2.1 Determinants of self-rated physical health

A cross-sectional study in three European countries the survey conducted in 2005 at three universities; participants include 2,103 first-year students at the University of Bielefeld, Germany; the Catholic University of Lublin, Poland; and Sofia University, Bulgaria. They use multivariable analysis, they found physical activity, being a female, less than two times visits or no visits to a doctor in the last six months, psychological well-being were significantly positive associated with self-rated physical health (Mikolajczyk, 2008).

One research studies the effects of objective and subjective socioeconomic status on self-rated physical health, depressive symptoms, and suicidal ideation in adolescents. Data from Korea Youth Risk Behavior Web-based Survey, and include 69,196 students from 400 middle schools and 400 high schools and students aged 12-18 in Korea, they used logit regression analysis, and they separated the females and males to analyze, they using the odd ratio to interpret the results, and they found that for the male students the worse self-rated physical health but female is opposite to male, and they also found that the higher parental education attainment, higher subjective economic status have a better self-rated physical health both male and female (Eunsook Choi, 2013).

A study explaining the socioeconomic differences in adolescent self-rated physical health, data from the German the cross-sectional 'Health Behavior in School-aged Children' Survey in 2006 include 6,997 respondents aged 11-15 years. Socioeconomic status was measured by the family affluence scale. They use multistage logit regression models, and they found lower perceived family wealth worse self-rated physical health for all gender. Having difficulty talking with mom and dad lead to worse self-rated physical health, and having less same gender friends worse self-rated physical health,

and they suggested that reducing health inequalities should primarily focus on improving material circumstances in lower affluent group (Richter, 2011).

Rueden want to investigate the impact of two different socioeconomic status measures on child and adolescent self-reported health related quality of life and the student from European country, 754 children 1,142 adolescents. They use univariate analyses F-test, and they found that lower family wealth, lower parental education predict worse related quality of life for both the children and the adolescent (Rueden, 2006).

There is a study wants to know the factors predict student self-rated physical health, their data come from 1,993 Ontario student drug use survey, they included 840 students from Ontario and it was a randomly selected sample, they analyze the data by 4 models, and include the independent variable step by step using multivariate regression equation, and finally they found that the age is not significant. Good child-parent relationship, fewer physical problems, higher school achievement has positive effect on the self-rated physical health. And being female, smoking has negative effect on the self-rated physical health (Vingilis, 1998).

One research study the factors determine self-perceived physical health and psychological well-being among Serbian schoolchildren and adolescents, they surveyed 2,721 schoolchildren and adolescents by face-to-face using questionnaire, they use categorical regression model, and they found being a female, higher age, higher objective and subjective socioeconomic status have better self-perceived physical health, "Possible explanations for these findings are that older respondents are more sensitive and vulnerable. This period of life is also associated with notable changes in mood. It appears that as children reach their adolescent years, they feel less secure, both psychologically and in their social environment"(Jovic-Vranes, 2011).

There is a survey conducted in Thailand, they studied the self-rated physical health, psychosocial functioning, and health-related behavior among Thai adolescents,

they surveyed 2,519 adolescents from 10 secondary high school of Chiang Mai province in Thailand, they used F-test for the continuously scaled variable and chi-squared for the categorically scaled variables. F-test, students doing more vigorous physical activity have a better self-rated physical health. And for the chi-squared, for the overweight boys they thought they were not unhealthy compared with others, for the obese boys they rated themselves not healthy than others, however, for the obese girl they thought they were not unhealthy compared with others, for the overweight girl they rated themselves not healthy than others (Page, 2008).

Another research study the factors affecting the sub-health status of university student, they surveyed ChangJiang University of china, and they using the cluster random sampling and included 940 students, they use logit regression, and they found being a female, have a bad adaptation ability lead to worse physical health (Wang, 2007).

Stephoe conducted a survey assessed the relationship between sleep duration and physical health in young adults, and sleeping time less than 6 hours can increase the risk of coronary heart disease and type 2 diabetes (Stephoe, 2006).

3.2.2 Determinants of self-rated mental health

One research study the effects of objective and subjective socioeconomic status on self-rated physical health, depressive symptoms, and suicidal ideation in adolescents, data from Korea Youth Risk Behavior Web-based Survey, and include 69,196 students from 400 middle schools and 400 senior high schools and students aged 12-18 in Korea. They used chi-square test, T-test and logit regression analysis, and when they analyze, they separated the females and males, and they define the depressive symptoms, during the past year, have you ever felt depressed or sad for 2 weeks continuously, and they using the odd ratio to interpret the results, and they find that for all the students the higher parental education attainment the less depressive symptoms,

and they also found that lower subjective household economic status, the more depressive symptoms both male and female. (Eunsook Choi, 2013).

One research study the factors determine self-perceived physical health and psychological well-being among Serbian schoolchildren and adolescents, they surveyed 2,721 schoolchildren and adolescents, they use categorical regression model, and they found gender, age, objective socioeconomic status, subjective socioeconomic status and social support are associated with psychological well-being. Being a male, lower age, higher objective subjective socioeconomic status and higher social support have a better psychological well-being (Jovic-Vranes, 2011).

Chen conducted a study about the depressive emotion of seventh grade students in China, they surveyed 335 students, and they use the T-test to analyze, the depression situation of girls is higher than boys', but the difference is not significant, and the depression situation of only child is higher than non-only child also insignificant, because they live in dormitory, their around environment are similar that means they enjoy the same room same food and other things. And the correlation analysis: they found that the family conflict and intimacy had negative correlation with depression (Chen, 2011).

To study the predictors of the depressive symptoms, Sunita surveyed 996 secondary school students in Hong Kong by cluster sampling method, and they use spearman correlation coefficients ensure the predictors, and then they include all significant 13 variables to do the stepwise regression, and finally they contain 9 variables, and they found more parental understanding, acceptable by peers, less amount of schoolwork, less health problem, being male, more parental caring and satisfaction with examination result have less depressive symptoms. However fulfill more parents' expectations have more depressive symptoms, they did not explain that (Sunita, 1999).

To analyze the depression and the influencing factors about senior high school student in Shanwei of China, they select students randomly from 12 senior high schools, and contain 3,042 students. (Their depression variable are yes or no question), and they use univariate and multivariate logistic regression, firstly in order to ensure the significant variables they do the stepwise regression, and finally they contain 9 variables, in the univariate logistic regression: sex, grade, and family economic situation, the academic record, learning pressure, family member relationship, parents' marriage status, communication with parents, relationships with classmates and teachers, how much pocket money every month, truancy, sleep quality grading all have effect on middle school students' depressive symptoms. In the multivariate logistic regression, they found being a female, high grade, more study stress, bad family member relationship, and having a bad relationships with classmates, having bad sleep quality have more depression symptom, they thought maybe for the girls their emotions is exquisite, more willing to express feelings, acknowledged and facing their own failure. For the grade or ranking, May be due to parents teachers and the students themselves look test scores as evaluation standard of personal ability, the study pressure will make them feel burden and appear depression symptoms(Wu, 2015).

There is a research study the childhood experience, family factors, school factors associated with depressive emotion in middle and senior high school students. They surveyed 1,382 middle and senior high school students in Chengdu of China and they use F-test. And finally they found female's depressive emotion higher than male's. The depressive emotion, both the 14 years old and 18 years old students' higher than 12 years old student's. From the family factors, closer relationship with parents and lower parents' expectation of academic rank lead to less depressive emotion. From the school factors, the more number of friends and higher academic achievement lead to less depressive emotion, they said the higher age may have higher study stress (Guo, 2003).

They want to explain the relationship between family poverty and childhood depressive symptoms, they surveyed 457 sixth grade students who are 11-13 years old study at Seattle-area public schools, and they use T-test, and they found high family income has lower depression symptoms (Tracy, 2008).

Wang want to study the relationship between obesity and depression. They surveyed 3,886 primary school students aged 9-10 years in Beijing (they used Kovacs Children's Depression Inventory), they use Chi-square test and ANOVA (analysis of variance), and they found For the girls, the depression situation is increased as the body weight increasing because they care more about their body shape, and for the boys, overweight and underweight have more depression than the normal body weight (Wang, 2007).

Hong conducted a survey studying association of sleep status with depression among high school students in Nanjing of China, they surveyed 7,127 students, and they use the logit regression to control the possible confounding factors, and use the odds ratio to interpret the association of sleep status with depression, they found the sleeping time less than 6 hour lead to higher depression status (Hong, 2007).

Lawlor use Systematic review and meta-regression analysis of randomized controlled trials to determine the effectiveness of exercise as an intervention in the management of depression. And finally they found the effectiveness of exercise in reducing symptoms of depression cannot be determined (Lawlor, 2001).

Yang conducted a survey to Study on the relationship between school adjustment ability and mental health of living in dorm middle school students in YanBian, and she found that students living in dorm have a worse self-rated mental health (Yang, 2010).

3.3 Conclusions and unanswered questions

There are the conclusions from the previous studies.

3.3.1 Conclusion of the review of prior research

From the literature review, most of studies also use the logit regression model, so we also choose this method. And the review of the literature has shown that there are eleven determinants which are the same for the self-rated physical health and self-rated mental health. These eleven factors are the following:

1. Perceived economic status

Eunsook Choi (2013) and Jovic-Vranes (2011) found higher economic status lead to better self-rated physical health and self-rated mental health, Richter (2011) and Rueden (2006) got the same result, the lower economic status lead to worse self-rated physical health, and Tracy (2008) found higher economic status lead to better self-rated mental health less depression symptoms. The higher Perceived economic status, the more resource they can enjoy, such as more health care, more health food (SRPH), and they will more satisfy with their life feeling less negative emotional (SRMH).

2. Gender

Eunsook Choi (2013) found male have worse self-rated physical health, and Mikolajczyk (2008) and Jovic-Vranes (2011) found the similar findings, the female have a better self-rated physical health, however, Vingilis (1998) and Wang (2007) found the different results, female have worse self-rated physical health. And Jovic-Vranes (2011) and Guo (2003) found the female have more depression symptoms than male. The female during the adolescent will have more change in Physiological and psychological aspects.

3. Exercise

Mikolajczyk (2008) and Page (2008) found doing more exercise has positive effect on the self-rated physical health. And Lawlor (2001) found the effectiveness of exercise in reducing symptoms of depression cannot be determined, because it needs the type of exercise and quality, such as WHO (2016) recommend adolescent aged 5-17 should

exercise for 60 minutes for keep healthy, and also good for the nervous system, meanwhile join in the physical activity can nature the social ability of adolescent; so exercise not enough time do not have the effect on physical health and mental health.

4. Parents' education level

Eunsook Choi (2013) and Rueden (2006) found the higher (lower) parental education predict better (worse) related quality of life or self- rated physical health and self-rated mental health, one possible reason for this is that lower parents' education level may have lower social status, so they have more depression emotion, and for the physical health parents with higher education level have better knowledge to look after and raise children.

5. Parent-child relationship (talk with parents)

Richter (2011) found difficult to talk with mom and dad (parent-child relationship) has worse self-rated physical health, and Vingilis (1998) found good child-parent relationship has positive effect on the self-rated physical health, because parents and children have a good relationship, their parents can take care well of them, such as talk or teach them how to keep physical health. And Wu (2015) found bad child-parent relationship lead to worse self-rated mental health, and Sunita (1999) found parent care more about children has positive effect on the self-rated mental health, because they can feel love and care and always keep worries out of mind , therefore have a better mental health.

6. Hospitalization

Mikolajczyk (2008) found less than two times visits or no visits to a doctor in the last six months was significantly positive associated with self-rated physical health, Vingilis (1998) found fewer physical problems has positive effect on the self-rated physical health. And Sunita (1999) found less health problem less depressive symptoms, more physical problem the students will feel low, and when they be in

hospitalization, they will be in a little room, which make them feel depression, so they have more depressive symptoms.

7. Grade ranking

Vingilis (1998) found higher school achievement has positive effect on the self-rated physical health, because they have more knowledge about keeping healthy. And Sunita (1999) found satisfaction with examination result have less depressive symptoms, and Guo (2003) found lower parents' expectation of academic rank lead to less depressive emotion, the lower expectation the lower stress, and when they get the expectation they feel more relax so have less depressive symptoms.

8. Overweight or BMI

Page (2008) found for the overweight boys they thought they were not unhealthy compared with others, for the obese boys they rated themselves not healthy than others, however, for the obese girl they thought they were not unhealthy compared with others, for the overweight girl they rated themselves not healthy than others. And Wang (2007) found for the girls, the depression situation is increased as the body weight increasing because they care more about their body shape, and for the boys, overweight and underweight have more depression than the normal body weight, because the abnormal body weight make them not confident, so they feel more depression.

9. Number of friends

Richter (2011) found having less same gender friends lead to worse self-rated physical health, this because they get support from friends, and they share the health knowledge with each other. And Guo (2003) found more friends lead to less depression better self-rated mental health, because no friend they will feel lonely and helpless.

10. Sleeping time

Steptoe (2006) conducted a survey assessed the relationship between sleep duration and self-rated physical health in young adults, and the odds ratio of rating a poor physical health for sleeping time less than 6 hours and sleeping 7-8 hours is 1.99,

this because short sleeping time could cause fatigue in daytime. And Wu (2015) found having bad sleep quality lead to more depression symptom. And Hong (2007) found the sleeping time less than 6 hour lead to higher depression status, because many depression patients have nightmares and poor sleep quality.

11. Living in dorm

Yang (2010) conducted a survey to check the relationship between school adjustment ability and mental health of living in dorm middle school students in YanBian, and found that students living in dorm have a worse self-rated mental health than students not living in dorm. The students living in dorm leave their parents and have a bad relationship with roommates, they will miss their parents and have to adapt to the new environment, so they tend to have a worse mental health.

3.3.2 Unanswered questions

The gap between this study and previous study, this study chooses the middle school student grade seventh and grade ninth of the whole country, it can represent the whole country's middle school students grade seventh and grade ninth, some studies only study the several schools or one grade students, such as, Mikolajczyk and Wang studied several university students, Page surveyed 10 secondary high schools' students, and Wu surveyed over 12 senior high schools' students, so the result also can apply to the whole country's middle school students grade seventh and grade ninth, and there is no study about how do pressure from parental expectations for children's academic attainment and living in dorm affect self-rated physical health, also do not have study focus on the relationship between pressure from parental expectations for children's academic attainment and self-rated physical health or self-rated mental health, so compare with previous studies, this study is the nationally representative study.

From the literature review, we can see, some studies found being a female is more likely to have lower self-rated physical health (Vingilis, 1998), but another study found females have a better self-rated physical health (Mikolajczyk, 2008; Jovic-Vranes, 2011), so the results are ambiguous.

And Chinese parents also want their children can get a higher educational level or higher grade, so the children will feel more stress from their parents' expectation for higher educational level or higher grade, and there is no study about the relationship between stress from their parents' expectation for higher educational level or higher grade and self-rated physical health or self-rated mental health.

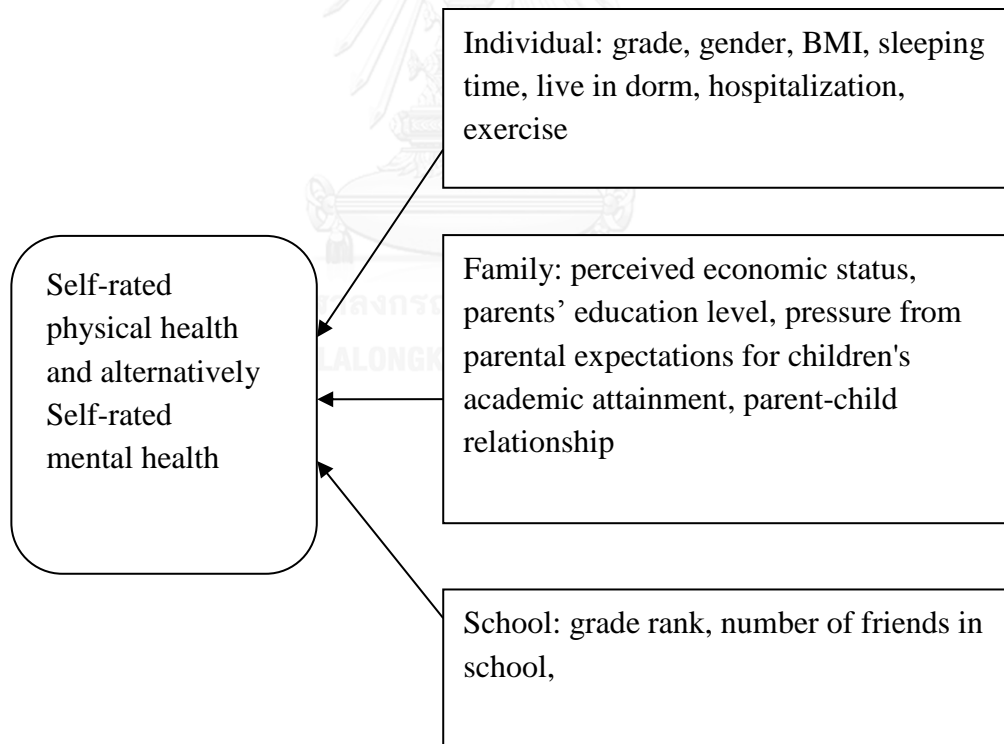


CHAPTER IV

CONCEPTUAL FRAMEWORK

4. Conceptual framework

This study seeks to examine the determinants of self-rated physical health and self-rated mental health of middle school students in China, focusing on perceived economic status, parent-child relationship and pressure from parental expectations for children's academic attainment. After doing literature review, finding is that the factors associated with the self-rated physical health and self-rated mental health comes from three parts: individual, family and school.



CHAPTER V

METHODOLOGY

5.1 Data

This study uses secondary individual-level data, and it contains data of middle school students (19,487 observations) in grade seven and nine.

The data comes from the China Education Panel Survey, 2013-2014 academic year. It can download for free, it is designed and implementation by the China Survey and Data Center which is under Renmin University of China, and nationally representative.

The survey uses a multi-stage proportional to size probability sampling method. In the first stage, 28 counties (districts) (PSU) are randomly selected from county (district) level administrative units across the whole country, in the second phase, 4 schools (SSU), which have the seventh grade and/or ninth grade from the geographical range under each county (district) sample, are selected, and in the third stage, 4 classes (TSU) respectively from each sample school, including 2 classes grade seven and 2 classes grade nine, are selected. In the fourth stage, if being the sample class, all students of the sample class constitute the final sample.

There are two questionnaires both student and parent, and each questionnaire has different parts, for the student questionnaire, it include individual status, family situation, school situation; and for the parent questionnaire, it consists of family education, the relationship between parents and school, and school education; so the students answer the main questions self-rated physical health, self-rated mental health and some basic demographic information, furthermore the parents were also surveyed, such as, how do they think about their children physical health, and their children's body weight, height, family income status, what kind of education level they expect

their children get, the current grade ranking, talk with each other, which the same question as the students' questionnaire. But this study will focus on the students' questionnaire to do analysis, because, it studies the students self-rated physical health and self-rated mental health. Because the student dataset was cleaned first, first of all, drop the irrelevant variables and keep all the key variables, and secondly drop the missing value of the key variables, thirdly summarize the data and finding the outlier, for example, the number of best friend in school, some students have 99 best friend, so we look at the standard deviation and mean of this variable, finally drop the individuals who have more 24 best friend, finally 11,857 individual left.

For this study, the self-rated physical health also come from by asking the respondents, how about your overall health status, answer is excellent, better, fair, not good, or poor. And the self-rated mental health is proxied by the depression, by asking: "in the last week, have you felt depressed?" and answer is never, seldom, sometimes, often, always.

5.2 Data analysis

5.2.1 Descriptive analysis

For the dependent variable self-rated physical health and self-rated mental health, this study uses the following independent variables: grade, gender, BMI, hospitalization, sleeping time, live in dorm, exercise, perceived economic status, parental education level, pressure from parental expectations for children's academic attainment, talking about worries with parents, grade rank, and number of friends in school. Due to the self-rated physical health and self-rated mental health between grade seventh and ninth students may have some difference, such as, the higher 9th students will afford more study stress ;and to some extent, because the age difference between 7th graders and 9th graders, the physical and psychological have some different with the

7th grade, so this study will do sub-sample analysis about the grade seventh and ninth students and both of them, the purpose of doing the sub-sample analysis is also check the determinants are the same or not for the grade seventh and ninth students.

There is individual survey weight for each student, given in the dataset, which is used when we run the regression because it can make the sample can represent the population better.

5.2.2 Regression models

In this study, for the first regression: the dependent variable self-rated physical health has five categories taking on the values 1=poor, 2=not good, 3=fair, 4=better, 5=excellent, and we transfer it into binary¹ combining category poor not good and fair into 0, better and excellent into 1. So there are two outcomes, good health and not good health or otherwise, so binary logit regression model will be used.

Binary logit model is $y_i^* = x_i\beta + \varepsilon_i$, and y_i^* is the latent variable which cannot observe, x_i is the explanatory variable, ε_i is the error term, error term is distributed logistically with mean 0 and variance $\pi^2/3$, What can be observed is y where

$$y_i = 1 \text{ if } y_i^* > 0$$

$$y_i = 0 \text{ if } y_i^* \leq 0$$

$$P(y_i^* > 0|x_i) = P(y=1|x_i) = \frac{e^{x\beta}}{1+e^{x\beta}}$$

Because probabilities must sum to one, $P(y=0|x_i) = 1 - P(y=1|x_i)$, and logit regression parameter is non-linearity, but we can change and make it linearity. (Wooldridge, 2003)

$$\text{Log} \left(\frac{p}{1-p} \right) = \log \left[\frac{P(y_i^* > 0|x_i)}{1 - P(y_i^* > 0|x_i)} \right] = x'\beta$$

And for convenient interpret usually take exponential for the two side of equation, $\frac{p}{1-p} = e^{x'\beta}$,

¹ When use the ordered logit model, and use the brant test the proportional odds assumption has been violated. See the appendix G

The left hand side ratio, when independent variable increase one unit, the ratio will increase e^β times, when $\beta > 0$, $e^\beta > 1$, the probability of event happened will increase, and vice versa. And this study will use the odds ratio to interpret the results. (Cramer, 2003), for the odds ratio, it means the odds of the probability (p) event happened and the probability not happened (1-p), so if it greater than 1, the events happened probability is more than not happened. Also can interpret in this way, the odds of one event are x times greater in (good health) compared (not good health) (Kurjak, 2006).

The second regression the dependent variable mental health has five categories 1=always 2=often 3=sometimes 4=seldom 5=never, but when we deal with the data, we reverse the scale, 1=always 2=often 3=sometimes 4=seldom 5=never and we transfer it into binary², combining category always often and sometimes into 0, seldom and never into 1, the reason for doing this is easy to interpret the results.

So there are two outcomes too, good health and bad health, so binary logit regression model will be used.

The econometrics model is the same as the self-rated physical health.

“The results will be reported as odds ratios. Regression coefficients are shown in the appendices. The odds is the ratio of the probability that some event will occur over the probability that the same event will not occur.

The formula for an odds is $P / 1-P$


Where P denotes the probability of the event of interest. For example, If the odds ratio larger than 1 then the odds of $Y=1$ increase. If the odds ratio less than 1 then the odds of $Y=1$ decrease. (Kleinbaum, 2002).

5.2.2.1 Variable description

²When use the ordered logit model, and use the brant test the proportional odds assumption has been violated. See the appendix H

The dependent variable is self-rated physical health, which has two categories 1 means good physical health, 0 means not good physical health or otherwise. And self-rated mental health, which has two categories 1 means good mental health that is less depression symptoms, 0 means not good mental health or otherwise.

Table 3 Independent variables


Variable	Description	Expected sign
Male	Dummy variable that takes the value of 1 if the individual is male and 0 otherwise. 	Regression with SRPH as dependent variable: +/-, males may more easier get the risk behavior such as smoking and drinking, but on the other hand, the female during the adolescent will have more change in Physiological aspects so the effect is uncertain
		Regression with SRMH as dependent variable: +, previous study show that the female have more complains, and they think more than the male so female will have more mental health problems
Grade9	Dummy variable that takes the value of 1 if the individual is in 9 th grade and 0 if is in 7 th grade.	Regression with SRPH as dependent variable: -, 9 th grade students should spend more time on the

		<p>study, so maybe they will sit a whole day, which is not good for health</p> <p>Regression with SRMH as dependent variable: -, 9th grade students have more stress on the study, because they should pass the exam and go to a good senior high school.</p>
BMI	Dummy variable that takes the value of 1 if the individual has abnormal BMI (BMI<18.5or >25),0 otherwise, the cut-point = come from international standard (WHO,2000)	<p>Regression with SRPH as dependent variable: -, abnormal BMI means not very health maybe too thin or obesity, maybe they have some health problem</p> <p>Regression with SRMH as dependent variable: -, abnormal BMI means not very health maybe too thin or obesity, because they care more about their body shape and this can influence their confidence, so they will have a not good mental health</p>
hospitalization (Been in hospitalization last year)	Dummy variable that takes the value of 1 yes and 0 otherwise.	Regression with SRPH as dependent variable: -, it means they have physical problem, so poor physical health

		Regression with SRMH as dependent variable: -, more physical problem the students will feel low, so they have more depressive symptoms.
Sleep (Sleeping time)	hours	Regression with SRPH as dependent variable: +, more sleeping time, they healthier and this because short sleeping time could cause fatigue in daytime
		Regression with SRMH as dependent variable: +, more sleeping time, they will keep a good emotion
pressure (pressure from parental expectations for children's academic attainment)	Dummy variable Taking the value of 1 if more than general pressure otherwise 0. (Students were asked the following question: Have you felt pressure from parental expectations of the education level you should get? There were five response categories: no, little, fair, much, a lot.	Regression with SRPH as dependent variable: -, when they have the pressure, they will tend to always thinking about the pressure and do not have other time to relax themselves, so rate a bad physical health
		Regression with SRMH as dependent variable: -, when they have the pressure, they will feel bad and have a bad mind, so

		rated a not good mental health
pareducation (parental education level)	Dummy variable that takes the value of 1 higher than senior high school, 0 lower than high school (represent the highest education level of parent, If equal to 1, means the parents' highest education level over or equal to senior high school)	Regression with SRPH as dependent variable: +/-, higher parents education level, they know more knowledge and can take care of children more, but in other hand, they may have to work , so take care of children less, the effect is uncertain
		Regression with SRMH as dependent variable: So further less the parents' accompany the children will feel lonely so more mental health
Eco (Economic status (family))	Dummy variable that takes the value of 1 if economic status is medium and better than medium and 0 otherwise.	Regression with SRPH as dependent variable: +, higher income higher self-rated physical health, they have more resource to enjoy, such as good food ,more health care,
		Regression with SRMH as dependent variable: +, higher income higher mental health, the children may feel superior comparing with other

		students and more satisfied with their life
exercise (Physical activity time per day)	Hours	Regression with SRPH as dependent variable: +, more physical activity time higher self-rated physical health, but it also depend on the quality of the exercise
		Regression with SRMH as dependent variable: +, more physical activity time higher self-rated mental health because join in the physical activity can nature the social ability of adolescent, and after exercise they will feel relaxed
talk(parent-child relationship)	It is dummy variables, talking about your worries or troubles with parents is equal to 1, others 0.	Regression with SRPH as dependent variable: +, talk with parents means parents and child have a good relationship, their parents can take care of them well, and talk or teach children how to keep physical healthy, so have a higher self-rated physical health

		Regression with SRMH as dependent variable: +, more discuss, better parent-child relationship they will always keep worries out of mind, so less depression
graderank (Current grade rank in class)	It is dummy variables, it takes value of 1 if it is moderate and better than moderate, and 0 otherwise	Regression with SRPH as dependent variable: +, higher grade higher self-rated physical health, because they have more knowledge about keeping healthy
	 The logo of Chulalongkorn University, featuring a central emblem with a sunburst and a tiered structure, surrounded by the university's name in Thai and English: จุฬาลงกรณ์มหาวิทยาลัย CHULALONGKORN UNIVERSITY.	Regression with SRMH as dependent variable: +, higher grade , they feel more happy more and confidence in class ,and when they fulfill the expectation they feel more relax so have less depressive symptoms
friend (Number of best friends)	Number	Regression with SRPH as dependent variable: +, they can share knowledge of being healthy, and they can care about each other , so they more healthier

		Regression with SRMH as dependent variable: +,more friends more happy and no friend they will feel lonely and helpless so more friends more healthier)
Dorm (Live in the school dormitory)	It is dummy variables, which has two categories, yes is equal to 1, no is equal to 0.	Regression with SRPH as dependent variable: -, the life style will change without the parents' super advisor, and the quality of food are not the same as home
		Regression with SRMH as dependent variable: -, they have to leave family members, and adapt the new environment, so they tend to have a worse mental health

CHAPTER VI

RESULTS AND DISCUSSIONS

6.1 Summary statistics

In this study, there are two dependent variables: the first one is self-rated physical health, it has two outcomes taking on the values 1 means good physical health, 0 means not good physical health.

Table 4 SRPH of middle school students

SRPH	Freq.	Percent
0	3,158	26.63
1	8,699	73.37
Total	11,857	100.00

As table 1 shows in chapter 2, section 2.2 health status of China's population, the combined poor, not good and fair account for 35.80%, combined better and excellent make up for 64.18%, and 2 people refuse answer the question. And compared with table 4, the self-rated physical health of middle school students is better than China population, only about 26% students have not good self-rated physical health.

Table 5 Cross tabulation: SRPH and perceived economic status

SRPH	perceived economic status		Total
	0	1	
0	798	2,360	3,158
1	1,405	7,294	8,699
Total	2,203	9,654	11,857

From table 5, we can see most students have a better perceived economic status and better self-rated physical health, the number is 7,294, which makes up 61.5% of the

full sample, and only 798 students have a worse perceived economic status and not good self-rated physical health; and 8,699 students have better self-rated physical health, 9,654 students have better perceived economic status, the worse perceived economic status or not good self-rated physical health is account a small part.

Table 6 Cross tabulation: SRPH and pressure exerted by parents

SRPH	pressure		Total
	0	1	
0	1,884	1,274	3,158
1	5,755	2,944	8,699
Total	7,639	4,218	11,857

From table 6, we can see most students have less pressure and better self-rated physical health, and only 1,274 students have a more pressure and not good self-rated physical health, on the contrary, 5,755 students have a less pressure and good self-rated physical health, which accounts for 48.5% of full sample; and 7,639 students have less pressure, the less pressure and not good self-rated physical health is 1,884 students.

Table 7 Cross tabulation: SRPH and parent-child relationship

SRPH	parent-child relationship		Total
	0	1	
0	997	2,161	3,158
1	2,105	6,594	8,699
Total	3,102	8,755	11,857

From table 7, we can see most students have better parent-child relationship and better self-rated physical health percentage is about 55.6% of full sample, and only 997 students have a worse parent-child relationship and not good self-rated physical health; and 8,755 students have better parent-child relationship, the better parent-child relationship and not good self-rated physical health is 2,161 students.

The second is self-rated mental health, which has two outcomes, 1 means good mental health, 0 means not good mental health.

Table 8 SRMH of middle school students

SRMH	Freq.	Percent
0	3,481	29.36
1	8,376	70.64
Total	11,857	100.00

As table 2 shows in chapter 2, 2.2 Health status of China's population, according to this study classify the self-rated mental health, always, often and sometimes account for 29.13%, seldom and never make up for 70.67%, 19 people refuse answer the question, 2 people answer do not know. And According to table 8, the self-rated mental health of middle school students is similar to the self-rated mental health of China population, the percentage is 29% for both students and China population have depression status.

Table 9 Cross tabulation: SRMH and perceived economic status

SRMH	perceived economic status		Total
	0	1	
0	753	2,728	3,481
1	1,450	6,926	8,376
Total	2,203	9,654	11,857

From table 9, we can see most students have a better perceived economic status and better self-rated mental health, the number is 6,926 about 58.4% of full sample, and only 753 students have a worse perceived economic status and not good self-rated

mental health; and 8,376 students have better self-rated mental health, the worse perceived economic status or not good self-rated physical health is account a small part.

Table 10 Cross tabulation: SRMH and pressure exerted by parents

SRMH	pressure		Total
	0	1	
0	1,930	1,551	3,481
1	5,709	2,667	8,376
Total	7,639	4,218	11,857

From table 10, we can see most students have less pressure and better self-rated mental health, the percentage is about 48.1% of the full sample, and only 1,551 students have a more pressure and not good self-rated mental health; and the less pressure or not good self-rated physical health is 1,884 students.

Table 11 Cross tabulation: SRMH and parent-child relationship

SRMH	parent-child relationship		Total
	0	1	
0	1,141	2,340	3,481
1	1,961	6,415	8,376
Total	3,102	8,755	11,857

From table 11, we can see most students have better parent-child relationship and better self-rated mental health, which accounts for 54.1% of full sample, and only 1,141 students have a worse parent-child relationship and not good self-rated mental health; and the better parent-child relationship and not good self-rated mental health is 2,340 students.

Table 12 Descriptive statistics for selected variables (N=11,857)

Variable	Mean	Std. Dev.	Min	Max
grade9	0.52	0.50	0	1
friend	7.06	4.86	0	24
Dorm	0.32	0.47	0	1
BMI	0.50	0.50	0	1
Sleep	7.82	1.19	0	10
Age	13.9	1.22	10.8	18
Male	0.46	0.50	0	1
Eco	0.81	0.39	0	1
hospitalization	0.08	0.27	0	1
pressure	0.36	0.48	0	1
graderank	0.45	0.50	0	1
exercise	0.75	0.71	0	3
pareducation	0.42	0.50	0	1
Talk	0.74	0.44	0	1

As table 12 shown, there are 11,857 students after cleaning the data, firstly we drop all the irrelevant variables according to the literature review, and drop the missing value of the variables, from the table, grade9 represents the which grade the student is, and 1 is grade 9th, so 52% of 11,857 is 9th grade students. Friend means the number of good friends that the students have, each student has about 7 good friends on average, and after delete the outlier the maximum is 24. Dorm means whether the student live in school dormitory about 32% students live in dormitory. BMI is body mass index, calculated by $\text{weight (kg) / height (m)}^2$, and the students have normal BMI code 0, abnormal otherwise, which less than 18.5 and larger than 25, from the table 5, we can see 50% have abnormal BMI. Sleep is sleeping time per day, observations sleeping 7.8 hours on average. And the surveyed students are about 13.9 years old, because the age difference is not too big, so this study will not include it as independent variable. And

46% are the male students, and the economic status of this sample is quite good about 81% of all students more than middle level, only 8% of all students been in hospitalization in 2013, pressure means the pressure from parental expectations for children's academic attainment and approximately 36% students feel more than a lot of pressure, 45% students in this sample grade or score ranking are over moderate students, students do exercise 0.75 hour on average, the maximize value is coming from one day 12 hours, they sleeping about 7.8 plus the standard deviation 1.1 hours is close to 9 hours, so the maximize exercise time per day should be 3 hours, parent education refers to the highest education level of parents and if equal to 1, means the parents education level over or equal to senior high school (Chenoa, 2016), talk stands for talk about worries with parents, there are two questions in questionnaire talk about worries with mom and dad, we combined these two variables (Vingilis, 1998), 0 means never talk about worries with mom or dad, about 74% students talk about worries with mom or dad, and we called it parent-child relationship.

6.2 Full sample regression results

Table 13 Regression for SRPH and SRMH of full sample

SRPH: Prob > chi2=0.0000; Pseudo R2 =0.0469 N =11,857

SRMH: Prob > chi2=0.0000; Pseudo R2=0.0396; N =11,857

	Model 1: SRPH		Model 2: SRMH	
	Odds Ratio	Robust Std. Err.	Odds Ratio	Robust Std. Err.
grade9	.96	.06	.81***	.05
BMI	.90**	.05	1.06	.06

hospitalization	.35***	.03	.76**	.07
Male	1.23***	.07	.90	.05
Eco	1.63***	.10	1.27***	.08
pareducation	1.12	.07	1.03	.06
Sleep	1.15***	.03	1.22***	.03
friend	1.01**	.01	1.02***	.01
graderank	1.44***	.14	1.42***	.14
exercise	1.18***	.05	1.06	.04
pressure	.85**	.05	.63***	.03
Talk	1.24***	.08	1.32***	.08
Dorm	.76***	.44	.81***	.05
_cons	.34***	.08	.31***	.07

* p<0.05; ** p<0.01; *** p<0.001.

6.2.1 Self-rated physical health

The Prob > chi2 =0.0000, so the model 1 is statistically significant. Independent variable grade and pareducation are not significant, it is not the factors determined the self-rated physical health. So for the BMI, friend, hospitalization, male, economic, pressure, grade ranking, parent-child relationship, exercise, sleep and living in dorm are statistically significant.

When perceived economic status from not good to god, the odds of having good self-rated physical health are 1.63 times larger for those with medium and better perceived economic status than those with worse perceived economic status, holding all other variable constant, it means the better economic status the student perceived, the better self-rated physical health, also the same as the previous study Jovic-Vranes

(2011), this because the higher perceived economic status, the more resource they can enjoy, such as more health care, more health food.

More pressure from parental expectations for children's academic attainment the worse self-rated physical health; and the odds of having a good self-rated physical health are 0.85 times lower for those with more than general pressure than those with below or equal general pressure; the same result as expected sign.

Students with a better parent-child relationship have better self-rated physical health than the students with a worse parent-child relationship; and for the better parent-child relationship, the odds of having a good self-rated physical health are 1.24 times larger for those talking worries with parents than those not talking with parents, this because their parents can take care well of them, such as talk or teach them how to keep physical health, this result is similar with the Vingilis (1998).

BMI is the similar as the results of Page (2008), the abnormal BMI lead to the worse self-rated physical health, because the obese students feel they are not as healthy as the others.

The students who had been to hospitalization tending to rate a not good self-rated physical health, this is the same as the expected sign, also same as the results of Mikolajczyk (2008), this because they have a bad physical health.

The male students have a better self-rated physical health than female, this is turn out the male not more easier get the risk behavior with respect to the expected sign, such as smoking and drinking this because 7th and 9th graders are simply too young to access them, and getting the same result as Vingilis (1998), this may due to the female during the adolescent will have more change in Physiological aspects.

For sleeping time, also get the same results as Steptoe (2006) and expected sign is the same, the appropriate longer sleeping time lead to the better self-rated physical health, this because short sleeping time could cause fatigue in daytime, and enough

sleeping time can help the organs recover well, so the relatively longer time is good for the physical health.

More friends results in the better self-rated physical health is, it demonstrates our expected sign, and the result is similar to Richter (2011), this because they get support from friends, and they share the health knowledge with each other, so they have a better physical health.

The better grade or score ranking predicts the better self-rated physical health, because they have more knowledge about keeping healthy. This is in accord with our expected sign and the same result as Vingilis (1998).

More exercise the students have done, the better self-rated physical health they have, this result is in accord with Mikolajczyk (2008), because exercise can improve the function of heart and other organs, such as bone and muscular.

Living in dorm is bad for the self-rated physical health; this may because lifestyle of students in dorm will change without the parents' supervision and the quality of food are not the same as home, and finally they have a worse physical health.

The grade is not the determinant of self-rated physical health, it may because they are the adolescent, their health status of most students is healthy, and the odds of good self-rated physical health are not significant for 7th grade and 9th grade.

The parents education, we getting the different results from Eunsook Choi (2013), for the expected sign is tell us the higher parents education, they will take care less of their children, because they need to work, but the results tell us it has no effect on the self-rated physical health, this may because the students do not realized that the relationship between parents education and their physical health.

6.2.2 Self-rated mental health

The Prob > chi2 =0.0000, the whole model 2 is statistically significant. The independent variable BMI, male, parents' education level and exercise are not significant, they are not the factors determined the self-rated mental health. So for the grade, hospitalization, economic, sleep, friend, grade rank, pressure, parent-child relationship, dorm is statistically significant.

Higher economic status tends to have positive effect on the self-rated mental health, similar with Tracy (2008). And the result is similar with our expected sign, because higher economic status children will more satisfy with their life feeling less negative emotional.

Better parent-child relationship tend to have positive effect on the self-rated mental health, the result is similar with Wu (2015) and our expected sign, this because children can feel love and care and always keep worries out of mind, therefore have a better mental health

The students have more pressure, the odds of having good self-rated mental health are 0.63 times lower for those with more than general pressure than those with below or equal general pressure, which means more pressure leads to the worse self-rated mental health, this maybe because when they have the pressure, they will feel bad and have a bad mind, so have a not good mental health.

When the grade 9th grade, the odds of good self-rated mental health is 0.81 times lower for 7th grade than 8th grade, which means the 9th grade have worse self-rated mental health means 9th grade students feeling more depression, which is the same as our expected sign.

Students been in hospitalization tend to have worse self-rated mental health, this result because more physical problem the students will feel low, and when then be in hospitalization, they will be in a little room, which make them feel depression, so they have more depressive symptoms and the same as Sunita (1999) as well as the expected sign.

For more friend that student have, the better self-rated mental health, which means the more friends students have the less depression they feel, the same results as Guo (2003), because more friends more happy and they share the health knowledge with each other, and no friend they will feel lonely and helpless.

More sleeping time, higher grade or score ranking all tend to have positive effect on the self-rated mental health, higher grade ranking which is similar with Guo (2003), sleeping time is similar with Hong (2007), and these results are similar with our expected sign.

Living in dorm has more chance to have a worse self-rated mental health, and this result is same as Yang (2010). This because students who living in dorm have to leave their parents and have a bad relationship with roommates, so they tend to have a worse mental health.

BMI is not significant, it may tell us the middle school students have not realized the abnormal BMI or body shape, so they may not feel anything about their BMI in terms of depression.

For the male, it is not significant, which same as Chen (2011), so it not the determinants of the self-rated mental health, so maybe the mental health of male and female do not have much difference.

For higher parents education level, they may have to work, so take care of children less, the children will feel lonely and our result is not significant, so the students do not look much value of the parents education level.

For the exercise, it is not significant also different with the expected, but it is the same result as Lawlor (2001), they found the effectiveness of exercise in reducing symptoms of depression cannot be determined, it depends on the quantity and quality of the exercise, WHO (2016) recommend adolescent aged 5-17 should exercise for 60 minutes for keep healthy, and also good for the nervous system, so maybe the students exercise too short time to good for the nervous system.

And when we compare the influence magnitude of the effect for self-rated physical health and self-rated mental health, for the parent-child relationship and sleeping time, they influences self-rated mental health more than self-rated physical health, and for perceived economic status, hospitalization and living in dorm, which affect self-rated physical health more than self-rated mental health.

6.3 Sub-sample regression results

6.3.1 Self-rated physical health of 7th graders and 9th graders

Table 14 Regression for SRPH of sub-sample

SRPH (7th grade): Prob > chi2= 0.0000; Pseudo R2= 0.0472; N=5,634

SRPH (9th grade): Prob > chi2= 0.0000; Pseudo R2 =0.0427; N =6,223

SRPH	7 th grade		9 th grade	
	Odds Ratio	Robust Std. Err.	Odds Ratio	Robust Std. Err.
BMI	.98	.08	.85**	.06
Hospitalization	.40***	.05	.33***	.04
Male	1.26**	.11	1.21**	.09
Eco	1.86***	.17	1.49***	.13
Pareducation	1.08	.10	1.16	.10
Sleep	1.19***	.05	1.13***	.04
Friend	1.02**	.01	1.01	.01
Graderank	1.30	.21	1.54***	.19
Exercise	1.11	.07	1.23***	.07
Pressure	.86	.07	.84**	.06
Talk	1.29**	.12	1.21**	.10
Dorm	.72***	.06	.79**	.06

_cons	.25***	.09	.40**	.12
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* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

From above result of self-rated physical health among 7th graders and 9th graders, the most result of 7th grade and 9th grade are similar, and go to the same direction and also similar with the results of the full sample, the different parts are the BMI, number of friends and grade or score ranking, exercise and pressure.

The different result of BMI is because the higher grade they care more about their body-shape, and they know more knowledge of health (Nayga, 2010), so the BMI is statistically significant and influence them more. For the second different part number of friends, this maybe because the 9th grade students spend more time on the study as well as their friends, so the number of friends is not significant, but for the 7th grade students they do not have that much study stress, they have more time playing and share knowledge with their friend, so it is significantly influence their self-rated physical health. For the third different part grade or score ranking, the 9th grade students care more about the grade and score because it reflects whether they can go to the better senior high school or not and higher grade or score ranking (glObserver website, 2015), they have more knowledge about keeping healthy, but for the 7th grade students, they do not care more about this. And for the exercise and pressure are similar, they have more knowledge about keeping healthy, the 9th grade students need more exercise because they have to study, so the exercise make a big difference for 9th grade students, and 9th grade students also know more how to deal with pressure than the 7th grade, and also maybe because the 7th grade students do not have that much pressure.

And when we compare the magnitude of effect for self-rated physical health among 7th grade and 9th grade, for the hospitalization, perceived economic status, parent-child relationship and sleeping time, they influences 7th graders more than 9th graders, and for living in dorm, it affects 9th graders more than 7th graders.

6.3.2 Self-rated mental health of 7th graders and 9th graders

Table 15 Regression for SRMH of sub-sample

SRMH (7th grade): Prob > chi2= 0.0000; Pseudo R2 = 0.0345; N =5,634

SRMH (9th grade): Prob > chi2= 0.0000; Pseudo R2 =0.0427; N =6,223

SRMH	7 th grade		9 th grade	
	Odds Ratio	Robust Std. Err.	Odds Ratio	Robust Std. Err.
BMI	1.01	.09	1.11	.08
Hospitalization	.88	.13	.68**	.09
Male	.93	.08	.87	.06
Eco	1.42***	.14	1.17	.10
Pareducation	1.06	.09	1.00	.08
Sleep	1.18***	.04	1.25***	.04
Friend	1.03***	.01	1.02**	.01
Graderank	1.34	.21	1.48***	.18
Exercise	.98	.06	1.12**	.06
Pressure	.63***	.05	.62***	.04
Talk	1.43***	.13	1.26**	.10
Dorm	.82**	.07	.80**	.06
_cons	.36**	.13	.22***	.07

* p<0.05; ** p<0.01; *** p<0.001.

For the self-rated mental health among 7th grade and 9th grade, the most results of 7th grade and 9th grade are similar, and go to the same direction too, the different part are four factors not the same, been in hospitalization, perceived economic status, grade or score ranking and exercise.

For been in hospitalization, the 9th grade students they will think more about health, but for the 7th grade students they will not consider about this, so the 9th grade students is the significant determinants, not for the 7th grade students.

The reason for different results of perceived economic status, the 9th grade students have more knowledge of the comparison with others, and also they do not have that much time to compare with others, so they do not think a lot of perceived economic status. For the 7th grade student they are opposite to 9th grade students.

For the grade or score ranking, the same as the self-rated physical part, the 9th grade students care more about the grade and score because it reflect whether they can go to a better senior high school or not (glObserver website, 2015), and higher grade or score ranking, they have more knowledge about keeping healthy and they will feel happy for the good grade, but for the 7th grade students, they do not care more about this, so the grade or score ranking of 7th grade students is not significant.

And when we compare the magnitude of effect for self-rated mental health among 7th grade and 9th grade, for the sleeping time, it influences 9th graders more than 7th graders, and for parent-child relationship, it affects 7th graders more than 9th graders.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

This study examines the determinants of self-rated physical health and self-rated mental health of middle school students in the People's Republic of China. The data comes from the China Education Panel Survey, conducted by China People's University in cooperation with other provincial universities, collected in 2013-2014. A total of 11,857 middle school students, who were the 7th grade and 9th grade students, were surveyed. Binary logit regressions were used to analyze the data.

The conclusion from the descriptive statistics, the self-rated physical health and self-rated mental health of 7th grade and 9th grade students are relatively good, the percentage of good self-rated physical health and good self-rated mental health is 74 and 71 respectively, and for the binary logit regression result for the full sample, the self-rated physical health and self-rated mental health of 9th grade are quite similar with 7th grade; but more friends, the higher perceived economic status, better parent-child relationship and the less pressure from parental expectations for children's academic attainment lead to the better self-rated physical health and self-rated mental health, and specially and living in dorm is bad for self-rated mental health and self-rated physical health.

As table 16 shows: most of the independent variables are significant, so the determinants of self-rated physical health are perceived economic status, pressure from parental expectations for children's academic attainment, parent-child relationship, been in hospitalization, gender, parent education level, sleeping time, number of best friend, graderank, exercise, living in dorm.

The determinants of self-rated mental health are grade, been in hospitalization, perceived economic status, pressure from parental expectations for children's academic attainment, parent-child relationship, sleeping time, number of friend, graderank, living in dorm.

Table 16 Summary of regression results

Factors	Full sample		Sub-sample			
	SRPH	SRMH	SRPH		SRMH	
			7 th grade	9 th grade	7 th grade	9 th grade
grade9		Y	-	-	-	-
BMI				Y		
Hospitalization	Y	Y	Y	Y		Y
Male	Y		Y	Y		
Eco	Y	Y	Y	Y	Y	
Pareducation	Y			Y		
Sleep	Y	Y	Y	Y	Y	Y
Friend	Y	Y	Y		Y	Y
Graderank	Y	Y		Y		Y
Exercise	Y			Y		Y
Pressure	Y	Y		Y	Y	Y
Talk	Y	Y	Y	Y	Y	Y
Dorm	Y	Y	Y	Y	Y	Y

Y means statistically significant.

Table 16 is a summary table about all regression, and from this table, for the key variable, perceived economic status, pressure from parental expectations for children's academic attainment, parent-child relationship; independent variable perceived economic status only in the model of self-rated mental health for the 9th grade is not significant, this because the 9th graders know more knowledge about comparison, so they do not look much value upon it or they know how to deal with the situations; and independent variable pressure from parental expectations for children's academic

attainment, only in the self-rated physical health for the 7th grade is not significant, this may be because the 7th graders do not feel that much pressure from their parents' expectations; and for parent-child relationship in each model is significant, which means it is very important for the self-rated physical health and self-rated mental health.

The conclusion from the sub-sample analysis of self-rated physical health, for the grade 9th student, the higher grade ranking, the better self-rated physical health, but the number of friends is not significant. For the 7th grade students grade ranking is not significant; having more friends leads to better self-rated physical health, BMI is the determinant of 9th grade students' self-rated physical health, the sub-sample analysis of self-rated mental health, for the 9th grade students who had been in hospitalization leads to not good self-rated mental health; higher grade ranking and doing more exercise will have better self-rated mental health, but perceived economic status is not significant; and the 7th grade students, contrary to the 9th grade students, neither being in hospitalization is significant nor grade ranking, and perceived economic status is significant, higher perceived economic status leads to better self-rated mental health, and other variables are the same as the full sample results.

7.2 Recommendations

Although the self-rated physical health and self-rated mental health of 7th grade and 9th grade students are relatively good, there is also something we should pay attention to; parents give them proper pressure about the future education; for the pressure that parents exert on their children, comprehensive school counseling should be promoted and new subjects for life-coping skills could be offered to help students deal with parental pressures, although some schools have psychological consultation centers (Xingtai No.24 middle school, 2015), but the students do not dare to go there for some reasons, such as they are afraid of classmates looking down upon them, so the schools

also can hold some psychological activity to find the abnormal students. And the better perceived economic status lead the students to rate a relatively better self-rated physical health and self-rated mental health, and there are some policies aiming at the senior high school students or higher grade, such as provide scholarship or financial aid; for the middle school, the book and dictionary free provided for the poor students, and provide living subsidies for boarder students whose families are financially difficult, but the standard are quite low 4-5 Yuan per day (CNCSSFA, 2007). So the governments or schools can give some scholarship for the poor middle schools students or increase the living subsidies standard; and for the parent-child relationship, there is no policy about this, the government could organize counseling for parents on how to improve the relationship with their children.

7.3 Limitations

Due to time is so limited, the data was not the latest data, and some determinants were constrained in the dataset, and during the analysis process, the dataset was come from China so maybe the results only can be adapt for China. The data was cross-sectional data, maybe there are some causality between independent variables and dependent variables, such as pressure may cause mental health or mental health perhaps cause pressure, and also when cleaning the data, the missing variables are quite large, so the results might be biased, and we cut off the BMI according to the WHO adults standard, so the results of 7th grade students' self-rated physical health is not significant, because the adolescents cut-off is smaller, maybe the normal BMI is merging into abnormal. And the independent variables are the same so may there are some relationship or link between self-rated physical health and self-rated mental health, which is cannot be observed.

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APPENDIXES

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

APPENDIX A Binary logit regression of SRPH (coefficients)

logit SRPH grade9 BMI hospitalization male eco pareducation sleep friend graderank
exercise pressure talk [pweight= sweight]

Iteration 0: log pseudolikelihood = -11056630

Iteration 1: log pseudolikelihood = -10544121

Iteration 2: log pseudolikelihood = -10538065

Iteration 3: log pseudolikelihood = -10538064

Logistic regression

Number of obs = 11857

Wald chi2(13) = 362.95

Prob > chi2 = 0.0000

Pseudo R2 = 0.0469

Log pseudolikelihood = -10538064

SRPH	Coef.	Robust Std. Err.	z	P>z	[95% Conf. Interval]
grade9	-.0384554	.0592469	-0.65	0.516	-.1545772 .0776664
BMI	-.1102586	.0558616	-1.97	0.048	-.2197453 -.0007719
Hospitalization	-1.041354	.0910952	-11.43	0.000	-1.219897 -.8628108
Male	.203689	.0570114	3.57	0.000	.0919487 .3154293
Eco	.4905417	.0628316	7.81	0.000	.3673941 .6136893
Pareducation	.1135398	.0598396	1.90	0.058	-.0037437 .2308233
Sleep	.1426799	.0246362	5.79	0.000	.0943938 .1909659
Friend	.0142767	.0058046	2.46	0.014	.0029 .0256535
Graderank	.3677266	.097696	3.76	0.000	.176246 .5592071
Exercise	.1619484	.0409788	3.95	0.000	.0816314 .2422654
Pressure	-.1652316	.0563781	-2.93	0.003	-.2757306 -.0547325
talk(parent-child relationship)	.2176495	.0604248	3.60	0.000	.099219 .3360801
Dorm	-.2757562	.0577082	-4.78	0.000	-.3888622 -.1626502
_cons	-1.057011	.2377096	-4.45	0.000	-1.522913 -.5911085

APPENDIX B Binary logit regression of SRMH (coefficients)

. logit SRMH grade9 BMI hospitalization male eco pareducation sleep friend
graderank exercise pressure talk dorm [pweight= sweight]

Iteration 0: log pseudolikelihood = -11204837

Iteration 1: log pseudolikelihood = -10765242

Iteration 2: log pseudolikelihood = -10761549

Iteration 3: log pseudolikelihood = -10761548

Logistic regression

Number of obs = 11857

Wald chi2(13) = 310.95

Prob > chi2 = 0.0000

Log pseudolikelihood = -10761548

Pseudo R2 = 0.0396

SRMH	Coef.	Robust Std. Err.	z	P>z	[95% Conf. Interval]
grade9	-.2107997	.0576902	-3.65	0.000	-.3238704 -.097729
BMI	.0574598	.0543634	1.06	0.291	-.0490905 .1640102
hospitalization	-.2822169	.0947866	-2.98	0.003	-.4679952 -.0964387
Male	-.1053504	.0552678	-1.91	0.057	-.2136734 .0029725
Eco	.2374041	.0632727	3.75	0.000	.1133918 .3614164
Pareducation	.0248921	.058098	0.43	0.668	-.0889779 .1387621
Sleep	.1994216	.0252789	7.89	0.000	.1498758 .2489674
Friend	.0238016	.0057845	4.11	0.000	.0124642 .0351391
Graderank	.3534113	.096118	3.68	0.000	.1650236 .5417991
Exercise	.055818	.0398311	1.40	0.161	-.0222496 .1338855
Pressure	-.4676285	.0547059	-8.55	0.000	-.5748501 -.360407
talk(parent-child relationship)	.2771486	.0595501	4.65	0.000	.1604325 .3938646
Dorm	-.2128303	.0571868	-3.72	0.000	-.3249143 -.1007463
_cons	-1.178801	.2357377	-5.00	0.000	-1.640839 -.7167639

APPENDIX C Binary logit regression of SRPH of sub-sample 7th grade (coefficients)

.logst SRPH BMI hospitalization male eco pareducation sleep friend graderank exercise pressure talk [pweight= sweight]

Iteration 0: log pseudolikelihood = -4761477

Iteration 1: log pseudolikelihood = -4520343.4

Iteration 2: log pseudolikelihood = -4516944.2

Iteration 3: log pseudolikelihood = -4516943.6

Iteration 4: log pseudolikelihood = -4516943.6

Logistic regression

Number of obs = 5634

Wald chi2(12) = 183.13

Prob > chi2 = 0.0000

Pseudo R2 = 0.0514

Log pseudolikelihood = -4516943.6

SRPH	Coef.	Robust Std. Err.	z	P>z	[95% Conf. Interval]
BMI	-.0249404	.0848641	-0.29	0.769	-.191271 .1413902
hospitalization	-.9400541	.1311998	-7.17	0.000	-1.197201 -.6829073
Male	.2279949	.085432	2.67	0.008	.0605511 .3954386
Eco	.6188115	.0929128	6.66	0.000	.4367058 .8009173
Pareducation	.0795467	.0877455	0.91	0.365	-.0924314 .2515248
Sleep	.1735208	.0380204	4.56	0.000	.0990021 .2480394
Friend	.0172359	.0079792	2.16	0.031	.0015971 .0328748
Graderank	.2635058	.1593644	1.65	0.098	-.0488428 .5758543
Exercise	.1046105	.0598725	1.75	0.081	-.0127374 .2219585
Pressure	-.1499144	.0850307	-1.76	0.078	-.3165715 .0167426
talk(parent-child relationship)	.2526459	.0916877	2.76	0.006	.0729413 .4323504
Dorm	-.3350428	.0862783	-3.88	0.000	-.5041452 -.1659405
_cons	-1.354417	.3613335	-3.75	0.000	-2.062618 -.6462165

APPENDIX D Binary logit regression of SRMH of sub-sample 7th grade (coefficients)

. logit SRMH BMI hospitalization male eco pareducation sleep friend graderank
exercise pressure talk dorm [pweight= sweight]

Iteration 0: log pseudolikelihood = -4588897.3

Iteration 1: log pseudolikelihood = -4432586.2

Iteration 2: log pseudolikelihood = -4430787.2

Iteration 3: log pseudolikelihood = -4430786.9

Logistic regression

Number of obs = 5634

Wald chi2(12) = 120.69

Prob > chi2 = 0.0000

Pseudo R2 = 0.0345

Log pseudolikelihood = -4430786.9

SRMH	Coef.	Robust Std. Err.	z	P>z	[95% Conf. Interval]
BMI	.0045568	.0850183	0.05	0.957	-.162076 .1711896
hospitalization	-.1238274	.1449343	-0.85	0.393	-.4078934 .1602387
Male	-.0677749	.0847287	-0.80	0.424	-.23384 .0982902
Eco	.3518949	.0963708	3.65	0.000	.1630116 .5407782
Pareducation	.0598002	.0883245	0.68	0.498	-.1133126 .232913
Sleep	.1688857	.037996	4.44	0.000	.094415 .2433564
Friend	.0291992	.0082697	3.53	0.000	.0129909 .0454075
Graderank	.2906002	.1580062	1.84	0.066	-.0190862 .6002867
Exercise	-.0239856	.0609682	-0.39	0.694	-.143481 .0955098
Pressure	-.4570825	.0846898	-5.40	0.000	-.6230715 -.2910936
talk(parent-child relationship)	.355742	.0926751	3.84	0.000	.1741022 .5373818
Dorm	-.1994585	.0871171	-2.29	0.022	-.3702048 -.0287122
_cons	-1.018269	.3475874	-2.93	0.003	-1.699528 -.3370099

APPENDIX E Binary logit regression of SRPH of sub-sample 9th grade (coefficients)

. logst SRPH BMI hospitalization male eco pareducation sleep friend graderank
exercise pressure talk [pweight= sweight]

Iteration 0: log pseudolikelihood = -6287427.1

Iteration 1: log pseudolikelihood = -6009353.4

Iteration 2: log pseudolikelihood = -6006543

Iteration 3: log pseudolikelihood = -6006542.6

Logistic regression

Number of obs = 6223

Wald chi2(12) = 183.39

Prob > chi2 = 0.0000

Pseudo R2 = 0.0447

Log pseudolikelihood = -6006542.6

SRPH	Coef.	Robust Std. Err.	z	P>z	[95% Conf. Interval]
BMI	-.1660215	.0741214	-2.24	0.025	-.3112967 -.0207463
hospitalization	-1.120814	.1267802	-8.84	0.000	-1.369298 -.8723289
Male	.1877731	.0768666	2.44	0.015	.0371173 .3384289
Eco	.3976424	.0851923	4.67	0.000	.2306686 .5646162
Pareducation	.1505263	.0823442	1.83	0.068	-.0108655 .311918
Sleep	.12189	.0328363	3.71	0.000	.0575319 .186248
Friend	.0117406	.0084544	1.39	0.165	-.0048298 .0283109
Graderank	.4303718	.1245858	3.45	0.001	.1861881 .6745555
Exercise	.2039723	.0561046	3.64	0.000	.0940093 .3139353
Pressure	-.1772266	.0752247	-2.36	0.018	-.3246643 -.029789
talk(parent-child relationship)	.190121	.0801858	2.37	0.018	.0329598 .3472823
Dorm	-.2354795	.0788264	-2.99	0.003	-.3899764 -.0809825
_cons	-.9121267	.2929899	-3.11	0.002	-1.486376 -.337877

APPENDIX F Binary logit regression of SRMH of sub-sample 9th grade (coefficients)

. logit SRMH BMI hospitalization male eco pareducation sleep friend graderank
exercise pressure talk dorm [pweight= sweight]

Iteration 0: log pseudolikelihood = -6544241.9

Iteration 1: log pseudolikelihood = -6315777.4

Iteration 2: log pseudolikelihood = -6314660.7

Iteration 3: log pseudolikelihood = -6314660.6

Logistic regression

Number of obs = 6223

Wald chi2(12) = 153.22

Prob > chi2 = 0.0000

Pseudo R2 = 0.0351

Log pseudolikelihood = -6314660.6

SRMH	Coef.	Robust Std. Err.	z	P>z	[95% Conf. Interval]
BMI	.1005459	.0718086	1.40	0.161	-.0401965 .2412882
Hospitalization	-.3925537	.1281934	-3.06	0.002	-.6438082 -.1412991
Male	-.1422348	.0734495	-1.94	0.053	-.2861931 .0017235
Eco	.1597363	.083557	1.91	0.056	-.0040324 .323505
Pareducation	-.0015411	.0774116	-0.02	0.984	-.1532651 .150183
Sleep	.2227791	.0338999	6.57	0.000	.1563364 .2892218
Friend	.0193117	.008141	2.37	0.018	.0033556 .0352678
Graderank	.3947549	.1219636	3.24	0.001	.1557106 .6337992
Exercise	.1130511	.0526782	2.15	0.032	.0098036 .2162985
Pressure	-.4765641	.0718765	-6.63	0.000	-.6174394 -.3356888
talk(parent-child relationship)	.2287236	.0774421	2.95	0.003	.0769398 .3805073
Dorm	-.2266224	.0768206	-2.95	0.003	-.3771881 -.0760568
_cons	-1.497004	.2939034	-5.09	0.000	-2.073044 -.9209639

APPENDIX G Ordered logit regression of SRPH proportional odds assumption

```
. ologit SRPH grade9 BMI hospitalization male eco pareducation sleep friend
      graderank exercise pressure talk dorm
```

Iteration 0: log likelihood = -14415.931

Iteration 1: log likelihood = -14010.021

Iteration 2: log likelihood = -14007.854

Iteration 3: log likelihood = -14007.854

Ordered logistic regression

Number of obs = 11857

LR chi2(13) = 816.15

Prob > chi2 = 0.0000

Pseudo R2 = 0.0283

Log likelihood = -14007.854

SRPH	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
grade9	-.1928205	.0367928	-5.24	0.000	-.2649331	-.120708
BMI	-.0761686	.0346605	-2.20	0.028	-.144102	-.0082352
hospitalization	-.96905	.0654154	-14.81	0.000	-1.097262	-.8408381
male	.1608705	.0351881	4.57	0.000	.0919031	.2298379
eco	.4646141	.0450282	10.32	0.000	.3763605	.5528676
pareducation	.0359	.0362191	0.99	0.322	-.0350882	.1068882
sleep	.1224209	.0157619	7.77	0.000	.0915281	.1533137
friend	.0140151	.0036195	3.87	0.000	.006921	.0211091
graderank	.2253117	.0662482	3.40	0.001	.0954676	.3551557
exercise	.2185438	.0248511	8.79	0.000	.1698366	.267251
pressure	-.1814962	.0359512	-5.05	0.000	-.2519592	-.1110331
talk	.2139533	.0394384	5.42	0.000	.1366554	.2912511
dorm	-.2776509	.0386353	-7.19	0.000	-.3533747	-.201927
/cut1	-3.878581	.2048752			-4.280129	-3.477033
/cut2	-1.597064	.1578144			-1.906375	-1.287754
/cut3	.6303758	.1537998			.3289337	.9318178
/cut4	2.274403	.1551541			1.970306	2.578499

```
. brant,detail
```

Estimated coefficients from binary logits

Variable	y_gt_1	y_gt_2	y_gt_3	y_gt_4
grade9	0.277	-0.065	-0.157	-0.237
	0.95	-0.64	-3.39	-5.66
BMI	0.341	0.012	-0.110	-0.058
	1.19	0.12	-2.52	-1.47
hospitaliz~n	-0.358	-1.256	-1.041	-0.716
	-0.82	-10.66	-14.45	-8.65
male	-0.676	0.063	0.213	0.128
	-2.30	0.64	4.79	3.20
eco	0.171	0.536	0.462	0.480
	0.48	4.89	8.67	8.77
pareducati~	-0.054	-0.174	0.060	0.021
	-0.18	-1.72	1.31	0.52
sleep	0.315	0.191	0.153	0.088
	3.47	5.18	8.00	4.82
friend	-0.020	-0.010	0.014	0.015
	-0.72	-1.04	3.01	3.77
graderank	-0.171	0.179	0.375	0.083
	-0.32	1.14	4.89	1.09
exercise	0.376	0.224	0.215	0.214
	1.69	3.09	6.73	7.76
pressure	-0.462	-0.409	-0.198	-0.157
	-1.64	-4.29	-4.46	-3.78
talk	-0.357	0.440	0.237	0.170
	-1.06	4.43	4.94	3.72
dorm	-0.045	-0.147	-0.301	-0.281
	-0.14	-1.40	-6.31	-6.27
_cons	3.539	1.196	-1.020	-1.837
	3.61	3.37	-5.53	-10.21

legend: b/t

Brant test of parallel regression assumption

	chi2	p>chi2	Df
All	120.84	0.000	39
grade9	5.76	0.124	3
BMI	4.42	0.220	3
hospitalization	26.94	0.000	3
male	12.83	0.005	3
eco	1.69	0.639	3
pareducation	6.46	0.091	3
sleep	15.57	0.001	3
friend	7.24	0.065	3
graderank	15.65	0.001	3
exercise	0.54	0.910	3
pressure	6.63	0.085	3
talk	12.81	0.005	3
dorm	2.55	0.467	3

A significant test statistic provides evidence that the parallel regression assumption has been violated.

APPENDIX H Ordered logit regression of SRMH proportional odds assumption

```
. ologit SRMH grade9 BMI hospitalization male eco pareducation sleep friend
      graderank exercise pressure talk dorm
```

Iteration 0: log likelihood = -15579.961

Iteration 1: log likelihood = -15140.252

Iteration 2: log likelihood = -15138.449

Iteration 3: log likelihood = -15138.449

Ordered logistic regression

Number of obs = 11857

LR chi2(13) = 883.03

Prob > chi2 = 0.0000

Pseudo R2 = 0.0283

Log likelihood = -15138.449

SRMH	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
grade9	-.2390071	.0367508	-6.50	0.000	-.3110374	-.1669769
BMI	.0279525	.03457	0.81	0.419	-.0398035	.0957085
hospitalization	-.398097	.0635793	-6.26	0.000	-.5227101	-.273484
male	-.0601773	.035128	-1.71	0.087	-.129027	.0086723
eco	.2275758	.04434	5.13	0.000	.140671	.3144806
pareducation	.0689023	.0363169	1.90	0.058	-.0022775	.1400821
sleep	.2189991	.0159926	13.69	0.000	.1876541	.250344
friend	.0207506	.0036228	5.73	0.000	.01365	.0278512
graderank	.2545386	.0651209	3.91	0.000	.1269039	.3821732
exercise	.0835247	.0244901	3.41	0.001	.0355249	.1315244
pressure	-.4700156	.0358227	-13.12	0.000	-.5402267	-.3998045
talk	.3602809	.0391667	9.20	0.000	.2835155	.4370463
dorm	-.1758706	.0382367	-4.60	0.000	-.2508132	-.100928
/cut1	-1.531355	.1610015			-1.846912	-1.215798
/cut2	-.2576556	.1545138			-.5604971	.0451859
/cut3	1.328367	.1539661			1.026599	1.630135
/cut4	2.66963	.1553428			2.365164	2.974097

```
. brant,detail
```

Estimated coefficients from binary logits

Variable	y_gt_1	y_gt_2	y_gt_3	y_gt_4
grade9	0.008	-0.187	-0.237	-0.273
	0.06	-2.53	-5.30	-6.61
BMI	0.072	0.015	0.036	0.030
	0.60	0.22	0.86	0.77
hospitaliz~n	-0.521	-0.505	-0.384	-0.370
	-2.95	-4.72	-5.21	-4.87
male	-0.467	-0.110	-0.092	-0.018
	-3.80	-1.56	-2.14	-0.45
eco	0.159	0.135	0.195	0.270
	1.03	1.55	3.64	5.15
pareducati~	-0.362	-0.085	-0.000	0.131
	-2.88	-1.17	-0.01	3.23
sleep	0.353	0.302	0.234	0.171
	8.79	11.14	12.39	9.29
friend	0.052	0.030	0.023	0.019
	3.64	3.90	5.08	4.72
graderank	0.545	0.317	0.300	0.191
	3.20	2.88	4.01	2.49
exercise	0.217	0.135	0.095	0.058
	2.37	2.65	3.15	2.12
pressure	-0.887	-0.714	-0.482	-0.409
	-7.31	-10.38	-11.30	-9.95
talk	0.528	0.600	0.335	0.347
	4.27	8.42	7.25	7.62
dorm	0.436	0.132	-0.184	-0.225
	2.86	1.65	-3.92	-5.12
_cons	0.272	-0.487	-1.404	-2.253
	0.69	-1.87	-7.73	-12.47

legend: b/t

Brant test of parallel regression assumption

	chi2	p>chi2	Df
All	120.84	0.000	39
grade9	4.95	0.176	3
BMI	0.42	0.936	3
hospitalization	1.69	0.640	3
male	15.32	0.002	3
eco	2.75	0.431	3
pareducation	19.70	0.000	3
sleep	26.12	0.000	3
friend	5.45	0.142	3
graderank	5.19	0.159	3
exercise	3.80	0.284	3
pressure	21.79	0.000	3
talk	17.08	0.001	3
dorm	26.14	0.000	3

A significant test statistic provides evidence that the parallel regression assumption has been violated.

APPENDIX I Correlation matrix (full sample)

corr SRPH SRMH grade9 BMI hospitalization male eco pareducation sleep friend graderank exercise pressure talk dorm (obs=11,857)

	SRPH	SRMH	grade9	BMI	hospit~n	male	eco	paredu~	sleep	friend	grader~k	exercise	pressu~	talk	dorm
SRPH	1.0000														
SRMH	0.1851	1.0000													
grade9	-0.0617	-0.1009	1.0000												
BMI	-0.0109	0.0264	-0.1751	1.0000											
hospitaliz~n	-0.1415	-0.0574	-0.0111	0.0033	1.0000										
male	0.0463	-0.0155	-0.0097	0.0335	0.0305	1.0000									
eco	0.1036	0.0506	-0.0129	-0.0159	-0.0165	-0.0069	1.0000								
pareducati~	0.0461	0.0209	-0.0430	0.0005	-0.0102	0.0039	0.1782	1.0000							
sleep	0.0873	0.1464	-0.3120	0.0881	-0.0217	0.0460	-0.0341	-0.1115	1.0000						
friend	0.0471	0.0592	-0.0945	0.0167	-0.0017	0.1688	-0.0218	0.0036	0.0748	1.0000					
graderank	0.0625	0.0612	-0.0432	0.0046	-0.0312	-0.0808	0.0369	0.0544	0.0295	0.0057	1.0000				
exercise	0.0795	0.0435	-0.0111	-0.0232	-0.0000	0.1213	0.0187	0.0180	0.0512	0.0948	0.0383	1.0000			
pressure	-0.0600	-0.1210	0.0153	-0.0030	0.0272	0.0515	-0.0658	-0.0822	-0.0306	0.0160	-0.0587	-0.0076	1.0000		
talk	0.0741	0.0970	-0.0296	-0.0006	-0.0386	-0.0639	0.0669	0.0843	0.0612	0.0300	0.0936	0.0667	-0.0740	1.0000	
dorm	-0.0690	-0.0302	0.0472	0.0021	0.0009	-0.0067	-0.1939	-0.2368	0.1729	0.0196	0.0038	0.0087	0.0533	-0.0303	1.0000

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