

**PREDICTING PHYSICAL ACTIVITY
BEHAVIOURS AMONG OBESE HIGH SCHOOL
STUDENTS IN JI LIN PROVINCE, CHINA**

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**PREDICTING PHYSICAL ACTIVITY
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STUDENTS IN JI LIN PROVINCE, CHINA**

by

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LIST OF ABBREVIATIONS

ANOVA	Analysis of variance
ATT	Attitude
CFA	Confirmatory Factor Analysis
CHB	Confirmatory Factor Analysis
EFA	Exploratory Factorial Analysis
EX-TPB	Extended the Theory of Planned Behaviour
INT	Intention
IPAQ-C-SV	International Physical Activity Questionnaire Chinese Short Version
KMO	Kaiser-Meyer-Olkin's
PA	Physical Activity
PBC	Perceived Behavioural Control
SEM	Structural Equal Model
SES	Social Economic Status
SN	Subjective Norm
TPB	The Theory of Planned Behaviour
USM	University Sains Malaysia
WHO	World Health Organization

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**MERAMAL TINGKAH LAKU AKTIVITI FIZIKAL DALAM KALANGAN
MURID SEKOLAH MENENGAH OBES DI WILAYAH JI LIN, CHINA**

ABSTRAK

Kekurangan aktiviti fizikal dalam kalangan pelajar obes sekolah menengah adalah masalah kesihatan awam global dan salah satu punca penting obesiti dan penyakit kronik. Di China, lebih daripada 70% pelajar sekolah menengah melakukan aktiviti fizikal kurang daripada satu jam sehari. Aktiviti fizikal yang mencukupi adalah cara penting untuk meningkatkan kecergasan fizikal pelajar sekolah menengah dan mengelakkan obesiti. Kajian ini menyiasat faktor yang meramalkan tingkah laku aktiviti fizikal dalam kalangan pelajar sekolah menengah di Bandar Raya Chang Chun, Wilayah Ji Lin, China. Teknik persampelan rawak berstrata telah digunakan untuk mengumpul data daripada 6,000 responden di tiga kawasan, 15 sekolah di Bandar Raya Chang Chun, Wilayah Ji Lin, China. Stratifikasi ini diaplikasikan berdasarkan tiga jenis kawasan, masing-masing kawasan bandar, pinggir bandar dan luar bandar. Kaedah kuantitatif digunakan dengan disusuli oleh kaedah kualitatif. BMI digunakan untuk memilih pelajar obes. Ujian-*t* dan ANOVA telah dilakukan menggunakan IBM SPSS 26. Untuk mengkaji perbezaan dalam teori lanjutan tingkah laku terancang (Sikap, Norma Subjektif, Tanggapan Kawalan Tingkah Laku, Niat dan Kepercayaan Kesihatan Pampasan) dengan SES yang berbeza, jantina, dan lokasi dalam kalangan tinggi pelajar obesiti sekolah. IBM SPSS AMOS 24 telah dijalankan untuk membina *Structural Equal Modelling* untuk menilai perkaitan dan korelasi antara sikap, norma subjektif, kawalan tingkah laku yang dirasakan, niat, kepercayaan kesihatan pampasan dan tingkah laku aktiviti fizikal. Regresi linear dijalankan untuk menentukan kesan moderator terhadap

hubungan antara variabel bebas dengan bersandar. Data kualitatif termasuk temu bual dengan 15 pelajar obes untuk menyokong dan menjelaskan lagi keputusan kuantitatif. Keputusan menunjukkan bahawa bagi jantina yang berbeza, terdapat perbezaan yang signifikan dalam sikap, kawalan tingkah laku yang ditanggap, niat dan aktiviti fizikal. Bagi SES yang berbeza, terdapat perbezaan yang signifikan dalam sikap, norma subjektif, niat, dan aktiviti fizikal. Untuk lokasi yang berbeza, terdapat perbezaan yang ketara dalam sikap, norma subjektif, niat, kepercayaan kesihatan pampasan dan aktiviti fizikal. Sikap, norma subjektif, kawalan tingkah laku yang dirasakan, niat dan kepercayaan kesihatan pampasan boleh meramalkan aktiviti fizikal. Sikap, norma subjektif, kawalan tingkah laku yang dirasakan, dan kepercayaan kesihatan pampasan mempunyai kesan ramalan langsung ke atas niat. Niat, kawalan tingkah laku yang dirasakan dan kepercayaan kesihatan pampasan boleh secara langsung meramalkan tingkah laku. Terdapat hubungan positif yang signifikan antara konstruk TPB dan tingkah laku aktiviti fizikal, tetapi CHB sebagai salah satu variabel Ex-TPB mempunyai hubungan negatif dengan niat dan tingkah laku aktiviti fizikal. Jantina mempunyai kesan moderator yang signifikan ke atas norma subjektif niat aktiviti fizikal. Status sosioekonomi (SES) mempunyai kesan moderator yang signifikan ke atas sikap dan persepsi kawalan tingkah laku terhadap niat aktiviti fizikal. Lokasi juga mempunyai kesan moderator yang signifikan pada norma subjektif niat aktiviti fizikal.

**PREDICTING PHYSICAL ACTIVITY BEHAVIOURS AMONG OBESE
HIGH SCHOOL STUDENTS IN JI LIN PROVINCE, CHINA**

ABSTRACT

Insufficient physical activity among high school obese students has become a global public health problem and one of the important causes of obesity and chronic diseases. In China, more than 70% of high school students have physical activity for less than an hour a day. Adequate physical activity is an important way to enhance the physical fitness of high school students and avoid obesity. This study investigates the factors that predict physical activity behaviour among high school students in Chang Chun City, Ji Lin Province, China. A stratified random sampling technique was used to collect data from 6,000 respondents in three areas, fifteen schools in Chang Chun City, Ji Lin Province, China (CCJLC). The stratification was applied based on three kinds of types of areas, respectively urban, suburban, and rural. Quantitative methods are used followed by qualitative methods. BMI is used to select obese students. The *t-test* and *ANOVA* were performed using IBM SPSS 26. To examine the differences in extended the theory of planned behaviour (Attitude, Subjective Norm, Perceived Behaviour Control, Intention and Compensatory Healthy Belief) with different SES, gender, and locations among high school obese students. IBM SPSS AMOS 24 was conducted to build a Structural Equal Model to assess the association and correlation between attitude, subjective norm, perceived behavioural control, intention, Compensatory Health Beliefs and physical activity behaviour. Linear regression was conducted to determine the effect of moderators on the relationship between independent and dependent variables. Qualitative data included interviews with 15 obese students to

support and further explain the quantitative results. The results show that for different gender, there is a significant difference in attitude, perceived behaviour control, intention, and physical activity. For different SES, there is a significant difference in attitude, subjective norm, intention, and physical activity. For different locations, there are significant differences in attitude, subjective norm, intention, compensatory health beliefs, and physical activity. Attitude, subjective norm, perceived behaviour control, intention and Compensatory Health Beliefs can predict physical activity. Attitude, subjective norm, perceived behaviour control, and Compensatory Health Beliefs have a direct predictive effect on intentions. Intention, perceived behaviour control and Compensatory Health Beliefs can directly predict behaviour. There is a significant positive relationship between the TPB constructs and physical activity behaviour, but CHB as one of the Ex-TPB variables has a negative relationship with intention and physical activity behaviour. Gender has significant moderating effects on the subjective norm of physical activity intention. Socio-economic status (SES) has significant moderating effects on attitude and perceived behaviour control of physical activity intention. Also, location has significant moderating effects on the subjective norm of physical activity intention.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Insufficient physical activity among high school students has become the most significant public health problem in the 21st century (Wang et al., 2012). In China, the physical activity status of high school students is not optimistic. Research indicated that more than 70% of high school students' physical activity is less than an hour a day (Zhang et al., 2012). As age increases, physical activity gradually decreases (Zhang et al., 2012). With the development of China's social economy, Chinese living standards have been continuously improved. The problem of obesity continues to be a significant public health problem, especially among high school students (Song et al., 2019). The main cause of obesity is insufficient physical activity, eating disorder, and irregular life habit. Insufficient physical activity and poor levels of physical activity represent a significant and serious threat to the individual, family, and society (Plotnikoff et al., 2012).

Obesity and overweight have reached epidemic proportions in many developed and developing countries worldwide, presenting significant liabilities to the public health systems and medical social security (Moreno-Murcia et al., 2013). Obesity and overweight are caused by the absorption of energy, exceeding the body's energy

consumption over an extended period, and excessive energy in the body converted into fat. Study shows an uptrend in obesity in childhood and adolescence, which tends to be an epidemic disease (Morgen & Sørensen, 2014; Ng et al., 2014). In the cities where most population worldwide lives, the number of people who die from being overweight and obese is more than from underweight (WHO, 2019). More than 340 million children and adolescents aged 5-19 are overweight or obese, and the global obesity prevalence rate has nearly tripled between 1975 and 2020 (WHO, 2020).

In the meantime, Zhang and Mao (2016) reported that 19% of Chinese youth are considered obese, and Wang and Zheng (2020) emphasized that 27% of Chinese high school students are classified as obese and overweight. Specifically, youth obesity prevalence continues to increase in many third-tier cities. Obesity has a weighty burden on the health care system, with substantial direct and indirect economic costs (Janssen et al., 2009; Wang & Lobstein, 2006). Similarly, in the United States and Australia, obesity is considered the second leading source of preventable morbidity and mortality. In Hong Kong, about 31.3% of persons aged 15-34 years are overweight or obese (Oi et al., 2019). Therefore, it is necessary to seek effective strategies to reduce these levels of obesity and find a convenient theory from a psychological point of view to predict physical activity (Pablos et al., 2018).

Almost every country's resident in the world is affected by health problems, especially chronic diseases caused by obesity such as heart disease and cardiovascular

diseases. According to the statistics released by Nunez (2019), the number of people with obesity or overweight is estimated at over five billion worldwide, and 110 million to 190 million people with severe obesity face significant weight-related self-stigma and disability in their daily lives, men who weighed 40% above average had a 30% higher risk of dying from cancer than men of normal weight. Women who weighed 40% above average had a 50% higher risk of dying from cancer than those of normal weight. High school student is the typical sedentary and physically inactive people, affected by the pressure of learning knowledge and the stress of college entrance examinations, they spend most of their time studying, and do not have enough time to do adequate physical activity (Tang, 2019). Overweight and obesity of high school students lead to a deficiency in social skills, social adaptability, and acting abilities, which also result in behaviour problems, and mental illnesses such as low self-esteem and irritability (Wen et al., 2019). Thus, predicting and understanding obese high school students' physical activity from several influencing factors of behaviour is an excellent way to control weight.

According to Zhang (2015), the distribution of obese people in China presents a regional difference, showing a decreasing trend from the northern area to the southern region. Regional climate and eating habits are the main reasons for this difference. There are more obese and overweight people in the northern part and fewer people in the southern part. Depending to data released by Zhang (2015), the problem of

overweight and obesity is obvious in the Northeast of China, especially in the Ji Lin Province. For example, the latitude in Ji Lin province is higher, the weather is colder, people exercise less, and their metabolism is slow, so residents need to eat more calories to withstand cold weather. What makes the increase in obesity is irregular habits consisting of eating too much and doing less physical activity. So much as the obesity rate in Ji Lin province is 7.3% higher than in the whole nation (Zhang., 2015).

The difference in factors such as gender, school location, and SES among high school students can affect the frequency and intensity of participation in physical activity, which can lead to obesity (Shi & Yang, 2011). Troped et al. (2010) emphasized that different geographical locations and different building environments will affect people's lifestyles and behaviour, therefore affecting people's participation in physical activities, promoting, or preventing the determination of people to join in physical activity. In addition, investigations and studies have shown that there is a linear relationship between gender and physical activity, and males are significantly higher than females in terms of intensity and frequency of physical activity behaviour, and the obesity rates of female high school students in China are significantly higher than those of males (Wang et al., 2001).

Research suggests that high school students with a high body mass index (BMI) experienced 30% higher mortality rates than adults (Biro & Wien, 2010). Overweight and obesity of high school students may cause a decline in social ability, physical

activity ability, inferiority complex, irritability, and other psychological disorders and behaviour problems (Boudreau & Godin, 2007).

According to Bardus (2012), regular physical activity can minimize and prevent health risks, such as heart disease, cancer, obesity, diabetes, and hypertension, and improve individuals' quality of life and mental health. It is essential to be familiar with the physical activity behaviour of high school students in Chang Chun City. The theory of planned behaviour (TPB) is the more convincing and widely used theory for explaining human intentions and behaviour and Compensatory Health Beliefs (CHB) play an essential role in the intention of behaviour and can enhance the prediction of intention forms and behaviour changes (Wang & Zheng, 2020). Therefore, the study tries from the psychological point of view, using the Extended Theory of Planned Behaviour (Ex-TPB) to predict and explain physical activity behaviour to solve the problem of high school students' obesity.

Chapter 1 introduces the background of the study, problem statement, research objectives, research questions, and research hypotheses; included are the significance of the study, limitations of the study, the definition of terms and summary.

1.2 Background of the Study

With the development of society and the economy, the health problems related to obesity have become a significant problem that China and other countries need to

face together. The impact of obesity and being overweight on high school students' growth cannot be underestimated; it is a significant public health challenge (Cai et al., 2018).

Being sedentary, too much screen time and a less active lifestyle have become the primary factor affecting human health. For high mortality caused by cardiovascular disease and other chronic diseases, lack of physical activity has become a critical and preventable risk factor. At the same time, lack of physical activity, irregular work schedules, and irregular eating habits have been recognized as public health and social problems worldwide (WHO, 2017). High school teenagers are facing intense pressure for further education, less active time, and high academic pressure, which is typical of sedentary habits (Liu et al., 2016). According to relevant department statistics, a total of 450 countries' surveys from different cities showed that 43 million teenagers aged 10-18 years old children worldwide were estimated to be overweight and obese in 2015. The prevalence of childhood obesity has also increased in the US, China, Russia, and other full-fledged countries and urban populations (Yeung et al., 2016).

Since 1985, China has conducted five nationwide surveys about high school students' physical activity. The results of the first four surveys show that the physical activity of Chinese high school students has continued to decline in the past 20 years, and the rate of students' obesity has continued to grow. In 2010, the 5th nationwide high school student's physical activity survey results showed that students' overall fitness

and health have improved, but the rate of obesity is still increasing. The main cause of the decline in physical activity and increase in obesity is insufficient physical activity, according to the survey results about the health of high school students in China. Studies have noted that long-term, regular physical activity can decrease the incidence of high school students' chronic diseases (such as cardiovascular disease), control the incidence of overweight and obesity, and reduce the risk of mental illness (Wang & Zheng, 2020).

At the same time, lacking physical activity is a common occurrence in many developed or developing countries. For example, the proportion of high school students who exercise one hour per day in the United States is 8%. In Europe, Belgium, Hungary, the Netherlands, Greece, and Switzerland, among teenagers aged 10-12 years old, only 4.6% of girls and 16.8% of boys can meet the standard activity recommendations for at least one hour a day, and physical activity of primary and secondary school students in China is not optimistic. Studies show that only 22.7% of teenagers aged 9-18 years old get physical activity for one hour and more daily, and the physical activity level gradually decreases with age (Verloigne et al., 2012). Other regional surveys also show that people have insufficient physical activity in some provinces and cities. In 2020, the Shanghai Education Commission survey showed that young students did not exercise enough, and 71.61% of the student respondents get physical activity in less than one hour daily, and it increases with the grade. The proportion of college students is the

highest (91.08%), followed by high school students (81.73%), junior high school students (72.95%), and elementary school students (53.37%) (Aubert et al., 2018).

Physical inactivity and low fitness levels are strongly associated with increased weight for children and high school students in Chang Chun City. Many young people keep an inactive lifestyle, failing to meet the recommended physical activity (PA) guidelines as they need to take moderate and even vigorous exercise moderately daily (Nader et al., 2008). In Chang Chun City, analysing the current situation, to resolve the high prevalence of physical inactivity and obesity, we need to design interventions to increase the practice of physical exercise. For developing these appropriate intervention strategies, it is necessary to understand the processes that lead the subject to initiate and maintain regular physical-sporting activity among high school students, including the motivation and distinct factors that may influence their fulfilment. However, only a few numbers of research have focused on the psychological factors that influence and predict the physical activity participation of Chinese high school students (Wang & Zhang, 2016).

In recent years, physical activity studies have gradually been developed towards theory and model. Various psychological theories have been applied to the study of physical activity behaviour, such as the self-determination theory, the expected value theory, the strategy development theory and the theory of planned behaviour. Among these theories, the theory of planned behaviour (TPB) is the more authoritative and

widely used all over the world to explain the intention and behaviour of humans (Wang & Zheng, 2020). And it is also a kind of social-cognitive theory that has been widely examined to predict behaviour in numerous populations.

Recently, studies have been looking at the extended version of TPB by including another construction in addition to the original constructs of TPB. For instance, Canova and Manganelli (2020) put habitual behaviour as an extended variable in the TPB model. The results showed that the addition of habitual behaviour improves the predictive ability of the TPB structural model and promotes the model's ability to explain behavioural intention and behaviour. Shi et al. (2018) added two extended variables, named legal norms and behaviour experience, to the original TPB construct (attitude, subjective norms, perceived behavioural control, intention, and behaviour). Shi et al. (2018) established a structural equation model (SEM) to analyse fatigue driving behaviour based on the Ex-TPB. The results showed that the SEM for fatigue driving behaviour based on Ex-TPB has a significant effect on driver fatigue driving behaviour and has good explanatory power and predictive power. Gao (2017) added goals conflict and corresponding plan variables to the original TPB. The results showed that the Ex-TPB model has a more robust solution relief, especially for predicting exercise behaviour, which increased by 32%.

Berli et al. (2014) concluded that Compensatory Health Beliefs (CHB) play an essential role in the intention of behaviour and can enhance the prediction of intention

forms and behaviour changes. Compensatory Health Beliefs can be one of the theoretical framework's variables to intervene and predict unhealthy behaviours, such as physical inactivity, smoking and drinking. As for physical inactivity, CHB could be introduced in the physical education class by clarifying its negative effect of CHB. High school students should be provided with alternative strategies to avoid activation of CHB, such as keeping plans seriously and avoiding tempting situations.

In this study, the CHB is added to the original TPB construct to constitute Ex-TPB to explain and predict obese high school students' physical activity behaviour. Numerous studies verify the utility of the TPB, explaining that physical activity behaviour has focused on adult populations. However, only a small quantity of research has been conducted on high school students, especially obese high school students. Thus, the purpose of this study is based on the Ex-TPB theoretical framework to predict obese high school students' physical activity behaviour in Chang Chun City, Ji Lin Province, China.

1.3 Problem Statement

Today, unhealthy life habits have become a serious social problem, such as physical inactivity, a sedentary lifestyle, and eating disorders. It is also a risk factor for chronic diseases, obesity, and cardiovascular disease (Feng et al., 2014). The problem of obesity has emerged clearly in our life, especially among high school students (Sun

& Fang, 2012). Increasing rates of obesity among Chinese high school students have grown up to be a significant public health concern in recent years (Feng & Mao, 2014). The difference in factors such as gender, school location, and SES among high school students can affect the frequency and intensity of participation in physical activity, which can lead to obesity (Shi & Yang, 2011). Previous studies related to physical activity and health promotion among Chinese obese high school students only focused on physical activity knowledge and the relationship between health behaviour and physical activity (McMichan et al., 2018). Few studies have used the relevant theories of psychology to analyse physical activity behaviour, to solve the problem of obesity in high school students, and analyze the reasons for the lack of physical activity in China obese high school students from the perspective of psychology (Fang & Sun, 2010). The theory of planned behaviour (TPB) is used for explaining human intentions and behaviour and Compensatory Health Beliefs (CHB) play an essential role in the intention of behaviour and can enhance the prediction of intention forms and behaviour changes (Wang & Zheng, 2020). Therefore, the purpose of this study is to examine and predict factors that contributed to physical activity behaviour among obese high school students based on the Extended Theory of Planned Behaviour (Ex-TPB).

1.4 Research Objectives

The purpose of this study is to examine factors that contributed to physical activity behaviour among obese high school students based on the Ex-TPB (attitude, subjective norms, perceived behavioural control, intention and compensatory health beliefs) in Chang Chun City, Ji Lin Province, China. The specific research objectives are as follows:

1.4.1 Research Objective 1

To examine differences in Ex-TPB (attitude, subjective norms, perceived behavioural control, intention, compensatory health beliefs and physical activity) with different socio-economic status (SES), gender, and locations among obese high school students in Chang Chun City, Ji Lin Province, China?

1.4.2 Research Objective 2

To predict physical activity behaviour using the Ex-TPB constructs (attitude, subjective norms, perceived behavioural control, intention and compensatory health beliefs) among obese high school students in Chang Chun City, Ji Lin Province, China.

1.4.3 Research Objective 3

To examine the moderating effects of SES and locations on the intention of physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

1.5 Research Questions

The following research questions addressed in this study include:

1.5.1 Research Question 1

Are there any significant differences in the Ex-TPB constructs (attitude, subjective norms, perceived behavioural control, intention, Compensatory Health Beliefs and physical activity) with different SES, gender, and locations among obese high school students in Chang Chun City, Ji Lin Province, China?

1.5.2 Research Question 2

Which TPB construct can predict physical activity behaviour among obese high school students in Chang Chun City, Ji Lin Province, China?

1.5.3 Research Question 3

Do SES and locations have significant moderating effects on the intention of physical activity among obese high school students in Chang Chun City, Ji Lin Province, China?

1.6 Research Hypotheses

The hypotheses of this study are listed below.

1.6.1 Research Hypothesis 1

It is hypothesized that there is no significant difference in Ex-TPB constructs (attitude, subjective norms, perceived behavioural control, intention, compensatory

health beliefs and physical activity) with different gender, SES, and locations among obese high school students in Chang Chun City, Ji Lin Province, China.

1.6.1(a) Gender

- H₀1.1*** There is no significant difference in attitude between students of different gender among obese high school students in Chang Chun City, Ji Lin Province, China.
- H₀1.2*** There is no significant difference in subjective norms between students of different gender among obese high school students in Chang Chun City, Ji Lin Province, China.
- H₀1.3*** There is no significant difference in perceived behavioural control between students of different gender among obese high school students in Chang Chun City, Ji Lin Province, China.
- H₀1.4*** There is no significant difference in intention between students of different gender among obese high school students in Chang Chun City, Ji Lin Province, China.
- H₀1.5*** There is no significant difference in compensatory health beliefs between students of different gender among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.6 There is no significant difference in physical activity between students of different gender among obese high school students in Chang Chun City, Ji Lin Province, China.

1.6.1(b) Socio-economic Status (SES)

H₀1.7 There is no significant difference in attitude between students of different SES among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.8 There is no significant difference in subjective norms between students of different SES among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.9 There is no significant difference in perceived behavioural control between students of different SES among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.10 There is no significant difference in intention between students of different SES among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.11 There is no significant difference in Compensatory Health Beliefs between students of different SES among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.12 There is no significant difference in physical activity between students of different SES among obese high school students in Chang Chun City, Ji Lin Province, China.

1.6.1(c) Location

H₀1.13 There is no significant difference in attitude between students at different locations among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.14 There is no significant difference in subjective norms between students at different locations among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.15 There is no significant difference in perceived behavioural control between students at different locations among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.16 There is no significant difference in intention between students at different locations among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.17 There is no significant difference in Compensatory Health Beliefs between students at different locations among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀1.18 There is no significant difference in physical activity between students at different locations among obese high school students in Chang Chun City, Ji Lin Province, China.

1.6.2 Research Hypothesis 2

The Ex-TPB constructs can significantly predict physical activity behaviour among obese high school students in Chang Chun City, Ji Lin Province, China.

1.6.3 Research Hypothesis 3

It is hypothesized that socio-economic status and locations of schools have no significant moderating effects on the relationship between the Ex-TPB sub-constructs (attitude, subjective norms, perceived behavioural control and compensatory health beliefs) and intention toward physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

1.6.3(a) Socio-economic Status (SES)

H₀3.1 Socio-economic status has no significant moderating effects on the relationship between attitude and intention toward physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀3.2 Socio-economic status has no significant moderating effects on the relationship between subjective norms and intention toward physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀3.3 Socio-economic status has no significant moderating effects on the relationship between perceived behavioural control and intention toward physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀3.4 Socio-economic status has no significant moderating effects on the relationship between Compensatory Health Beliefs and intention toward physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

1.6.3(b) Location of Schools

H₀3.5 School locations have no significant moderating effects on the relationship between attitude and intention toward physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀3.6 School locations have no significant moderating effects on the relationship between subjective norms and intention toward physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀3.7 School locations have no significant moderating effects on the relationship between perceived behavioural control and intention toward physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

H₀3.8 School locations have no significant moderating effects on the relationship between Compensatory Health Beliefs and intention toward physical activity among obese high school students in Chang Chun City, Ji Lin Province, China.

1.7 Significance of the Study

The significance of this study is as follows:

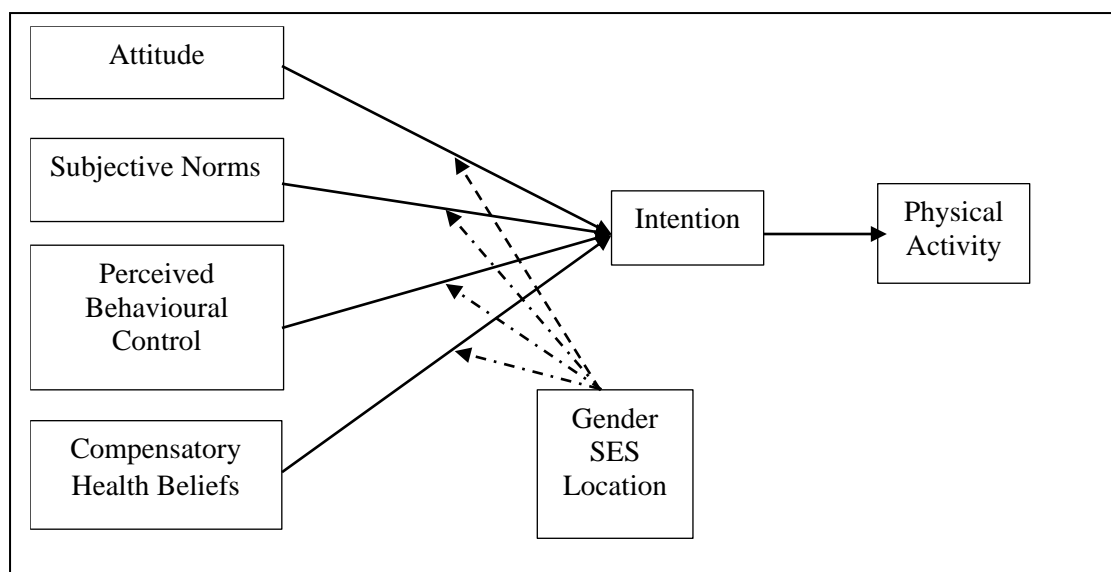
1. This study is the first of its kind in Chang Chun City to predict physical activity behaviour among obese students in high school.
2. The findings of this study will serve as guidelines for educational developers to include knowledge of the physical activity and health promotion for obese high school students.
3. The results of this study can guide the relevant governmental authority's education department, and school leaders in formulating improvements to provide balanced development for physical education and course study do high school students.
4. The results of this study will improve and consolidate TPB explanation and prediction intervention physical activity behaviour.

1.8 Conceptual Framework

The TPB is a theory used to understand and predict behaviours, which posits that behaviours are determined by behavioural intentions immediately, under certain circumstances, which are determined by a combination of three factors: attitudes toward the behaviour, SN, and PBC (Ajzen, 1991). The TPB is widely used for explaining human intentions and behaviour. Compensatory Health Beliefs (CHB) is a self-regulation strategy, for example, “I can eat a lot of snacks before going to bed because I have done physical exercise at night.” Holding this belief reduces the guilt of the initiator and begins to succumb to temptation (De Nooier et al., 2009). The CHB has significant negative effects on intention and behaviour, plays an essential role in the formation of intention and behaviour and can enhance the prediction of intention and behaviour changes (Wang & Zheng, 2020). In this study, the CHB variable was added to the TPB framework to form the Ex-TPB framework, EX-TPB can significantly improve the ability to explain and predict the behaviour based on TPB, the conceptual framework as shown in Figure 1.1.

Figure 1.1

Conceptual Framework of the Ex-TPB



Adapted from the theory of planned behaviour (Ajzen, 1991)

1.9 Limitations of the Study

Limitations are those conditions beyond the researcher's control that may restrict the study's conclusions and application to other situations. The present study has certain limitations that need to be considered when considering the research and its contributions. Important limitations include:

First, for this research study, the research population is obese high school students. The research results may be influenced by the study pressure and academic pressure, less free time, and more time occupied by bust study. The survey results can only represent high school students, which may have different from other kinds of students, such as elementary school, junior high school, high school, and university.

Second, for data collection, this report appears to be the only testing of the Ex-TPB in a large population of high school students in Chang Chun City. Because of China's unique high-pressure college entrance examination system, some third-grade students who choose the arts and sports college entrance examination have left school early to take a professional examination, other a few third-grade students do not have enough time to fulfil the questionnaire. Therefore, the study population of this study may lack some students with special circumstances.

Third, there is limited kinds of literature and a thesis about the study of TPB in China. Thus, many English pieces of literature are cited in this thesis. Cross-cultural linguistic differences may lead to differences in the translation of certain nouns.

1.10 Operational Definitions

The terms and definitions, particularly the operational definition, used in this study are the following.

1.10.1 Attitude

In this study, attitude toward the behaviour is defined as a person's overall evaluation of the behaviour reflected in a positive or negative assessment of performing the behaviour (Ajzen, 1991). This construct is measured by six items based on the instrument developed by González et al. (2012) and was translated into the Chinese language version. Each item was scored on a 4-point Likert scale.

1.10.2 Subjective Norms

Subjective norms (SN) are an individual's perception of social normative pressure or relevance of other beliefs that they should or should not perform a behaviour (Ajzen, 1991). For this study, the SN towards physical activity needs to be measured by the instrument developed by González et al. (2012) and translated into the Chinese language. Four items measure this construct. Each item was scored on a 4-point Likert scale. Number 1 represents strongly disagree. In contrast, number 4 represents strongly agree. Number 1 to number 4 respectively represent different SN levels.

1.10.3 Perceived Behavioural Control

Perceived Behavioural Control comes from control beliefs, which is an individual's perception of how difficult it is to perform a particular behaviour (Ajzen, 1991). It refers to how individuals perceive that achieving a specific behaviour is easy or difficult. Thus, five items were used to measure high school students' PBC, based on the instrument developed by González et al. (2012) and translated into the Chinese language. A 4-point Likert scale was used to measure the response options. Ranged from 1 = Strongly Disagree to 4 = Strongly Agree.

1.10.4 Intention

Ajzen (1991) believe that behaviour intention refers to the tendency of an individual to take a specific action, that is, to a certain extent, whether or not to take this action under the guidance of the decision-making process expression. Therefore,

behavioural intention is a necessary process for any behavioural performance. For this study, the Chang Chun City high school students' intention of taking regular physical activity was measured by using four items, based on the instrument developed by González et al. (2012), such as “*I will try to exercise at least six times in the next two weeks.*” This item was translated into Chinese and evaluated the validity and reliability. Each item was scored on a 4-point Likert scale. Ranged from 1 = Strongly Disagree to 4 = Strongly Agree.

1.10.5 Physical Activity

The World Health Organization (WHO, 2018) defines physical activity as any exercise produced by skeletal muscles that require energy consumption, including activities during the workday, games, housework, travel, and leisure and entertainment activities. The International Physical Activity Questionnaire Chinese Short Version (IPAQ-CSV) (Macfarlane et al., 2007) was used to assess the physical activity levels of participants among obese high school students in Chang Chun City. The IPAQ is a seven-day self-reporting report designed explicitly for Chinese school-aged youth and adolescents, including a long version (thirty-one items) and a short version (seven items), the short version was used in this study. The questionnaire consisted of seven items. All items are about the time you spent on physical activity in the past seven days. For example, “*during the past seven days, how many days did you do some vigorous physical activity.*” Each item was scored on a 4-point Likert scale.