COMPENSATORY BELIEFS IN WEIGHT CONTROL AMONG UNDERGRADUATE STUDENTS

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ABSTRACT

Compensatory Health Beliefs (CHBs) are one of important concepts which have been used to explain the failure to adopt self-set health goals. Despite the fact that there is much empirical evidence that confirms that CHBs affect self-regulation, especially in terms of individuals' health behavior, there are some questions that have not been studied yet, and there is no empirical evidence to support the hypotheses as presented in the CHBs model. Furthermore, there are no empirical studies that explore the generalizability of the CHBs model to see if it can be applied in a varieties of adolescent groups with different weight control conditions. Therefore, the main objectives of this study were to test the hypotheses presented in the CHBs model, and to present a model whose concept expands from the original model. The present study was designed as a quantitative approach. In this study, 788 undergraduate students at Mae Fah Luang University were selected as samples. The study instrument was a self-administered questionnaire consisting of eight psychometric scales that had been verified for content validity and reliability with resulting satisfactory values. Moreover, the analysis of the causal relationships of different variables in the compensatory health beliefs model was based on path analysis using the AMOS 21 program.

The important findings were that desirability had an influence on resolving motivational conflicts by resisting desire and adapting risk perception/outcome expectancy when engaging in tempting behavior. Identified self-concordance had an influence on resolving conflicts by resisting desire. Weight control self-efficacy had an influence on resolving motivational conflict by resisting desire and adapting risk perception/outcome expectancy when engaging in tempting behavior. Weight control self-efficacy had an influence on identified self-concordance. Compensatory behavior self-efficacy had an influence on compensatory behavior intention. Actual behavioral control had an influence on compensatory behavior intention and compensatory behavioral self-efficacy. In addition, the present study also found that the expanded compensatory health beliefs model can be effectively used for explaining the data in the case when individuals have a normal BMI value and when individuals perceive that they have a normal weight. From these findings it could be implied that an activating compensatory belief might be one of various factors that result in the individuals being not overweight or obese if they implement compensatory behavior. Thus, the concept of compensatory health beliefs should be applied to counseling or assistance for individuals who want to control their weight to result in them realizing the process of compensatory health beliefs, which will affect their compensatory behavior intentions in the future. Actual compensatory behavior should be promoted to enhance self-efficacy, which can be conducted by encouraging individuals to change their compensatory behavior intention to become actual behavior, through helping them to plan specific, practical guidelines, monitoring, and providing feedback on a regular basis.

KEY WORDS: COMPENSATORY HEATH BELIEFS/WEIGHT CONTROL

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ความเชื่อเชิงชดเชยในการควบคุมน้ำหนักของนักศึกษา
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บทคัดย่อ

ความเชื่อทางสุขภาพเชิงชดเชยเป็นหนึ่งในแนวคิดที่ใช้อธิบายความล้มเหลวในแสดงพฤติกรรมเพื่อบรรลุเป้าหมายทางสุขภาพที่บุคคลกำหนด แม้ว่าจะมีหลักฐานเชิงประจักษ์ที่ช่วยสนับสนุนว่าการใช้ความเชื่อเชิงชดเชยนั้นส่งผลต่อการกำกับตนเอง โดยเฉพาะในประเด็นที่เกี่ยวข้องกับพฤติกรรมสุขภาพของบุคคล กระนั้นก็ตาม ยังมีข้อสงสัยบางประการที่ยังไม่มีการศึกษาและไม่มีหลักฐานเชิงประจักษ์ที่ช่วยยืนยันข้อสันนิษฐานต่างๆ ที่เสนอไว้ในแบบจำลองความเชื่อทางสุขภาพเชิงชดเชย กับทั้งยังไม่มีการศึกษาว่าแบบจำลองความเชื่อทางสุขภาพเชิงชดเชยนี้สามารถใช้อธิบายพฤติกรรมที่เกี่ยวกับการควบคุมน้ำหนักในกลุ่มวัยรุ่นที่มีเงื่อนไขในการควบคุมน้ำหนักแตกต่างกันได้เหมือนกันหรือไม่อย่างไร ดังนั้นการทำความเข้าใจความสัมพันธ์ตัวแปรต่างๆ ในแบบจำลองความเชื่อทางสุขภาพเชิงชดเชยจะช่วยขยายองค์ความรู้ที่ใช้ในการอธิบายและทำนายปรากฏการณ์ที่เกี่ยวข้องกับพฤติกรรมสุขภาพ โดยเฉพาะอย่างยิ่งพฤติกรรมการควบคุมน้ำหนักให้เกิดความชัดเจนมากยิ่งขึ้น การศึกษานี้ใช้รูปแบบการวิจัยเชิงปริมาณเพื่อทดสอบสมมติฐานต่างๆ ที่เสนอไว้ในแบบจำลองความเชื่อทางสุขภาพเชิงชดเชยที่นำเสนอโดยราเบียวและคณะ และเพื่อเสนอแบบจำลองที่ขยายแนวคิดเพิ่มเติมจากแบบจำลองความเชื่อทางสุขภาพเชิงชดเชยเดิม โดยศึกษาในนักศึกษาระดับปริญญาตรี มหาวิทยาลัยแม่ฟ้าหลวง จำนวน 788 คน เครื่องมือวิจัย คือ แบบสอบถามแบบเขียนตอบด้วยตนเอง โดยประกอบด้วยมาตรวัดทั้งสิ้นแปดมาตรวัด ซึ่งได้ผ่านกระบวนการตรวจสอบคุณภาพด้านความตรงเชิงเนื้อหาและความเชื่อมั่น และใช้การวิเคราะห์เส้นทางในการหาความสัมพันธ์เชิงเหตุผลของตัวแปรต่างๆ ด้วยโปรแกรม เอมอส 21

ผลการศึกษาที่สำคัญ คือ ความปรารถนาในสิ่งล่อใจมีอิทธิพลต่อการลดความขัดแย้งของแรงจูงใจด้วยการปฏิเสธสิ่งล่อใจ และการปรับเปลี่ยนการรับรู้ระดับความเสี่ยงของสิ่งล่อใจหรือปรับเปลี่ยนเป้าหมายใหม่อีกครั้ง ความสอดคล้องในตนเองต่อเป้าหมายในการควบคุมน้ำหนักแบบเห็นคุณค่ามีอิทธิพลต่อการปฏิเสธสิ่งล่อใจ การรับรู้ความสามารถของตนเองในการควบคุมน้ำหนักมีอิทธิพลต่อการปฏิเสธสิ่งล่อใจ และการปรับเปลี่ยนการรับรู้ระดับความเสี่ยงของสิ่งล่อใจหรือปรับเปลี่ยนเป้าหมายใหม่อีกครั้ง การรับรู้ความสามารถของตนเองในการควบคุมน้ำหนักมีอิทธิพลต่อความสอดคล้องในตนเองต่อเป้าหมายทางสุขภาพแบบเห็นคุณค่า การรับรู้ความสามารถของตนเองในการแสดงพฤติกรรมชดเชยมีอิทธิพลต่อความตั้งใจที่จะแสดงพฤติกรรมชดเชย การเคยควบคุมพฤติกรรมชดเชยได้จริงมีอิทธิพลต่อความตั้งใจที่จะแสดงพฤติกรรมชดเชยและการรับรู้ความสามารถในการแสดงพฤติกรรมชดเชย รวมทั้งยังพบว่าแบบจำลองความเชื่อทางสุขภาพเชิงชดเชยที่ขยายแบบจำลองเพิ่มเติมสามารถใช้อธิบายพฤติกรรมการควบคุมน้ำหนักได้อย่างดีในกรณีที่ปัจเจกมีดัชนีมวลกายอยู่ในเกณฑ์ปกติและรับรู้ว่าตนเองมีน้ำหนักตัวอยู่ในเกณฑ์ปกติ ซึ่งผลการศึกษาดังกล่าวชี้ให้เห็นว่ามีความเป็นไปได้ว่าการใช้ความเชื่อทางสุขภาพเชิงชดเชยอาจเป็นปัจจัยหนึ่งที่ส่งผลให้กลุ่มบุคคลเหล่านี้ไม่กลายเป็นผู้ที่มีน้ำหนักเกินหากบุคคลได้แสดงพฤติกรรมชดเชยจริง นอกจากนี้ผลจากการศึกษาบางประการแสดงให้เห็นว่าความสอดคล้องในตนเองต่อเป้าหมายในการควบคุมน้ำหนักและการรับรู้ความสามารถของตนเองในการควบคุมน้ำหนักส่งผลต่อกลวิธีลดความขัดแย้งของแรงจูงใจดังนั้นจึงควรมีโครงการฝึกอบรมเกี่ยวกับการสร้างแรงจูงใจ การรับรู้ความสามารถของตนเอง และการตั้งเป้าหมายให้แก่นักศึกษา เพื่อพัฒนาการรับรู้ความสามารถของตนเอง และเสริมสร้างวิธีการกำหนดเป้าหมายและสร้างแรงจูงใจภายในตนเองอย่างเหมาะสมอันจะนำไปสู่การเปลี่ยนความเชื่อเชิงชดเชยเป็นพฤติกรรมเชิงชดเชยต่อไปในอนาคต

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CHAPTER I
INTRODUCTION

1.1 Background and Significance of the Problem

According to the World Health Organization (WHO, 2013), the number of people living with overweight and obesity in 2008 was nearly doubled compared to the year 1980. In addition, approximately 35 percent of people aged 20 years and above worldwide, especially in Europe and America, were overweight, and 11 percent of people from the same group were obese (body mass index (BMI) is equal to or over 30 kg/m^2). The estimated prevalence of the overweight and obesity in Australian children and adolescents from 2005-2025 showed a steady increase in the number of obese males and females in all age groups; one-third of the young Australian population aged 5-19 years will experience overweight or obesity in 2025 (Human Services, Australia, 2008). Furthermore, in the past three decades, approximately 170 million of the world's child population aged under 18 years were overweight, and the overweight prevalence among children was the highest in upper-middle income countries. Nonetheless, this trend can be found in almost all countries, population groups and age groups (WHO, 2012).

Although Thailand's obesity prevalence figures are not comparable to those of European countries, America, Australia and the Middle East, the figures are tending to increase and are similar to those of some Asian countries, such as China, Korea, Japan, and Singapore. The Fourth National Health Survey of the Thai population aged 15 years and over revealed that 28.3 percent of male population and 40.7 percent of female population were living with obesity (Wichai Ekphalakorn (in Thai), 2010). In addition, some studies showed that the over-nutrition problem among Thai children was tending to be more serious, and approximately 1.6 million Thai children were found to gain over-nutrition, the rate of which was the highest in Bangkok and other provinces in the central region and was higher in municipality

areas than outside the municipality areas (the National Economic and Social Development, 2010).

There was evidences that 19.5 percent of the Thai population aged 15-29 years were obese –18.5 percent for males and 20.6 percent for females (Wichai Ekphalakorn, 2010). This population is the age of young adolescent and the transition to adulthood. These age groups are undergraduate students, in particular, their dietary habits involve a significantly higher risk associated with obesity. This is due to the fact that they like to consume junk food and fast food, new types of food that are widely spread through a variety of media. Both types of food were considered as a low nutritious food– they are rich in starch, sugar and fat, especially saturated fat and contain low fiber content (Obcheuy Wongtong (in Thai), 1998; Sukumal Parsomsak (in Thai), 2009). Furthermore, the majority of undergraduate students stay in the dormitory, so they have little chance to prepare food on their own, and they eat food at their convenience, which is mostly one plate dish that may have inappropriate nutritive values. Moreover, their main meal of the day is dinner, and they often have a party with their friends. This food consumption behavior is a key factor in their overweight and obesity (Ampawan Visavateeranon, 1998; Anukool Polsiri, 2008). There was a supporting study of Thaksaphon Thamarangsi et al. (2011), which explored factors that influence overweight and obesity in the Thai population. This study revealed that Thai adolescents habitually ate high-calorie food, especially dessert and fast food in the western style. In addition, the proportion of food consumed by most adolescents was inappropriate – they did not have main meals but consumed snacks, desserts, soft drinks, sweetened beverages and consumed less food containing fiber. Besides, concerning energy usage, most of them did not exercise in the degree and frequency recommended by experts, and their activities and lifestyles involve low physical energy, such as using a computer, using an elevator and watching television.

Although the obesity prevalence rate among adolescents is not very high compared to that of middle-aged people, their obesity and overweight rates are tending to increase. More importantly, Adolescents are obviously affected by overweight and obesity, especially in psychological terms. It is evident that adolescents living with overweight or obesity tend to possess lower self-esteem (French et al 1995; Clay et al. 2005; Franklin et al. 2006; Nowicka et al. 2008). Also, they are more likely to suffer

from psychiatric disorders, such as depressive disorders (Liem et al. 2008; Calamaro & Waite, 2009), body dissatisfaction, which may lead to eating disorders (Paxton et al. 1991; Ricciardelli & McCabe, 2001; Wilkosz et al. 2011; Ursoniu et al. 2011), and poorer well-being than those without the problems (Vogt Yuan, 2010; Mond et al. 2011). Overweight and obesity among adolescents are a key factor in the prediction of the obesity trends for adults too (Smolak and Thomson, 2009).

Adolescence is a transitional stage when a lot of changes occur. It is the age of transition from kids, who depend on adults, to adults, who possess self-sufficiency (Learner & Steinberg, 2004). Adolescents' distinct changes include physical, cognitive, emotional and behavioral growth. In addition, this is the age when individuals seek emancipation, identity formation, and functional roles (Cheung et al. 2007). In terms of physical changes, in particular, adolescents tend to attach great importance to physical appearance as it is their self-representation (Learner & Steinberg, 2004). Moreover, the social value that a good build is desirable and attractive to people is a factor that results in most adolescents being preoccupied with, and worried about, their appearance. This concern leads them to adopt a lifestyle and behavior associated with attempts to change or improve their appearance. For example, they try to control their food, exercise or lose weight in order to feel better about themselves (Pesa et al. 2000).

A study on the prevalence of weight control and weight loss among Caribbean adolescents revealed that the weight control prevalence between male and female adolescents was different. That is, female adolescents were more likely to control their weight than their male counterparts. In addition, 40.5 percent of female adolescents and 25.2 of male adolescents wanted to lose their weight through dietary control and exercise (McGuire et al. 2002). In Thailand, there are studies on the overweight and obesity prevalence, but there are many limitations to the study of the prevalence of weight control and weight loss. The reviewed literature shows that there are studies on the weight control prevalence among Thai adolescents, but all of them were conducted on small sample groups. Based on the studies, 38.2 percent of samples controlled and lost their weight (Somsak Tinkhajee and Pulsak Pumwiset (in Thai), 2012), and 43.1 percent used to lose their weight (Nattreeya Chaochumnum et al. (in Thai), 2005). The data on weight control among Thai adolescents above manifests that

the level of Thai adolescents' weight control is quite high, and similarly to adolescents in foreign countries.

Some studies showed that within five years, adolescents and people in other ages who tried to lose or control weight usually gained back the weight they had lost, and in another five years, the weight they gained back was greater than that they had lost. Similarly, concerning exercise, those who had just started exercising always gave up exercising within the first six months (National Task Force on the Prevention and Treatment of Obesity, 1993). In addition, although individuals had knowledge about behavior that had negative health impacts, for example, consumption of excessive food or a lack of exercise, and tried to have a lifestyle that has good health effects, their efforts were not successful (Pinel et al. 2000). The question is why these adolescents fail to adopt regular and continuous behavior that is conducive to good health, especially weight control.

Determining factors in individuals' commitment to self-set health goals have gained a wide interest from psychologists (Rabieu et al. 2006). Individuals tend to set different health goals, such as regular exercise, dietary control, or compliance with medical personnel's advice. However, some studies suggested that continuous and regular behavior in line with the self-set health goals is a challenge and may not be successful. For example, a study found that 96 percent of obese individuals lost at least five kilograms after eating hypocaloric diet, but 52 percent of them could control their weight for up to one year, and only 11 percent remained weight control behavior for up to five years (Toubro & Astrup, 1997). In addition, individuals tended not to be able to increase the levels of their physical activities in a continual manner (Perri et al. 1997).

Academics have attempted to understand the factors contributing to the low levels of individuals' commitment to self-set health goals. Part of the psychological explanation for this phenomenon focuses on the reasoned cognitive process (Rabiau et al. 2006). Rabiau et al. (2006) argued that important theories related to the reasoned cognitive process include Rogers' protection motivation theory (1975, cited in the Boer and Seydel, 1996) and theory of planned behavior proposed by Ajzen (1985). The protection motivation theory suggests that individuals' health behavior is a result of the processes of perceived severity, perceived vulnerability,

perceived response effectiveness, and self-efficacy. These factors will lead to the intention of adopting appropriate health behavior (protection motivation) or inappropriate health behavior.

Concerning the theory of planned behavior, it says that individuals' behavior is a result of their behavior intention, which is influenced by three main factors: (1) attitudes towards the behavior, 2) subjective norm about the behavior, and (3) perceived behavioral control (Ajzen, 1985). That is, perceived behavioral control has a direct influence on behavior.

Bandura (1991) presented the cognitive process related to reasoning and decision-making in the self-regulation model. He proposed that the self-judgment process is the process in which individuals make decisions or assess themselves as to if they can change their behavior efficiently and if the changing behavior is in line with their self-set goals or standards. The information from self-observation will be compared with their goals. The self-judgment process is composed of three components –1) social referential comparison, made to determine whether their behavior is higher or lower than others, in order that they can find ways to improve their behavior, 2) valuation of activities – if individuals find that their activities have low or no value, they will use less efforts to do them, and 3) perceived performance determinants. However, self-regulation varies to individuals, which may depend on their perceived performance determinants and affect their behavior. Individuals usually feel proud of themselves if they have any achievement and perceive that their achievement stems from their ability and efforts. Individuals do not feel self-satisfied if they perceive that their achievement derives from external factors, thinking that it does not come from their own ability or efforts (Bandura, 1991).

Apart from the protection motivation theory, theory of planned behavior, and the concept of self-regulation of Bandura, there is a concept focusing on individuals' daily decision, especially when they are faced with temptations that are like short-term rewards but may have short-term or long-term health effects on them. The concept suggests that individuals' self-set health goals, such as having weight loss, a good build, or good health do not usually go together with desirable temptations (Fishbach et al. 2003; Trope & Fishbach, 2000 cited in Rabiau et al. 2006). Thus, individuals need to have an appropriate self-regulation process (Metcalfe & Mischel,

1999, cited in Rabiau et al. 2006). The interactions between temptations and health goals of individuals cause them to have internal conflict or cognitive dissonance (Abraham & Sheeran, 2003; Giner-Sorolla, 2001 cited in Rabiau et al. 2006). Another alternative that helps individuals reduce internal conflict is compensatory beliefs (Rabiau et al. 2006).

The Compensatory Health Belief (CHB) is a concept related to reasoning for having or refraining from adopting particular behavior, especially health behavior. The compensatory health belief refers to the belief that the negative consequences of unhealthy behavior (but desirable) can be compensated by engaging in other behaviors that has a good health impacts (Rabiau et al. 2006). Many studies found that the compensatory health belief related to individuals' goal attainment (Rabiau et al. 2009). CHB was considered as a reaction that responds to desirable temptations (Knäuper and Kronick, 2010) and it can also predict the success or failure of individuals' self-regulation (Miquelon et al. 2012).

Rabiau et al. (2006) attempted to create an understanding about individuals' health behavior on the basis of the reasoned cognitive process. They proposed that the reasoned cognitive process occur when it has incompatibility between the temptation to involve in unhealthy behaviors and self-set health goals which creates three motivational conflict resolution strategies: 1) Resist desire, 2) adapt risk perception/outcome expectancy, and 3) activated compensatory health belief.

Also Rabiau et al. (2006) set hypotheses that degree of desirability on temptation has influence on activating compensatory health beliefs. They suggested that when the temptation is undesirable, individuals should be able to resist the desire and do not need to use compensatory health beliefs. In addition, when the temptation is exceedingly desirable and individuals cannot resist, they should not be able to activate CHB because they believe that the intensity of the desire strong enough to be used as a reason for the behavior. Compensatory health beliefs tend to be used when the desirability degree is at a moderate level (Rabiau et al. 2006).

Moreover, health-related self-efficacy was considered as another factor that influences CHB usage. Rabiau et al. (2006) suggested that high health-related self-efficacy associate with the levels of compensatory health beliefs. That is,

individuals with high health-related self-efficacy should be related to a low tendency to activate compensatory health beliefs.

The value of individuals' self-set goals or in other words the importance of the outcomes to individuals is another factor that may affect the levels of motivational conflict (Rabiau et al. 2006). Individuals can achieve their goals, such as exercising regularly, eating healthy diet, quitting smoking, etc. through self-set motivation as they are very interested in these goals or set their goals with great determination and their goals have concordance to them. In addition, individuals may attain their goals as a result of motivation that they have not built by themselves, but as a result of external motivation, e.g. reward or self-punishment, which is expressed in the form of guilt or anxiety, or the conflict between the goals and the selves. The health goal self-concordance leads to profound interest and value that are difficult to change as long-lasting personalities. Therefore, the health goal self-concordance should be another variable that influences behavior responding to individuals' conflict (Rabiau et al. 2006).

Due to a lack of study that explores how Thai adolescents apply conflict resolution strategies in their cognitive processes which will be able to gain more understanding about the cognitive behavior among adolescents. Despite there are a number of empirical evidences should confirm that compensatory health beliefs affect self-regulation, especially in terms of individuals' health behavior (Knäuper and Kronick, 2010; Miquelon et al. 2012), there are some questions that have not been studied yet, and there is no empirical evidence that supports the hypotheses about determinants of conflict resolution strategies of individuals when they encounter with the conflict between health goals and desires, as presented in the compensatory health belief model (Rabiau et al. 2006). Furthermore, there are no empirical studies that explore the generalizability of compensatory health beliefs model if it can be applied in a varieties of adolescent groups with different weight control conditions. Those reasons had led to this study.

1.2 Research Objectives

The present study aimed at investigating theoretical hypotheses postulated in the compensatory health beliefs model which was developed by Rabiau et al. (2006), for which no empirical study has been conducted. In addition, this study strived to extend the existing compensatory health beliefs model to the weight control behavior under different conditions among undergraduate students. Therefore, the objectives of this study are as follows:

(1) To examine the influences of degree of desirability of tempting behavior on individuals' motivational conflict resolution strategies.

(2) To examine the influences of person's health goal self-concordance on individuals' motivational conflict resolution strategies.

(3) To examine the influences of weight control self-efficacy on individuals' motivational conflict resolution strategies.

(4) To examine the influences of weight control self-efficacy on person's health goal self-concordance.

(5) To examine the influences of compensatory behavior self-efficacy on compensatory behavior intention.

(6) To examine the influences of actual behavioral control on compensatory behavior intention and compensatory behavior self-efficacy.

(7) To examine the ability to explain weight control behavior of extended version of compensatory health beliefs model under different conditions among undergraduate students.

1.3 The Scope of the Study

This study is a cross-sectional study in which the samples were late adolescents studying at Mae Fah Luang University, Chiang Rai.

1.4 The Operational Definitions

1.4.1 Weight control behavior

Weight control behavior refers to actions for maintaining the current weight or keeping the weight down. In this study, weight control behavior consisted of two dimensions:

(1) Weight control behavior through dietary control refers to an attempt to maintain the current weight or keep the weight down by controlling the food intake, refraining from or reducing, certain types of food, e.g. food that are rich in starch, sugar and fat, as well as refraining from having certain meals, such as dinner, special meals, and food between main meals.

(2) Weight control behavior through physical activities refers to an attempt to maintain the current weight or keep the weight down by doing physical activities to burn energy, such as exercising, playing sports, walking up the stairs instead of using the elevator, and walking instead of using cars.

1.4.2 Degree of desirability

Degree of desirability refers to level of desirableness of temptations that may adversely affect weight control. In this study, the temptations are divided into temptations related to eating and temptations related to physical activities.

1.4.3 Motivational conflict resolution strategies

Motivational conflict resolution strategies refer to procedures used to resolve conflict as a result of the inconsistency between the desirability of temptations that may have adverse impacts on weight control and person's health goals. In this study, there are three motivational conflict resolution strategies, as follows:

(1) Resistance of desire refers to a strategy to resolve motivational conflict by rejecting, opposing, or not yielding to the temptations that may have adverse effects on weight control.

(2) Adaptation of risk perception/outcome expectancy refers to a strategy to resolve motivational conflict by reducing the levels of risks associated with, or adverse effects on, weight control, or reducing the levels of expectation about weight

loss in the case that yielding to temptations that can have negative effects on weight control occurs.

(3) Activation of compensatory health beliefs refers to a strategy to resolve motivational conflict resolution with the belief that negative impacts on weight control can be compensated for by engaging in other behavior that is believed to have positive effects on weight control in the future in the case that yielding to temptations that can have negative effects on weight control occurs.

1.4.4 Health goal self-concordance

Health goal self-concordance refers to an integration of self-set health goals into individuals' selves, with are equipped with the freedom to set health goals. In this study, health goal self-concordance (weight control) consisted of three characteristics:

(1) External self-concordance refers to the way of setting health goals from external motivation, i.e. desire for rewards (e.g. praise) or for escape from punishment.

(2) Introjected self-concordance refers to the way of setting health goals by building external motivation in ones' selves without accepting the motivation as part of their selves. The goals and behaviors stem from the need to avoid guilt and shame or to boost individual ego which will make them feel more confident and worth.

(3) Identified self-concordance refers to the way of setting goals by attaching the real value to the goals, by accepting the goals and adopting behavior as important part to ones' selves.

1.4.5 Self-efficacy

Self-efficacy refers to individuals' self-confidence that they are able to manage and behave in a particular way to achieve their goals. In this study, self-efficacy is divided into two groups:

(1) Weight Control Concerning Self-efficacy refers to individuals' perception about their ability to control weight until they achieve their goal. In this study, weight control concerning self-efficacy consisted of two types, which are self-efficacy for dietary control and self-efficacy for physical activities in order to lose weight.

(2) Compensatory Behavior Concerning Self-efficacy refers to individuals' perception about their capability to conduct compensatory behavior to achieve their self-set goals. In this study, the compensatory behavior related self-efficacy consisted of compensatory behavior related self-efficacy through dietary control and compensatory behavior related self-efficacy through physical activities to lose weight.

1.4.6 Compensatory behavioral intention

Compensatory behavioral intention refers to the purpose or effort to conduct compensatory behavior to resolve motivational conflict over weight control.

1.4.7 Actual Compensatory behavioral control

Actual compensatory behavioral control refers to the past compensatory weight control behavior through dietary control or physical activities to burn calories, based on individuals' report.

1.4.8 Overweight

Overweight refers to the state of individuals' body mass index (BMI), which is represented as the relationship between weight and height, is equal to or above 23 kg/m^2.

1.5 Expected Benefits

This research is expected to expand the theoretical knowledge used for explaining phenomena associated with health behavior, especially weight control. It is expected to result in a clearer knowledge and understanding about the determinants of the conflict between self-set health goals and the degree of desirability based on the compensatory health belief model.

It is also expected that this study will serve as a guideline for developing strategies to assist individuals with losing weight so that they are able to control weight regularly and continuously. This involves the integration of the concept of the compensatory health belief, the behavioral change process, and psychological counseling based on different concepts, in order to enhance the efficiency in weight

control. Also, it is anticipated that the information will be applied to the plans to improve other health behavior, such as compliance with medical personnel’s advice, exercise, drug and alcohol addiction.

CHAPTER II
LITERATURE REVIEW

The literature reviewed in this study consist of various concepts and theories, which comprise five parts: 1) General concepts of compensation, 2) Compensatory health beliefs model, 3) Theories on the compensatory health beliefs model, 4) Research on the compensatory health beliefs model, and 5) Conceptual framework of the study.

2.1 General Concepts of Compensation

Compensation-related concepts exist in many disciplines, e.g. economics, biology and psychology. The scope of the study of compensation-related concepts in different disciplines varies according to their conceptual basis. In psychology, compensation has been widely studied (Backman and Dixon, 1992), and it covers neuroscience (Berlucchi and Buchtel, 2009; Dennis et al. 2013), sensory handicapped (Salthouse, 1984; Berardi et al. 2000; Braimoh, 2006), and interpersonal interaction (Tynes et al. 2008; Weiland et al. 2011).

As mentioned, the details and focus of compensation-related concepts differ from discipline to discipline. To understand them, it is important to specify the context where ‘compensation’ is used. This chapter mainly discusses compensation in psychology, including its definitions and types.

2.1.1 The Definitions of Compensation

Compensation has many meanings, which differ from discipline to discipline. This chapter presents the definitions of ‘compensation’ in general contexts and in specific contexts (in psychology):

In a psychological dictionary, compensation refers to an action or process of amending or replacing loss (Colman, 2003). According to the American Heritage

Dictionary, compensation (psychology) means a behavior that an individual develops either consciously or unconsciously to balance a real or imaginary deficiency (American Heritage Dictionary, 2013). In addition, in psychoanalysis, compensation is individuals' defense mechanism, which is individuals' attempt to redress the perception of their defects that cannot be eliminated, e.g. physical defects, by creating other positive points in compensation (Colman, 2003).

Based on the above definitions, compensation in psychology is related to individuals' behavior and cognitive process in recompense for internal or external deficiencies with a focus on other strengths or advantages. In conclusion, the concepts applied to create an understanding about compensation in psychology are usually related to individuals' cognitive process and behavior.

2.1.2 Types of Compensation

Chernev and Harmilton (2009) divided compensation into two types: (1) Self-regulatory compensation and (2) Evaluative compensation. Self-regulatory compensation is a direct compensation on the individual's self, while evaluative compensation deals with the individual's evaluative process. This chapter focuses on self-regulatory compensation and provides brief information about evaluative compensation because the content of evaluative compensation is irrelevant to the scope of this study.

(1) Self-regulatory compensation

Self-regulatory compensation deals with psychological and behavioral mechanisms, whereby individuals try to compensate for negative internal or external events by creating positive changes to the self. Self-regulatory compensation comprise of five categories:

(1.1) Physiological compensation

Physiological compensation is individuals' adaptation to physical handicaps. Studies reveals that individuals tend to overcome their sensory handicap by developing special sensitivity in a different sensory modality. A good example is the development of sensitive hearing among blind people to compensate for visual impairs (Bull, Rathborn, and Clifford, 1983; Focker et al. 2012).

(*1.2) Cognitive compensation*

Cognitive compensation deals with individuals' attempt to overcome the deficiencies of their cognitive process, i.e. attention, perception, and memory. For example, a study on a group of elderly people indicated that older ages have negative impacts on work and activities that need specific skills, e.g. recall and reaction time. However, the study revealed that the elderly usually make up for the decline in specific abilities by improving new skills such as global evaluation and accurate anticipation, which enable them do their daily activities normally (Charness, 1981; Salthouse, 1984).

(*1.3) Affective compensation*

Affective compensation deals with self-regulatory process which increases positive feelings when negative feelings occur in individuals. For example, individuals who confront difficulty situations, such as a physical disabilities, imprisonment or legal prosecution, or loss of a loved one, tend to recover quickly from their suffering. For this phenomenon, it can be explained that these individuals tend to compensate for their negative feelings caused by unpleasant situations by focusing on other positive points that result in positive emotions. For example, those who suffer from the loss of a loved one often develop a new social network, for example, by serving as volunteers or joining religious activities (Neill and Kahn, 1999) or having more interactions, or doing more activities, with other people, such as friends and close relatives (Stevens, 1995).

(*1.4) Compensation in symbolic self-completion*

Compensation in symbolic self-completion reflects individuals' attempt to reduce conflict of their desire and self-image by means of external artifacts related to their self-image (Wicklund and Gollwitzer, 1981). For example, academics that have no, or a few of, academic works usually create a creditable image by using a title that shows their expertise, such as "Dr." or "Lecturer" (Jones et al. 2009). In addition, this type of compensation is expressed through consumption behavior. The study of Rucker and Gavinsky (Rucker and Gavinsky, 2008) suggested that psychological of powerlessness is associated with the willingness to pay for goods and services related to mental condition to foster the sense of power. For example, customers recognizing that they have little power tend to increase their

willingness to pay for goods that they perceive to have a high status to reinforce their sense of power. Rucker and Gavinsky (2008) provided an example of awareness of the status of a Rolex watch, which has a clear symbolic status. Between a billionaire and bank employee, a billionaire does not recognize that his power is greater when wearing a Rolex watch while a bank employee does.

(*1.5) Behavioral Compensation*

Behavioral compensation can involve adjustment to behavior in response to changes in the external environment. For instance, individuals change their behavior by increasing their caution when they perceive a higher risk to themselves (e.g., individuals may walk more slowly on slippery ice) or in some cases, individuals may have a riskier behavior if they perceive that environmental changes helps reduce the risk of particular behavior. For example, individuals may be brave to drive faster if they perceive that the car they are driving is equipped with an anti-lock brake. One important thing is that behavioral compensation is different from other types of compensation. That is, behavioral compensation can be both positive and negative, while other types of compensation tend to be positive compensation – individuals' attempt to overcome deficiencies (Chernev and Harmilton, 2009).

(2) Evaluative compensation

Evaluative compensation involves the evaluation of external events or objects. It is divided into two types – compensation in the decision process and compensation in inferential reasoning (Chernev and Harmilton, 2009).

In the decision process, compensation is abilities of an option's strength of a particular thing that can compensate for deficient or missing attributes (Johnson and Meyer, 1984, cited in Chernev and Harmilton, 2009). Decision strategies are divided into compensatory strategies and non-compensatory strategies. Compensatory strategies are part of the multi-attribute utility model (Keeney and Raiffa, 1976, cited in Chernev and Harmilton, 2009). The concept of this model is that individuals choose a strong option to compensate for their deficient or missing attributes. The compensation needs exchange between attributes in the decision process. On the contrary, for non-compensatory strategies, deficiency of an attribute will prevent individuals from considering options so that they ignore the attributes of other options.

Non-compensatory strategies will result in individuals avoiding the exchange, by excluding low-value options from consideration (Tversky, 1972, cited in Chernev and Harmilton, 2009).

For inferential reasoning, compensation is a process that individuals use to infer unclear or missing data. There are two popular types of inferential reasoning – evaluative consistency inferences and inferences based on perceived covariation (Chernev and Harmilton, 2009).

Evaluative consistency inferences are evident in social psychology research, which reveals that individuals rarely think of others in a mixed term; they tend to regard that others' characteristic are always static. Accordingly, the first characteristic of other individuals that an individual remembers usually influences his or her perception and interpretation of them. This phenomenon is called "halo effect" (Nisbett & Wilson, 1977). For example, individuals with a good looking are always evaluated and perceived to have pleasant personality and possess greater abilities than those of average appearance (Arch, 1946).

Inferences based on perceived covariation deal with linking the value of options that do not show attributes or show some unclear attributes and evident attributes (Chernev and Harmilton, 2009). Common forms of covariation are associating the prices of products with their quality (people in general understand that a good-quality product is expensive), the name of products with their quality (famous brand products usually offer better quality than infamous brand products), and reliability with quality guarantee (reliable products officer a longer warranty period than unreliable products) (Broniarczyk and Alba, 1994).

Apart from evaluative consistency inferences and inferences based on perceived covariation, individuals use compensatory reasoning to infer unclear or incomplete information. Compensatory reasoning is pressured by the conflict between expectations and choices. In other words, compensatory reasoning deals with the process of using information that is not present or not clear. Thus, the deficiency of options will be compensated by other options that have more value, for example, if a house salesperson presents houses that have the same features, e.g. sizes and prices but does not present some information. If any presented features are superior to other features presented at the same time, for example, bigger house with a cheaper price,

individuals using compensatory reasoning tend to infer that the house may have some defects that have not been presented, such as a bad location or need for a lot of renovation (Chernev and Harmilton, 2009).

2.2 Compensatory Health Beliefs (CHBs) Model

The compensatory health belief model was developed by Rabiau et al. (2006), a psychologist and professor in health psychology at McGill University, Canada. The theoretical concept of the compensatory health belief model was developed based on the protection motivation theory (Roger, 1975) and the theory of planned behavior (Ajzen, 1991). In addition, the compensatory health belief model is based on the self-concordance model (Sheldon, and Elliot, 1999). The self-concordance model is based on the self-determination theory (Deci and Ryan, 2000), which expands the concept of the self-determination theory. That is, the self-concordance model focuses on individuals' personal goals rather than specific motivation (Rabiau et al. 2006).

Key elements of the compensatory health beliefs model consist of motivational conflict between a desire and goal self-concordance, self-efficacy, and implementation intentions or plans (Rabiau et al. 2006). The compensatory health belief model starts from individuals' cognitive conflict between a health-related desire and goal, which causes motivational conflict – when individuals are faced with something satisfactory but detrimental to health. For example, individuals desire to smoke but are aware that smoking is harmful to health. Rabiau et al, (2006) proposed that individuals may have three conflict resolution strategies –resisting desire, adapting risk perception/outcome expectancy, and activating compensatory health beliefs (Figure 1). These three conflict resolution strategies are outlined as follows:

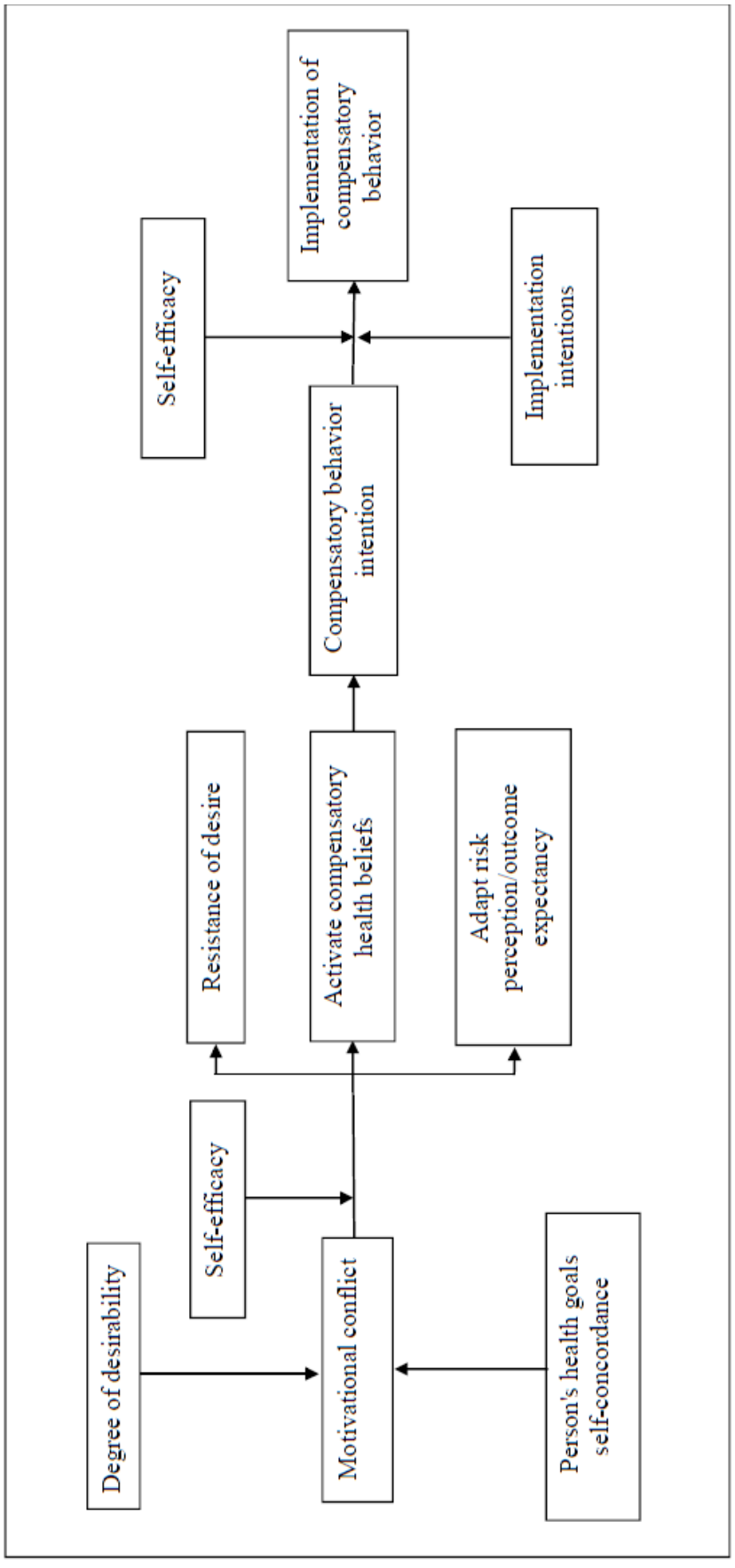

Figure 2.1 Compensatory Health Beliefs Model (Rabiau et al. 2006).

The first strategy is resisting desire. This strategy deals with rejecting desire, which finally will reduce motivational conflict because individuals do not involve themselves in behavior that is detrimental to health. For example, individuals that are on a diet can refuse to eat food that results in weight gain.

The second strategy is adapting risk perception/outcome expectancy, which deals with changing individuals' belief that the desire may not have a bad health impact or prevent them from reaching their goal. For example, individuals may think that a lack of exercise may not be very harmful to blood circulation or cardiovascular system. They may adjust their perceived risk that they have a lower risk of heart disease.

The last strategy is activating compensatory health beliefs, which is the easiest strategy to use because it allows individuals to engage in tempting behavior without conflict or feeling of guilt. Using this strategy, individuals do not need to change their desire or beliefs. Individuals provide reasons for their temping behavior that has an adverse health impact or prevent them from reaching a goal by planning to compensate for temping behavior with new behavior that they believe can compensate for it and help improve their health in the future.

In addition, Rabiau et al. (2006) assumed there are two factors that determine the conflict resolution strategies: (1) the degree of desirability of the tempting behavior and (2) a person's health goals self-concordance. An assumption of Rabiau et al. (2006) is that resisting desire tends to occur when the degree of desirability is not very high. On the contrary, adapting risk perception/outcome expectancy and activating compensatory health beliefs are more likely to be used when the desirable behavior has a high satisfaction level. On the contrary, if the desirable behavior is not very satisfactory, and individuals have a high level of health related self-efficacy, they will be able to resist desire and do not need to activate compensatory health beliefs, and then compensatory health beliefs will not occur. When the desire is too strong for individuals to resist, they will not activate compensatory health beliefs either because they view that the desire is strong enough to serve as a reason for the behavior. Compensatory health beliefs tend to be used when the desire is at a moderate level (Rabiau et al. 2006).

Rabiau et al. (2006) has attached great importance to another factor. They suggested that the levels of health related self-efficacy have a relationship with the levels of activated compensatory health beliefs. That is, those with a high level of health related self-efficacy are more likely to activate compensatory health beliefs at a low level (Rabiau et al. 2006).

In general, individuals are able to achieve their goal through self-motivation if they are really interested in the goal or determine goals uncompromisingly (Ryan and Deci, 2000a) and if they have health goals self-concordance (Koestner et al. 2002). In addition, individuals may achieve their goals from extrinsic motivation which refers to a motivation that they do not define but because of external motivations, rewards, or self-punishment, which are expressed in the form of guilt or anxiety (Sheldon and Elliot, 1999). Rabiau et al. (2006) divided person's health goals self-concordance in the compensatory health belief model in three characteristics:

(1) External self-concordance, which is motivational behavior because of the desire for reward or escape from punishment. Individuals will not be able to restrain themselves from, and resist, desire; they will adapt risk perception/outcome expectancy.

(2) Introjected self-concordance refers to individuals internalize motivation but do not accept the motivation as part of themselves. Behavior is based on the internalization aims to avoid guilt and shame or to result in the feeling of value. Rabiau et al. (2006) regarded that individuals having health goals always activate compensatory health beliefs to reduce conflict because their motivation is so strong that it prevents them from changing their beliefs but is not strong enough to resist the temptation.

(3) Identified self-concordance involves individuals value behavioral goals or conscious regulation. They accept behavior as something important to themselves. For example, individuals may realize that eating nutritious food or smoking no cigarettes has a positive health impact, so they develop the value as part of their identity. Rabiau et al. (2006) had an assumption that the group individuals tends to be able to resist desirability of tempting behavior and they are not likely to activate compensatory health beliefs to reduce motivational conflict.

In addition, when individuals activate compensatory health beliefs to reduce motivational conflict, they need to create an intention or plan to conduct compensatory health behavior. (Rabiau et al. 2006). In the compensatory health beliefs model, planning overlaps with the word "implementation intention," which is a self-regulatory strategy that links forecast situations with the behavior that leads to goals and details of planning. Planning compensatory behavior or implementation intention is the stage in which individuals form a concrete detailed picture about how they will compensate for behavior that has a negative health impact (that they will have or have had) in their thought. This process relies on self-efficacy to imagine the possible method that allows them to achieve their goals. Without planning, individuals cannot see any practice guidelines, and they may fail to implement compensatory behavior (Gollwitzer, 1993; Gollwitzer, 1999; Gollwitzer and Brandstatter, 1997).

After compensatory plan development, individuals have to face choices as to if they will implement compensatory behavior as planned. Individuals developing a conclusion that they will implement compensatory behavior as planned will complete implementing the behavior. Implementing compensatory behavior reduces motivational conflict and other negative feelings because individuals believe that they have removed negative effects, or it results in them returning to normal condition after they have implemented tempting behavior. Another possibility is that the failure to implement compensatory behavior will leave individuals with conflict. Individuals' conflict arising from their failure to implement compensatory behavior will stay with them until: (1) they reevaluate their efficacy for implementing compensatory behavior and finally implement it; (2) they seek other conflict resolution methods by adapting risk perception/outcome expectancy, and (3) their conflict fades away over time (Rabiau et al. 2006).

Rabiau et al. (2006) suggested that implementing compensatory behavior does not compensate for a negative health impact. Mostly, individuals fail to implement compensatory behavior as planned, so it is evident that activating compensatory health beliefs tend to have a negative health impact.

In general, individuals have a wrong belief that implementing compensatory behavior can reduce adverse effects of behavior harmful to health. This belief will result in continual behavior detrimental to health, by implementing

compensatory behavior that they expect will replace behavior having a positive health impact. Finally, this will make a long-term health impact. In addition, it is difficult to identify which compensatory health beliefs are right or wrong. This is because behavior having a negative health impact resulting from activating compensatory health beliefs will affect health in many dimensions. That is, compensatory behavior may partly compensate for a negative health impact. In addition, although compensatory behavior can compensate for behavior harmful to health, individuals usually fail to implement their plan. They may postpone compensatory behavior, and their conflict and unhappiness will decrease over time so that their desire to implement compensatory behavior reduces. Thus, it can be concluded that activating compensatory health beliefs always has a relationship with a negative health impacts of individuals (Rabiau et al. 2006).

2.3 Theories on the Compensatory Health Beliefs Model

As mentioned, the compensatory health belief model was developed by integrating many different theories. The last part is dedicated to the concepts and theories about the compensatory health belief model in brief.

2.3.1 Protection motivation theory

The compensatory health belief model was developed based on Rogers' protection motivation theory (1975 cited in Boer and Seydel, 1996). Developing the protection motivation theory in 1975, Rogers started with the desire to understand the influence of fear appeals on behavior. Later, the theory was revised and employed in 1983. The revision was based on the conceptual basis of Lazarus (Lazarus, 1966) and Leventhal (leventhal, 1970 cited in Boer and Seydel, 1996), which proposed that a process of threat appraisal and a process of coping appraisal lead to appropriately and inappropriately coping with health threats. The appraisal of the health threat and the appraisal of coping responses lead to suitable behavior intention (protection motivation) or unsuitable behavior intention. The protection motivation theory proposes that there are four factors that determine individuals' protection intention: (1)

Perceived severity, (2) Perceived probability of the occurrence, (3) Perceived response efficacy, and (4) Perceived self-efficacy (Maddux and Rogers, 1983).

Rabiau et al. (2006) applied the concept of suitable and unsuitable appraisal of health threats from the protection motivation theory to serve as the basis for the development of the first part of the compensatory health belief model, especially in the process of appraisal of the conflict between desire and personal health's goal. The compensatory health belief model starts from the conflict between individuals' desire and health goals and forms motivational conflict. Rabiau et al. (2006) proposed that individuals may have three conflict resolution strategies: 1) Resisting desire, 2) Adapting risk perception/outcome expectancy, and 3) Activating compensatory health beliefs, as presented in the compensatory health belief model section.

In addition, Rabiau et al. (2006) had an assumption that there are two other factors that determine the degree of motivational conflict and the selection of motivational conflict resolution strategies in individuals: 1) Degree of desirability of tempting behavior and 2) Person's health goals self-concordance. Moreover, they developed it based on the self-concordance model which was developed based on the self-determination theory. For a clear picture, the next section will present the self-determination theory and then the self-concordance model.

2.3.2 Self-Determination Theory

The self-determination theory (SDT) focuses on creating motivation and developing personality using empirical methods based on the organismic meta-theory, which focuses on the development of intrinsic motivation to result in personality development and behavioral self-regulation, similarly to the development of living beings. The scope of the study of this theory is the trends of growth and intrinsic mental desire in individuals. This is a basic factor in individuals' personality integration and self-motivation (Ryan and Deci, 2000a).

The self-determination theory proposes that motivation involves all aspects of behavior implementation or behavior intention. It can be said that motivation is the core or central issue of psychological study. Individuals' actions may stem from intrinsic motivation or extrinsic motivation. Intrinsic motivation is an action resulting

from interest in, or satisfaction with, the action. It refers to behavior that is motivated by internal rewards. Extrinsic motivation involves engaging in a behavior in order to gain particular results, e.g. reward and avoidance of punishment. Motivation occurs in all societies and cultures and is a basis that individuals use for explaining their own and others' behavior (Ryan and Deci, 2000b).

Ryan and Deci (Ryan and Deci, 2000a) suggested that there are three major needs that result in individuals' development, growth, integration, and well-being. The needs consist of the need for competence, need for relatedness, and the need for autonomy. Most importantly, the needs are basic factors in the development of individuals' intrinsic motivation.

(1) The need for competence is the individuals' desire to manage or deal with environment effectively. Individuals try to master the environment and desire to have the feeling that they are efficient when they are able to manage the environment.

(2) The need for relatedness concerns individuals' intrinsic need to contact, connect, and pay attention to, others. Many daily activities involve other people and lead to the sense of belongingness.

(3) The need for autonomy involves individual's need to be a determiner or a causal agent and the need to have volition to do anything in line with their self (in line with their interest and value). Autonomy does not mean that individuals have to separate themselves from other individuals. Instead, it means willingness to take actions and have choices of behavior, whether it stems from their desire or is their response to others' demand (Deci & Vansteenkiste, 2004).

The self-determination theory also proposes that individuals' behavior may be amotivational, whereby individuals lack behavior intention – individuals may not behave or behave unintentionally. Amotivation results from the fact that individuals do not see the value of what they will do, or feel that they are unable to do it, or do not expect it will give desirable results. On the contrary, individuals may behave in line with their intrinsic motivation, which occurs when individuals feel satisfied with an activity, and this is the starting point of self-determination. As for extrinsic motivation, it is in between amotivation and intrinsic motivation. Extrinsic motivation consists of different levels of self-regulation autonomy. Extrinsic behavioral motivation is divided into four patterns, as follows:

(1) External regulation – Individuals' behavior derived from extrinsic motivation with the least autonomy. The behavior aims to respond to their satisfaction with extrinsic rewards. Individuals usually feel that their behavior is forced, and they infer that their action is triggered by external factors.

(2) Introjected regulation – This is individuals' behavior that internalizes regulation, but they do not accept the regulation as part of themselves completely. The behavior aims to avoid guilt and anxiety or to strengthen their ego, such as pride. The common form of introjected regulation is behaving to show competence (to avoid failure) to maintain self-worth. Despite driven by intrinsic drives, individuals infer that their behavior comes from external factors, and they do not view that this is completely part of their self.

(3) Identified regulation – This reflects the use of consciousness of valuing behavior goals or regulation. Thus, individuals tend to accept their action as part of themselves.

4) Integrated regulation – This deals with extrinsic motivation with the highest autonomy. The regulation occurs when identified regulation is completely internalized into individuals. This means that individuals accept and appraise it and incorporate it into other values and needs.

When individuals internalize regulation and accept it as part of themselves, they will feel autonomy. However, this does not mean that all individuals develop based on the four patterns. Individuals can internalize values during different steps, which depend on experiences and current situations (Ryan and Deci, 2000a).

2.3.3 Self-Concordance Model

Sheldon and Elliot (1999) developed the self-concordance model by expanding the self-determination theory (SDT), focusing on individuals' goals instead of specific motivation and situations that may affect motivation based on the focus of the self-determination theory (Sheldon and Elliot, 1999). Under the model, individuals with health goals self-concordance are those who achieve their life goals by showing that the goals are chosen by them and the goals are not determined or controlled by extrinsic motivation – this shows individuals' interest, passion, values, and actual key beliefs (Sheldon et al. 2004). Based on the self-concordance model, the goals are

defined as “concordance” with the self when the goals are integrated into individuals’ self.

Sheldon and Elliot (1999) believe that many people can determine their goal but cannot achieve it. Some people can achieve their goal while their contentment is not improved. Both forms of failure are the result of the failure of “conative process.” The conative process is related to the motivation creation process, which starts with the formation, journey and achievement or cancellation of the goals. The process affects individuals’ contentment, self-adjustment, and motivation in the future. In conclusion, the self-concordance model shows different steps, from the goal adoption to the goal achievement, as well as the results of goal achievement in response to individuals’ needs, satisfaction, and contentment.

Sheldon and Kasser (Sheldon and Kasser, 1998) proposed that sometimes goal achievement may not be able to satisfy individuals if the goal is not integrated into their self – this shows an absence of goals self-concordance after they achieve their goal. Sheldon and Elliot (Sheldon and Houser-Marko, 2001) argue that the next process is the assessment of satisfaction experiences related to their needs. The need-related satisfaction was developed by Sheldon and Kasser based on the self-determination theory of Ryan and Deci (Ryan and Deci, 2000a), who proposed that individuals’ psychological needs are divided into three major forms: 1) Need for competence, which occurs when individuals feel that they are efficient and are able to manage their behavior; 2) Need for autonomy, which is the feeling as a person who determines or chooses his or her behavior based on his or her needs; 3) Need for relatedness, which is individuals’ linkage to, or assimilation with, their important people. The three basic needs result in individuals’ change in well-being.

In addition, Sheldon and Elliot (1998) presented the characteristics of goal achievement, which was developed based on the self-determination theory of Deci and Ryan (2000a). This is expressed in the form of the inference as to if the behavior is influenced by internal or external factors, which consisted of four characteristics based on the self-determination theory of Deci and Ryan (2000a). They changed integrated regulation into intrinsic motivation.

Sheldon and Elliot (1998) divided behavioral motivation into two major types – autonomy motivation and controlled motivation. Autonomy motivation

consists of intrinsic motivation and identified motivation. Both types of motivation can predict individuals' actual intention and attempt to achieve a goal. Both types of motivation show the profound interest in the core self. Controlled motivation consists of extrinsic motivation and introjected motivation. Having both types of motivation, individuals may not feel belongingness of self-determined motivation. Thus, they tend to be confused when they confront temptation. Their goal may become less significant over time. Sheldon and Elliot (1998) believed that both types of motivation have a relationship with behavior intention but may have no relationship with the maintenance of levels of attempt and goal achievement.

Individuals can achieve their goal with self-determined motivation in the case when they are really interested in the goal or they have unwaveringly determined the goal by themselves (Ryan and Deci 2000) and the goal is in accordance with their self (Koestner et al. 2002). However, individuals may achieve their goal from motivation that they have not determined – from external drives, rewards, or self-punishment. This is expressed in the form of guilt or anxiety or a lack of goals self-concordance (Sheldon, and Elliot, 1999).

Rabiau et al. (2006) applied the self-determination theory and self-concordance model in the compensatory health belief model by dividing person's health goals self-concordance into three types: (1) Person's health goals self-concordance with external motivation; (2) Person's health goals self-concordance with introjected motivation; and (3) Person's health goals self-concordance with identified motivation, as presented in the section of compensatory health beliefs.

In addition, Rabiau et al. (2006) had another assumption that the self-efficacy levels have a relationship with the levels of activating compensatory health beliefs. That is, those with high health related self-efficacy tend to activate compensatory health beliefs at a low level. Rabiau et al. (2006) applied the self-efficacy theory, which was developed by Bandura (1977) to explain compensatory health beliefs too.

2.3.4 Self-Efficacy Theory

The self-efficacy theory was developed by Bandura (1984) based on the social learning theory, which presents that individuals' behavior consists of two types

of expectation: efficacy expectation and outcome expectation. Reward or punishment based on Skinner's operant conditioning theory is important for individuals' behavior. Individuals' cognitive process is crucial to behavior. Bandura suggested that self-efficacy is necessary for choosing to behave in a particular way and continuing behaving in that way.

Self-efficacy means individuals' belief about their ability to behave so that they achieve a result. Outcome expectation is expectation under which individuals evaluate an outcome after they behave in a particular way. Bandura further explained that the sources of individuals' self-efficacy comprise:

(1) Enactive mastery experience – Success in actions is a powerful source because it is individuals' actual successful experience. Success makes individuals perceive that they are highly capable of behaving. Frequent failures result in individuals estimate their ability lower, especially if the failures happen before they feel that they are capable.

(2) Vicarious experience – This happens when individuals see that others possessing similar qualifications succeed in certain activities, so that they perceive their self-efficacy. Individuals view that they are able to do similar things successfully as others do.

(3) Verbal persuasion – This is a commonly-used method, which makes individuals believe that they are able to do activities successfully. However, a more effective verbal persuasion is possible. Verbal persuasion that is not in line with reality may destroy the listener's beliefs and feelings and damage the persuader's credibility.

(4) Physiological and affective state – In general, individuals usually use physical and emotional data to assess their ability, e.g. excessive excitement causing hands shaking was an obstacle to doing something. Individuals forecast that they will be more capable and successful if they have normal physical condition, without stress or fatigue (Bandura, 1977).

Individuals' self-efficacy has a relationship with health behavior. There are a number of studies discovering that self-efficacy effects change in individuals' health behavior (Godding and Glasgow, 1985; Stotland and Zuroff, 1991; Williams and Kinney, 1991). Therefore, Rabiau et al. (2006) applied the self-efficacy theory as an important variable for explaining self-concordance, motivational conflict resolution

strategies, and compensatory behavior intention in the compensatory health belief model (Figure 1).

When individuals select motivational conflict resolution strategies by activating compensatory health beliefs, they need to plan implementing compensatory behavior (Rabiau et al. 2006). In the compensatory health belief model, the meaning of planning overlaps with the word "implementation intention" (Gollwitzer, 1999). This means the self-regulation strategies that involve linking projected situations with behavior targeted at a goal will lead to details of planning. Rabiau et al. (2006) developed the implementation intention concept based on the theory of planned behavior (TPB), proposed by Ajzen (1985), which will be presented next.

2.3.5 Theory of Planned Behavior

Ajzen (1985; 1991) developed the theory of planned behavior (TPB) based on the theory of reasoned action (TRA) of Fishbein and Ajzen (1975). Its basic concept is individuals' behavior is always supported by a reason. They utilize existing data in a systematic manner to decide to behave or not to behave in a particular way. Intention is a natural motivational factor and an important factor in behavioral prediction. That is, the higher intention individuals have, the more they try to behave in that way.

However, Ajzen and Madden (1986) views that TRA has some limitations. That is, in reality, intention is not the only factor in individuals' behavior; behavior intention is interfered with by many other internal and external factors, e.g. skills, knowledge, ability, sufficient planning, times, and opportunities. All the factors determine individuals' behavior. Ajzen (1991) regarded that individuals' behavior is incomplete volitional control, so the theory of planned behavior was developed in the following time.

The basic principle of the theory of planned behavior is individuals' behavior is a result of behavior intention. There are three major factors in individuals' behavior intention: (1) Attitudes towards the behavior; (2) Subjective norm about the behavior, and (3) Perceived behavioral control (Ajzen, 1985), which means self-efficacy for controlling behavior has a direct influence on behavior.

Attitudes towards the behavior deal with individuals' evaluation that affects the overall behavior, which stem from behavioral beliefs and evaluation in both positive and negative ways. If individuals believe that the behavior will have an impact and their evaluation shows a positive result, they will have positive attitudes to the behavior. On the contrary, if their evaluation result is negative, they will have negative attitudes toward the behavior, which will eventually affect their behavior intention (Ajzen, 1985).

The subjective norm is individuals' perception of their own and group's expectations or needs that influence their decision as to if they should or should not behave in a particular way. This results from their normative beliefs (as to if they are expected to behave in a particular way) and their motivation to comply with referent (Ajzen, 1995).

Perceived behavioral control deals with individuals' perception about their capabilities to manage or perform certain behavior. These affect individuals' confidence in implementing behavior that promotes or overcomes obstacles (Ajzen, 1991).

Rabiau et al. (2006) applied the TPB in the final part of the compensatory health belief system by presenting that compensatory behavior occurs when individuals have compensatory behavior intention and there are two major factors that affect individuals' compensatory behavior intention, consisting of implementation intention and self-efficacy.

2.4 Researches on Compensatory Health Beliefs

As the compensatory health beliefs model was developed in 2006 so that research related into this topic has been in a limited circle. Based on literature review on the compensatory health beliefs model, there are ten relevant research works that can be accessed, which are described below:

Knäuper et al. (2004) developed a compensatory health beliefs measurement form to investigate its reliability and validity. They also studied the relationship between compensatory beliefs and relevant constructs. Knäuper et al. (2004) divided the study into two parts. The first study aimed to develop a scale to

measure the activation of compensatory health beliefs by gathering comments about activating compensatory health beliefs via the Internet. There were 142 research participants – 35.4 percent were males; 50.6 percent, females; and 14 percent, unidentified gender, most of whom were 18-25 years. Initially, research participants filled in their opinions about activating compensatory health beliefs, which consisted of 523 messages. After that, the research team analyzed all relevant comments and removed irrelevant ones – 237 messages were found to be relevant to the activation of compensatory health beliefs. The research team analyzed these 237 messages again and removed redundant and broad messages, so there were 67 messages left. The team adjusted these messages to make them easier to be understood by people with different educational backgrounds; and the team selected the 5-point scale (Likert type response). After that, the 67 messages were sent to 12 health psychology experts and psychometrics to check the accuracy of the messages. After examination by the experts, there were 40 messages left in the scale.

As for the second study, Knäuper et al. (2004) aimed to test the reliability of the CHBs scale. There were 381 research participants, who were undergraduate students at McGill University (82.4 percent were females, 17.3 percent were males, and 1 person did not identify their gender). Their average age was 20.9 years. The research team informed the research participants that they needed to complete the CHBs scale twice – the questionnaire would be sent to them again via email 4.5-5 months after they completed the questionnaire for first time. There were 371 participants that expressed their intention to join the research, but only 141 of them completed the questionnaire for the second time, which resulted from invalid email address. The factor analysis yielded the scale composed of 17 items with four sub-dimensions – substance use, eating/sleeping habits, stress, and weight regulation. The internal consistency value of the scale was at a good level ($\alpha = .76$), and the level showed consistency after a test-retest correlation ($r_{tt} = .75$). Compensatory health beliefs had a negative relationship with health related self-efficacy. The research participants gaining high compensatory health beliefs scores had low self-efficacy scores toward preventive nutrition ($r = -.19$, $p = .05$) and alcohol resistance ($r = -.20$, $p = .04$). In addition, compensatory health beliefs scores had a relationship with conscientiousness personality trait, which was measured using NEO Five-Factor

Inventory (NEO-FFI) ($r = -.19$, $p = .04$). The research participants with high compensatory health belief scores had low conscientiousness scores. Moreover, high compensatory health beliefs scores had a relationship with high health-related risk behavior and illness symptoms. An interesting result was that the four sub-dimensions of the compensatory health beliefs had a relationship with health risk behavior in respective aspects. It was also found that those with BMI of 27 or more (overweight) gained high compensatory health beliefs scores.

In 2009, psychometric properties of the compensatory health beliefs scale were tested again by Nooijer et al. (2009). Their study employed the compensatory health beliefs scale that had been developed by Knäuper et al. (2004) in a context with cultural difference. The research team studied the psychometric properties of the compensatory health belief scale in the Dutch context, which was different from the Canadian context. The research team asked two translators to translate the compensatory health beliefs scale, from English to Dutch. One translator received information about the compensatory health beliefs concept, but the other one did not. After that, the research team submitted the scale translated by both translators to experts from many disciplines, e.g. health promotion, nutrition, psychology, and the methodology, to consider the equivalence of the Dutch version to the English version, in terms of meanings, experiences, and concepts. Both versions of the scale were merged into a single version to produce a scale to be utilized in the study. The samples in the study consisted of 145 undergraduate students from two universities in the Netherlands. The research participants had to complete the questionnaire two times and send them back to the research team via email again after two-week. A statistical analysis showed that the psychometric properties of the Dutch scale and the English one had consistency. The reliability of the Dutch compensatory health beliefs scale was at a good level ($\alpha = .78$). The test-retest analysis showed a Pearson correlation of .82 ($p < .01$).

However, the study by Kaklamanou et al. (2012) found that the compensatory health belief scale developed by Knäuper et al. (2004) had some suspicious issues. The study by Radtke et al. in 2010 (cited in Kaklamanou et al. 2012) on the psychometric properties of the German compensatory health belief scale revealed that Radtke et al. could not find four components based on the study by

Knäuper et al. (2004). The study also suggested that the sub-dimensions in the English version of the CHBs scale from Canada may lack validity and reliability in some contexts. Therefore, Kaklamanou et al. (2012) reexamined the psychometric properties of the compensatory health belief scale consisting 40 items among samples in England. The study comprised 364 samples, aged 18-74 years, 75.7 percent were females and 22.3 percent were males, but only 175 of them returned the measurement form. A statistical analysis manifested that the research team could not identify all the four components mentioned in the original scale; only three of them were found – stress, sleeping pattern, and exercise. In addition, the compensatory health belief scale used among the samples from England could not predict a relationship between their compensatory health beliefs and health behavior. The reliability after the retest of the compensatory health beliefs scale within six months was very low. Kaklamanou et al. (2013) studied problems with the compensatory health beliefs scale among 43 English samples, consisting of 32 females and 11 males with an average age of 34.98 years. In the study, to measure compensatory health beliefs, the samples were asked to provide answers verbally. They had to read each question and respond to each question based on what they thought about. If they did not answer within 10 seconds, the researcher would give them a signal. The compensatory health beliefs scale used in this study consisted of 32 items. Fifteen items were added to the original scale developed by Knäuper et al. (2004). The study results revealed that although most research participants reported no problem with completing the compensatory health beliefs scale, most of them identified at least one problematic question. However, the problem in the compensatory health beliefs scale could be solved by rewording. An interesting finding was that most of the problematic questions were those existing in the original scale. The research participants suggested that the compensatory health beliefs scale consisted of many vague points, such as unclearness between compensatory beliefs and compensatory behaviors. They did not believe messages in the compensatory health beliefs scale but implemented behavior in line with such beliefs. Kaklamanou et al. (2013) suggested that the questions about behaviors or situations should be specific, and an instruction for completing the questionnaire should clearly state that health beliefs here are the respondents' beliefs, not other people's beliefs. In addition, they suggested that wording in the form should be clear to prevent the respondents'

confusion. More importantly, the compensatory health beliefs scale should be divided into the compensatory health beliefs scale and compensatory behaviors scale containing questions consistent with the compensatory health beliefs scale. Concerning psychometric characteristics of the compensatory health beliefs scale in the verbal form, the study results found that the face validity and reliability of the whole compensatory health belief scale were at a good level (α = .79) although the reliability scores in some sub-dimensions were very low.

Apart from the quality of measurements utilized for investigating compensatory health beliefs, especially the compensatory health beliefs scale, there are studies on compensatory health beliefs focusing on the ability to predict individuals' health behavior. The studies were conducted on various health behavior groups, i.e. weight loss and weight control, smoking, and self-care behavior of some groups of patients. Their details are as follows:

The first group consisted of studies on the relationship between compensatory health beliefs and weight control behavior. The first study was conducted in 2008 by Monson et al. (2008), which was a pilot study. The research team aimed to search for empirical data that could identify if compensatory beliefs are a response to temptation. The samples in this study comprised of 10 female students at McGill University in Canada, aged 18-22 years. All participants were on a diet to lose five pounds or more on average, and they were screened to make sure that they did not have eating disorders. As for the study methodology, the research team asked the research participants to abstain from eating for at least 2.5 hours to ensure that they were hungry enough when they saw cookies. The researcher presented two cookies with the same appearance and size to the research participants. One was a vanilla cookie and the other was an almond cookie. The research participants were divided into two groups: the experimental group and the control group. In the experimental group, a cookie was labeled "low sugar and fat," and the other one was labeled "high sugar and fat." As for the control group, both cookies were labeled "low sugar and fat." The types of cookies were randomly selected because the researcher did not know which type of cookies was preferred by the research participants. The research participants had to write the answer which cookie they would like to taste and eat. They were informed that the cookie with low sugar and fat tasted bland, but the one

with high fat and sugar was more delicious and palatable. The researcher hypothesized that the decision to choose the cookie labeled "high fat and sugar" would result in conflict in the participants' mind and encourage them to activate compensatory beliefs to allow themselves to eat that cookie despite knowing that the action may affect the goal to lose their weight. The study showed that the experimental group activated compensatory beliefs to choose the cookie with high sugar and fat. Some messages written during the decision making included *"I can always abstain from eating cookies for the time following the eating of said cookie."* and *"I would rather eat a high calorie cookie, and overall less food, than eat a low calorie cookie."* Samples in the control group did not activate compensatory beliefs. Thus, the research team concluded that compensatory beliefs occurred to respond to conflict in individuals' mind in order to justify their behavior, and the team believed that the failure in weight loss partly results from activating compensatory beliefs and non-compliance with plans.

Kronick and Knäuper (2010) examined issues that were similar to those studied earlier by Monson et al. (2008). They hypothesized that people who are on a diet activate compensatory beliefs before implementing tempting behavior by eating high-calorie food. The samples of this study were recruited from announcements on the Internet and newspapers, each of whom was given 20 dollar as remuneration. They consisted of 42 females who were on a diet, with the average body mass index (BMI) value of 24.59; they wanted to lose five pounds or more. They were asked to refrain from eating for at least 2.5 hours to make sure that they would be hungry enough when they saw food that was their temptation. When they were asked about their hunger degree from 0-5, where 0 means 'not at all.' and 5 means 'very hungry," mean of their hunger degree was found to be 3.52. They were divided into two groups: the experimental group and the control group. The means of the hunger degree of both groups were similar. In the experimental group, Cookie A and Cookie B were labeled "high-calorie" and "low-calorie," respectively. In the control group, there were Cookie A and Cookie B too, but they were given the same label: "low-calorie." During the experimentation, the research participants chose the cookie that they wanted to taste and wrote why they decided to choose that cookie. Both groups were informed that the high-calorie cookie was more crispy and delicious than the low-calorie one. The study

results found that the research participants choosing the cookie with high calories, which was tastier, were more likely to have conflict in their thought and activated compensatory beliefs. Thus, the researcher's conclusion was that temptation motivates the use of compensatory intention, and the compensatory intention will affect tempting behavior, which may be harmful to health or result in individuals failing to achieve their goal.

Discovering that temptation motivates the use of compensatory intention and the compensatory intention affects tempting behavior, Kronick et al. (2011) studied the power to predict individuals' calorie intake and use of compensatory beliefs. The research samples were on a diet, 60 females and nine males aged from 18-42 years with an average body mass index (BMI) value of 24.17. The experience sampling methodology (ESM) was utilized. Each research participant had to complete a questionnaire and measurement form, and each was given an electronic device that notified him or her to record relevant data seven times a day, for seven days. They were asked to send the recorded data back to the researcher. The study found that compensatory beliefs and compensatory intention forecast their calorie intake during weight control. It was found that compensatory beliefs and compensatory intention lead individuals to implement tempting behavior that may negatively affect their weight control and to fail to implement their plan to achieve their goal.

The above study is consistent with study by Miquelon et al. (2012), which revealed that compensatory health beliefs could predict the success or failure of self-regulation among women who were on a diet. The samples in the study were 121 women who were on a diet, aged 18-30 years with an average BMI value of 22.8. Each was paid 12 dollars for participating in the research. The research team collected their primary data on their weight, height, BMI value, motivation to lose weight, and weight control rules. After that, the research participants had to complete the compensatory beliefs scale. Two months later, they had to complete the questionnaire via email to assess their weight loss and compliance with the rules they had set. The study found that those with high compensatory belief scores were more likely to adhere to the rules at a low level and were more likely to have a history of weight loss failure than those with low compensatory belief scores. However, the research team viewed that the use of compensatory beliefs may not have a negative impact on weight

loss if individuals can implement compensatory behavior based on their beliefs on a consistent and continuous basis. However, mostly, individuals cannot implement compensatory behavior as expected, so they fail to achieve their goal. The study also revealed that the use of compensatory beliefs has a negative relationship with autonomous motivation, which stems from individual's autonomy to set their own goal. This type of motivation enables individuals to cope with temptation strongly, resist desire, and implement their plan to achieve their long-term goal. The study also found that the research participants who reported that their weight loss resulted from autonomous motivation were less likely to use compensatory beliefs, which resulted in them complying with their weight control rules and guidelines and having more chance to succeed in losing weight.

Apart from weight control behavior, compensatory health beliefs were involved in studies on self-regulation and self-care of certain groups of patients. The details are as below:

Nguyen et al. (2006) studied the influence of compensatory beliefs and self-efficacy for adherence with medical treatment among 115 adolescents suffering diabetes type 1, aged 12-18 years, who were receiving treatment at the Montreal Children's Hospital. The study tools consisted of the Diabetes Compensatory Beliefs scale developed by Knäuper et al. (2004), the Diabetes Self-efficacy Scale developed by Rubin and Peyrot (1989) (cited in Nguyen et al. 2006), and the Diabetes Self-care Activities scale developed by Toobert et al. (2000) (cited in Nguyen et al. 2006). Moreover, research team obtained the patients' glycosylated hemoglobin test result (HbA1c) as a physiological measure of the extent to which the participants follow their treatment. The study found that the use of improper compensatory beliefs had a relationship with glycemic control, report on monitoring blood sugar, and diet control among the research participants. However, their self-efficacy had no relationship with their compensatory beliefs.

In 2009, Rabiau et al. (2009) restudied the activation of compensatory beliefs about glucose testing to identify if it can predict blood sugar levels and adherence with the medical treatment process among adolescents living with diabetes type 1. The samples consisted of 114 adolescents diagnosed as having diabetes type 1 a year before, aged 12-18 years, who were receiving treatment at the Montreal

Children's Hospital, as well as their parents. The adolescents had to complete a questionnaire while waiting for an examination at the clinic, and their parents had to complete a brief demographics questionnaire. The study tools consisted of the Glucose Testing Compensatory Beliefs Questionnaire, the Diabetes Knowledge Scale, Generalized Perceived Competence Scale, and the Illness Representations Questionnaire. In addition, the glycosylated hemoglobin levels served as the adherence to treatment; the summary of diabetes self-care activities measure was used to assess their self-care behavior. The study tools had moderate-high reliability levels, ranging from 0.70-0.88. The findings showed that adolescent samples using compensatory beliefs were less likely to strictly comply with the treatment process although they had a good level of knowledge about the disease and self-care. Those using glucose testing compensatory beliefs were less likely to receive blood sugar examinations on a regular basis and had a low level of blood sugar control.

The last group of research works on compensatory beliefs focusing on health behavior deals with smoking behavior, which is as follows:

Radtke et al. (2011) investigated a relationship between compensatory beliefs and readiness to quit smoking among 244 adolescents, aged 15-21 years. The research team developed a smoking specific compensatory belief scale. The scale development complied with a standard scale development process. It started with a pilot study on 10 samples so as to obtain 89 questions and submission of the 89 questions to health psychology experts, which finally yielded 13 questions. The statistical analysis results manifested that the smoking specific compensatory belief scale had a good reliability level ($\alpha = .80$). The study also found that the activation of smoking specific compensatory beliefs had a negative relationship with the readiness to quit smoking of the participants although other variables, e.g. self-efficacy and conscientiousness were controlled.

Most of the research works on activation of compensatory health beliefs as mentioned focus on the investigation of results or the influence of the activation of compensatory beliefs on health behavior, e.g. weight control, smoking, adherence or compliance with advice of medical personnel, and self-control. The results of the studies on activated compensatory health beliefs are very useful for creating an understanding of individuals' cognitive process and health behavior, especially

individuals' self-regulation behavior. There are not many studies that help answer the questions as to how individuals respond to temptation that may have a negative health impact, what determines the response to the temptation, and what factors influence the activation of compensatory beliefs. Therefore, it is crucial to study these issues.

2.5 Conceptual Framework in the Study

The conceptual framework of this study was developed based on the compensatory health beliefs model of Rabiau et al. (2006). It starts with the concept that when individuals confront temptation that is a desire that may have a negative health impact, generally, they have positive health goals – having good health and having no illness or health conditions that may negatively affect daily activities. The interactions that contain conflict between the desire to behave in the way that may have a negative health impact and health goals result in motivational conflict. When the conflict occurs, they adopt a different conflict resolution strategy. Rabiau et al. (2006) divided conflict resolution strategies into three strategies: (1) Resisting desire, 2) Adapting risk perception/outcome expectancy, and (3) Activating compensatory health beliefs.

Rabiau et al. (2006) hypothesized that there are three major factors that determine the use of motivational conflict resolution strategies within individuals: 1) Degree of desirability of tempting behavior, 2) Person's health goals self-concordance, and 3) Self-efficacy.

When individuals select the third conflict resolution strategy – activation of compensatory health beliefs by planning to compensate with a new behavior that individuals believe will make up or help improve or maintain their health after they implement tempting behavior. However, individuals' implementation of compensatory behavior depends on the degree of their compensatory behavior intention. The factors influencing compensatory behavior intention consist of implementation intention and self-efficacy (Figure 1). However, implementation intention based on the compensatory health belief model presented by Rabiau et al. (2006) overlaps with compensatory behavior intention. As a result, in this study, these two variables were

not separated, and individuals' actual behavioral control was added to the model to help explain individuals' behavior more perfectly, as shown in Figure 2.

The conceptual framework has led to testing different hypotheses presented in the compensatory health belief model, which are described below: (Figure 3)

Rabiau et al. (2006) hypothesized that there are two major factors that determine the degree of individual's conflict: 1) Degree of desirability of tempting behavior and 2) Person's health goals self-concordance. Both factors determine individuals' use of motivational conflict resolution strategies.

Rabiau et al. (Rabiau et al, 2006) hypothesized that resisting desire tends to occurs when the desire level is not very high. On the contrary, adapting risk perception/outcome expectancy and activating compensatory health beliefs tend to be used when the impact of temping behavior has a high satisfactory level. This has led to Hypothesis 1.

Hypothesis 1: *Degree of desirability of tempting behavior influences the difference in the selection of motivational conflict resolution strategies. This hypothesis can be divided into sub-hypothesis as follows:*

Hypothesis 1.1 Degree of desirability of tempting behavior (DD) has a negative influence on resistance of the desire (RD)

Hypothesis 1.2 Degree of desirability of tempting behavior (DD) has a positive influence on adaptation to risk perception/outcome expectancy (AP)

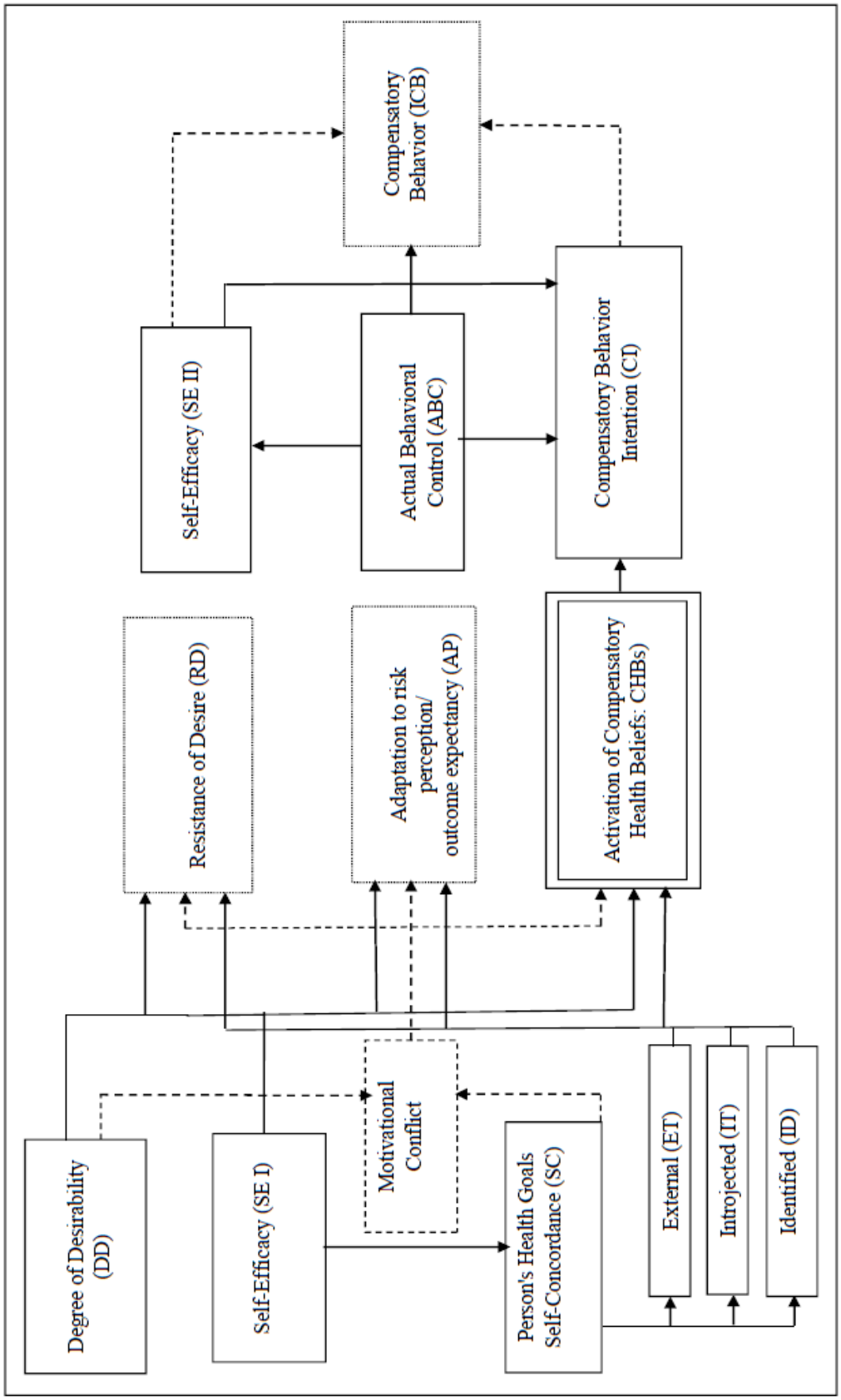

Figure 2.2 Conceptual Framework of the Study

Hypothesis 1.3 Degree of desirability of tempting behavior (DD) has a positive influence on activation of compensatory health beliefs (CHB)

Rabiau et al. (2006) divided person's health goals self-concordance into three groups:

(1) Individuals with external health goals self-concordance (ET) – Individuals implement motivational behavior because they want reward or want to escape from punishment. They are not able to restrain themselves from, and resist desire.

(2) Individuals with introjected health goals self-concordance (IT) – Individuals internalize motivation but do not accept the motivation as part of themselves. Behavior based on the internalization aims to avoid guilt and shame or to result in the feeling of value. Rabiau et al. (2006) regarded that individuals having the health goals usually activate compensatory health beliefs to reduce conflict in their mind because their motivation is so strong that it prevents them from changing their beliefs but is not strong enough to resist the temptation.

(3) Individuals with identified health goals self-concordance (ID) – Individuals value behavioral goals or conscious regulation. They accept behavior as something important to themselves. For example, individuals may realize that eating nutritious food or smoking no cigarettes has a positive health impact, so they develop the value as part of their identity. Rabiau et al. (2006) hypothesized that the individuals are more likely to be able to resist desirability of tempting behavior, and they are not likely to activate compensatory health beliefs to reduce conflict in their mind. There is no empirical study that confirms the hypothesis, which has led to Hypothesis 2.

Hypothesis 2: *Difference in health goals self-concordance patterns results in difference in the selection of motivational conflict resolution strategies. This hypothesis can be divided into sub-hypothesis as follows:*

Hypothesis 2.1 External health goals self-concordance (ET) has a positive influence on adaptation to risk perception/outcome expectancy (AP)

Hypothesis 2.2 Introjected health goals self-concordance (IT) has a positive influence on activation of compensatory health beliefs (CHB)

Hypothesis 2.3 Identified health goals self-concordance (ID) has a positive influence on resistance of desire

Rabiau et al. (2006) hypothesized that when motivational conflict occurs, self-efficacy concerning weight control will influences individual selection of motivational conflict resolution strategies. Individuals who perceive that they have capacity to control their weight will be able to resist the tempting behavior. Due to there is no empirical study that confirms the hypothesis, which has led to the following hypotheses.

Hypothesis 3: *Self-efficacy concerning weight control (SE I) results in difference in the selection of motivational conflict resolution strategies. This hypothesis can be divided into sub-hypothesis as follows:*

Hypothesis 3.1 Self-efficacy concerning weight control (SE I) has a positive influence on resistance of desire (RD)

Hypothesis 3.2 Self-efficacy concerning weight control (SE I) has a negative influence on adaptation to risk perception/outcome expectancy (AP)

Hypothesis 3.3 Self-efficacy concerning weight control (SE I) has a negative influence on activation of compensatory health beliefs (CHB)

Literature review revealed that self-efficacy is a key element to behavior (Bandura, 1977) and is a variable that has been widely studied in terms of general behavior and health-related behavior. Self-efficacy has been applied to promote many kinds of health behavior (Strecheret al., 1986; Hevey, Smith & McGee, 1998). Rabiau et al. (2006) hypothesized that self-efficacy yields a different impact in a different stage. Initially, individuals' self-efficacy affects their goal determination. However, there is no empirical study that confirms the hypothesis, which has led to the following hypotheses.

Hypothesis 4: *Self-efficacy concerning weight control (SE I) influences health goals self-concordance patterns. This hypothesis can be divided into sub-hypothesis as follows:*

Hypothesis 4.1 Self-efficacy concerning weight control (SE I) has a negative influence on external health goals self-concordance (ET)

Hypothesis 4.2 Self-efficacy concerning weight control (SE I) has a negative influence on introjected health goals self-concordance (IT)

Hypothesis 4.3 Self-efficacy concerning weight control (SE I) has a positive influence on identified health goals self-concordance (ID)

Rabiau et al. (2006) suggested that individuals' self-efficacy concerning implementing compensatory behavior has a relationship with compensatory behavior intention and implementation of compensatory behavior. When the level of individuals' self-efficacy is low, their chance to implement compensatory behavior deceases. In addition, the failure to implement compensatory behavior will reduce their self-efficacy because such failure reinforces their negative feelings. On the contrary, if individuals have high self-efficacy, their chance to implement compensatory behavior successfully will increase, and this behavior will result in their increased self-efficacy. This is a continuous cycle, which has led to Hypothesis 5.

Hypothesis 5: *Self-efficacy concerning implementing compensatory behavior (SE II) influences compensatory behavior intention (CI).*

Because this is not longitudinal research, its scope is compensatory behavior intention. Thus, additional hypotheses about a relationship between individuals' self-efficacy and their compensatory behavior were not formulated.

The conceptual basis of the implementation compensatory behavior in the compensatory health belief model of Rabiau et al. (2006) was partly based on the theory of planned behavior, presented by Ajzen (1991). The review of the theory of planned behavior revealed that the factors influencing behavior intention consist of 1) Attitudes toward behavior, 2) Subjective norms, and 3) Perceived behavioral control. In particular, perceived behavioral control, some structures of which overlap with those of self-efficacy, influences behavior intention and implementation of target behavior, which has led to the expansion of the compensatory health belief model, as follows:

The compensatory health belief model suggests that apart from self-efficacy, a key factor in individuals' compensatory behavior intention is implementation intention, which deals with the linkages between forecast situations and goal-oriented behavior, which leads to details of planning. However, in this study, no additional hypotheses about the relationship between compensatory behavior intention and implementation intention were formulated because the variables overlap, so actual behavioral control was added because individuals' actual behavioral control has a relationship with their perceived behavioral control and has direct influence on the implementation of target behavior to explain a relationship between actual behavioral control and compensatory behavior intention, as presented in the hypotheses:

Hypothesis 6: *Actual behavioral control (ABC) has a positive influence on compensatory behavior intention (CI).*

Hypothesis 7: *Actual behavioral control (ABC) has a positive influence on self-efficacy concerning implementing compensatory behavior (SE II)*

The review of literature on the activation of compensatory beliefs revealed that the compensatory beliefs model developed by Rabiau et al. (2006) has a negative relationship with weight control. That is, when activating compensatory beliefs, individuals are more likely to implement tempting behavior having a negative impact on weight control (Monson et al. 2008; Kronick & Knäuper, 2010; Kronick et al. 2011; Miquelon et al. 2012). However, there is no study to confirm if the compensatory beliefs model can be predicted and explained individuals' weight control in other contexts. For example, when individuals are not overweight and do not in the process of weight control. This has led to Hypotheses 8.

Hypothesis 8: The extended version of compensatory health beliefs model can only be used for explanation when individuals were overweight, perceived themselves overweight, and were in the process of weight control.

Remark

DD	=	Degree of desirability
SE I	=	Self-efficacy concerning weight control
SE II	=	Self-efficacy concerning implementing compensatory behavior
SC	=	Self-concordance
ID	=	Identified self-concordance
ET	=	External self-concordance
IT	=	Introjected self-concordance
RD	=	Resistance of desire
AP	=	Adaptation to risk perception/outcome expectancy
CHB	=	Compensatory health beliefs
CI	=	Compensatory behavior intention
ABC	=	Actual behavioral control
Hn	=	Hypothesis n

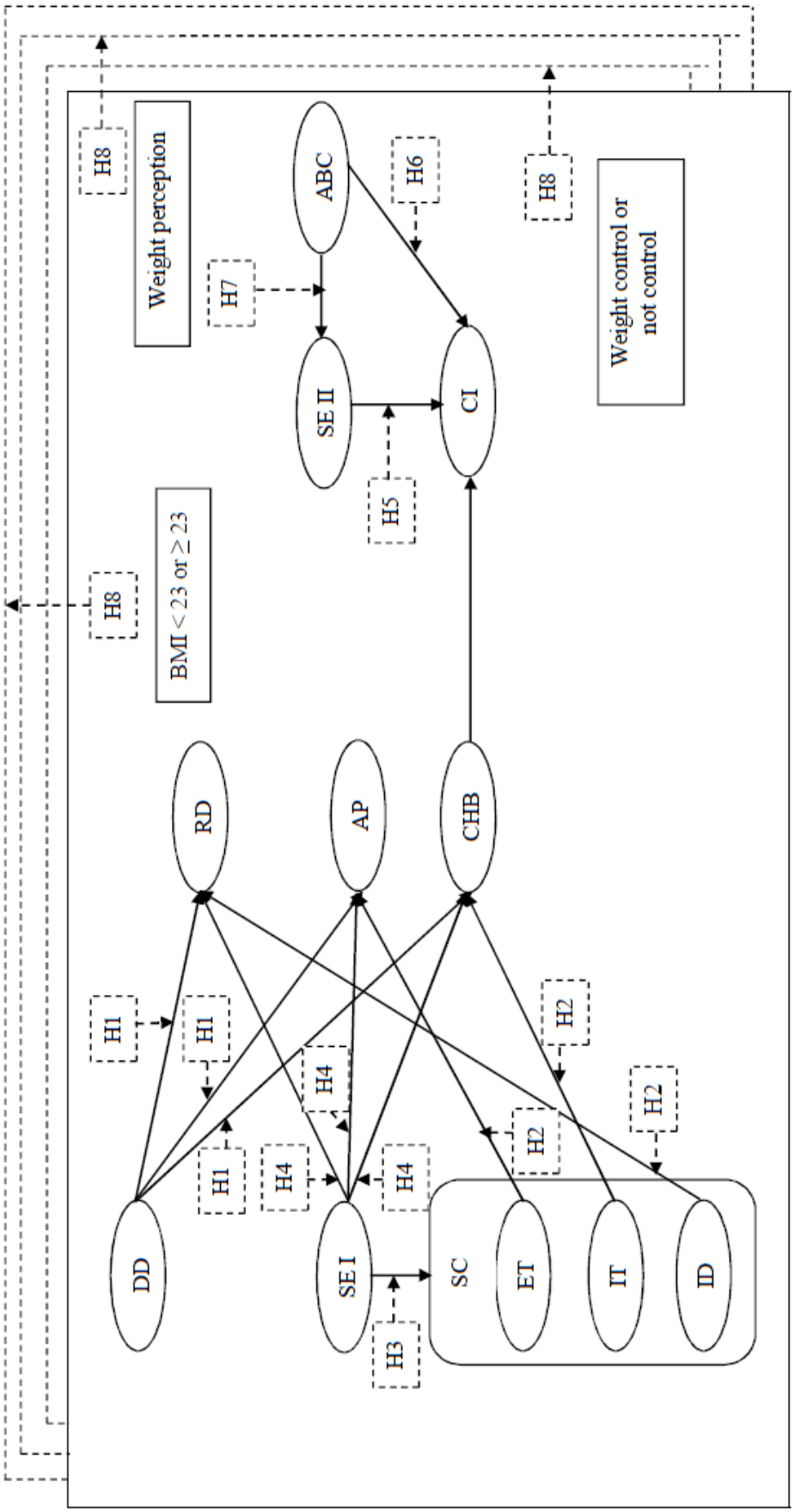

Figure 2.3 Conceptual Framework based on the Hypothesis 1-8

CHAPTER III
RESEARCH METHODOLOGY

The present study is a quantitative study with cross-sectional design. Its two main objectives were: (1) to test hypotheses presented in the compensatory health beliefs model by Rabiau et al. (2006) and (2) to present a model whose concept expands from the original compensatory health beliefs model. To achieve these objectives, the research population and samples, data collection tools, data collection method, and data analysis were defined. Details of the each of them are described below.

3.1 Population and Samples

The population in this study was adolescents aged 17-19 years and young adults aged 20-24 years who were undergraduate students. Attaching great importance to their appearance, people of these ages have great efforts to control their weight (McGuire et al. 2002; Nattariya Chaochumnum et al. (in Thai), 2005; *Somsak* Tinkhajee, and Poonsak Pumviset (in Thai), 2012). In this study, undergraduate students were selected as samples. With mature physical development, apart from paying attention to their shape, face, and personality (Susman and Rogol, 2004; Salekin and Averett, 2008), individuals at these ages also have their own thinking and freedom to behave in particular manners, including eating, exercise, and weight control (Moshman, 2005).

In this study, the multi-stage sampling strategy was employed, starting with purposive selection: undergraduate students at Mae Fah Luang University, Chiang Rai province, an autonomous university consisting of a diversity of students, in terms of birthplaces, religions, languages, and cultures. At Mae Fah Luang University, there were totally 10,516 undergraduate students (Division of Registrar, Mae Fah Luang University, 2013). In this study, the sample size calculation was conducted

based on the population frame, using the formula of Krejcie and Morgan (1970), as follows:

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

When

S = Sample size

N = Population size

X^2 = Chi-square, when the degree of freedom equals 1 and the reliability level represents 99% ($X^2 = 6.656$)

d^2 = Acceptable sampling deviation (0.05)

P = Proportion of the interesting characteristic of the population (if it is unknown, p = 0.5)

The above formula was adopted because the interesting characteristic in this study was weight control behavior of undergraduate students in Thailand. However, because there had been no studies on the prevalence of weight control among undergraduate students in Thailand, the proportion of the interesting characteristic of the population (p) equaled 0.05, as recommended by Krejcie and Morgan (1970). When values were put in Krejcie and Morgan's formula and the acceptable sampling deviation level was 0.05, it showed that:

$$S = \frac{6.656 \times 10{,}516 \times 0.5 \times 0.5}{(.05)^2 \times (10{,}516-1) + 6.656 \times 0.5 \times 0.5} = 624$$

Based on the formula above, the size of samples in this study was 624 at minimum. After Mae Fah Luang University was purposively sampled, cluster sampling was conducted to select students enrolling for general education courses, which were attended by students from different schools and class years. Purposive sampling was conducted for three courses, each of which consisted of 300 students or more: 1001106 Man and Society (N = 421), 1001141: General Psychology (N = 454), and 1001203: Creative Thinking and Inquiry Skills for Everyday Use (N = 355). As these three courses allowed students from all schools and years within the university to

enroll for on an equal basis, the opportunity and possibility for all students in the university to enroll for the courses should be considered to be equal. Students who enrolled for the course (s) were samples that were the representatives of all students at this university. Simple random sampling was conducted to randomly select general education courses to serve as samples. Two courses were randomly selected – General Psychology and Creative Thinking and Inquiry Skills for Everyday Use. The total number of students enrolling on the courses equaled 809. This study involved only Thai undergraduate students (excluding students from other countries enrolling for the courses). However, there were some students enrolling both courses, and there were some students who did not want to participate in the research. Thus, final sampling could be considered to be random or purposive sampling. The samples were Thai students who attended the classes on the days when data collection was conducted, had never completed the questionnaire, and consented to complete the questionnaire. Through random sampling, questionnaires from 795 students were received. As some of them were not complete, the total number of samples in this study was 788, representing 97.40 percent of all student samples (809).

3.2 Research instruments and Psychometric Properties

The research measurement was the questionnaires that the author had developed to collect quantitative data. The procedure of the research measurement development and examination is described below:

(1) Investigate relevant concepts, theories, and literature to understand the constructs of different variables that needed to be measured in the study;

(2) Develop questions in line with the constructs and send them to the thesis advisor, who had expertise in psychometric test to check their content validity;

(3) Improve the questions based on the advisors' recommendations and try it out with a group of individuals, whose demographic characteristics were similar to those of the samples in the study. They were students who enrolled for 1001302: Human Relations, a general education course offered to students from all programs and class years. The course was enrolled on by 62 students, but on the day when data collection was conducted, only 51 students attended the class and only 45

questionnaires were complete for data analysis, which represented 72.58 percent of student who enrolled for the course (62 students); and

(4) Analyze the quality of respective scales by means of confirmatory factor analysis and reliability analysis using Cronbach's alpha coefficient. The values are presented in the next section.

The research measurements developed and used for data collection were a self-administered questionnaire, which comprised eight parts, as follows:

Part 1: Personal data: The questions were close- and open-ended questions for collecting personal data. The questions were developed based on relevant literature, which consisted of four parts:

(1) Demographic characteristics: Gender, age, residence, money earned per month, extra money per month, the source of the extra money, etc.

(2) Health: Weight, height, medical problem, etc.

(3) Education: School and class year, etc.

(4) Weight control behavior: Weight perception, weight control status, weight control methods, etc.

Part 2: Degree of Desirability Scale: This scale was used for assessing the degree of desirability, e.g. food or physical inactivity that may have an adverse effect on weight control. It was a 10-level rating scale, ranging from 0-10 points (0 = No desire at all and 10 = Desire the most). There were 28 desirability-related statements. In this study, desirability was divided into two groups: eating and physical activities (using low energy). There were 15 items about desirability for eating (Items 1-14 and Item 25) and 13 items for desirability for physical activities (Items 15-28)

The reliability value was analyzed for the desirability scale with 45 undergraduate students who enrolled for 1001302: Human Relations – samples used for testing the scale quality. To examine the reliability value of this case, internal consistency was studied by identifying the Cronbach's alpha coefficient, which equaled 0.81, which showed a high reliability value.

After the collection of data from 788 samples, confirmatory factor analysis was conducted for the 28 items of the desirability scale in order to analyze the construct validity. Prior to confirmatory factor analysis, exploratory factor analysis was conducted to test the structure of the relationship among the variables. This aimed

to identify if the data was appropriate for factor analysis, based on the value of KMO value (Kaiser-Meyer-Olkin), which measures the suitability of sample data for component analysis (high KMO value should stay near 1), and the value of Bartlett's test of sphericity, which tests the relationship of different variables to identify if they have identity matrix. The value of Bartlett's test of sphericity has to be statistically signifinant. An analysis revealed that the KMO level equaled 0.86, which showed that the data that was analysed was very suitbale for component analysis, and the value of Barlett's test had a statistical signifinance level of (Sig.) = 0.00, which revealed that the desirability-related statements had a relationship with each other so that they were suitable for component analysis.

After confirmatory factor analysis for the 28 items of the desirability scale was completed, based on factor loading, the observable variables in Items 1-14 and 25 were found to have a relationship with the desirability for eating. Observable variables in Items 15-28 had a relationship with the desirability for physical inactivity. The factor loading of both sub-components had positive values, ranging from 0.17 to 0.66, and all had a statistical significance ($p < 0.05$) (as shown in Table 3.1). After the model was adjusted, the consistency of the degree of desirability scale consisted of Chi-square (X^2) = 519.29, (df) = 276, X^2/df = 1.88, GFI 0.95, AGFI = 0.93, NFI = 0.91, CFI = 0.95, and RMSEA = 0.03. This showed that the scale had construct validity; it had consistency with empirical data. In addition, the reliability value of the scale was measured by identifying Cronbach's alpha coefficient, which was found to increase to 0.86, which showed a high reliability value.

Table 3.1 The Confirmatory Factor Analysis (CFA) for the Degree of Desirability Scale

Obervable variables	Factor Loading		S.E.	C.R.	R^2
	Eating	Physical inactivity			
1	.46		1.00	***	.21
2	.40		.10	9.20	.16
3	.56		.11	11.03	.32
4	.48		.12	8.86	.23
5	.43		.11	8.32	.18
6	.55		.12	10.45	.30
7	.42		.12	8.40	.18
8	.32		.11	7.11	.10
9	.55		.14	9.37	.30
10	.52		.12	10.66	.28
11	.37		.11	8.28	.14
12	.47		13	9.12	.22
13	.28		.10	6.06	.08
14	.59		.14	9.92	.35
15		.30	1.00	***	.09
16		.47	.23	6.42	.22
17		.44	.19	6.30	.19
18		.54	.19	6.73	.29
19		.45	.19	6.40	.20
20		.56	.20	6.60	.32
21		.17	.11	3.81	.02
22		.44	.18	6.39	.19
23		.40	.11	6.60	.16

Table 3.1 The Confirmatory Factor Analysis (CFA) for the Degree of Desirability Scale (cont.)

Obervable variables	Factor Loading		S.E.	C.R.	R^2
	Eating	Physical inactivity			
24		.66	.25	6.23	.43
25	.55		.13	9.43	.31
26		.58	.21	6.86	.34
27		.64	.25	7.22	.41
28		.43	.20	6.37	.18

Part 3: Self-efficacy Scale This scale was utilized for evaluating individuals' self-confidence to identify if they had potentiality or ability to manage themselves to attain their self-set goals. This scale was developed based on the self-efficacy concept by Bandura (1991). The 10-level rating scale consisted of 0-10 points (0 = Not confident at all and 10 = Most confident). In this study, the self-efficacy scale was divided into two sub-scales – the scale of self-efficacy for weight control (Self-Efficacy I) and the scale of self-efficacy for compensatory behavior for weight control (Self-Efficacy II), which are described below:

(1) Weight Control Self-efficacy Scale – This scale was utilized for evaluating individual's self-confidence to identify if they were able to behave to control their weight so as to achieve their goal. This scale consisted of eight items. The weight control self-efficacy scale was divided into two aspects: self-efficacy for weight control by going on a diet (Items 1, 3, 5, 6 and 8) and self-efficacy for weight control by doing physical activities (Items 2, 4, and 7).

As for the reliability value of the weight control self-efficacy scale from 45 students, who were samples for testing the tool quality, the Cronbach's alpha coefficient equaled 0.83, which was a high reliability value.

After that, confirmatory factor analysis was conducted all the eight items for the scale among 788 samples. Exploratory factors were analyzed to test the structure of the relationship among the variables to identify if they were suitable for factor analysis, based on the value of KMO and Bartlett's test. The KMO value equaled 0.80 and the Barlett's test value had a statistical signifinance level of (Sig.) =

0.00. This manifested that the data analysed was suitable for factor analysis. After confirmatory factor analysis was conducted for the weight control self-efficacy scale, observable variables in Items 1, 3, 5, 6, and 8 were found to have a relationship with self-efficacy for weight control by going on a diet. Observable variables in Items 2, 4, and 7 were found to have a relationship with self-efficacy for weight control by doing physical activities. The factor loading of both sub-components had positive values, which ranged from 0.43 to 0.89, and all had a statistical significance level of 0.05 (See Table 3.2). After the model adjustment, the consistency of the weight control self-efficacy consisted of Chi-square (X^2) = 40.28, df = 14, X^2/df = 2.88, GFI = 0.98, AGFI = 0.96, NFI = 0.98, CFI = 0.98, and RMSEA = 0.04. This manifested that the scale had construct validity – it had consistency with empirical data.

A reexamination of the reliability of the scale of the self-efficacy for weight control conducted by identifying Cronbach's alpha coefficient (n = 788 students) showed that the Cronbach's alpha coefficient was 0.80, which was a high reliability level.

Table 3.2 The Confirmatory Factor Analysis (CFA) for the Weight Control Self-efficacy Scale

Observable variables	Weight of the components		S.E.	C.R.	R^2
	Going on a diet	Physical activities			
1	.59		1.00	***	.35
2		.72	1.00	***	.52
3	.75		.14	10.95	.57
4		.78	.05	22.64	.63
5	.43		.094	10.55	.18
6	.43		.082	10.46	.19
7		.86	.07	14.77	.74
8	.89		.13	12.22	.80

(2) Compensatory Behavior Self-efficacy Scale – This scale was utilized for evaluating individuals' self-confidence to determine if they were able to implement compensatory behavior to control their weight. This scale consisted of 12 statements items. The compensatory behavior self-efficacy scale was divided into two parts, as the same of the weight control self-efficacy scale– self-efficacy for compensatory behavior by going on a diet (Items 2, 4, 6, 7, 9, and 10) and self-efficacy for compensatory behavior by doing physical activities (Items 1, 3, 5, 8, 11, and 12). As for the scale reliability, the scale of compensatory behavior self-efficacy had Cronbach's alpha coefficient of 0.83, which was a high reliability value (n = 45 students).

When data on actual samples was collected (n = 788 students), confirmatory factor analysis was conducted for 12 items of the compensatory behavior self-efficacy scale. The analysis started with identifying if the data was suitable for factor analysis, based on the KMO and Bartlett's test values. It was found that both values were suitable for factor analysis (0.92, with a statistical signifinance level of (Sig.) = 0.00). Based on confirmatory factor analysis of the 12 items, observable variables in Items 1, 3, 5, 8, 11 and 12 had a relationship with self-efficacy for implementing compensatory behavior by going on a diet. Observable variables in Items 2, 4, 6, 7, 9 and 10 had a relationship with compensatory behavior self-efficacy by doing physical activities. Both sub-components had positive factor loading (0.54-0.85), and all have had a statistical significance level of 0.05 (as presented in Table 3.3). In addition, the consistency of the scale after the model adjustment consisted of Chi-square (X^2) = 68.30, df =27, X^2/df = 2.53, GFI = 0.99, AGFI = 0.96, NFI = 0.99, CFI = 0.99, and RMSEA = 0.04. This manifested that the scale had consistency with empirical data. It can be said that the compensatory behavior self-efficacy scale had construct validity. A reexamination of the reliability of the scale conducted by identifying Cronbach's alpha coefficient of 788 student samples revealed that the Cronbach's alpha coefficient of the scale increased to 0.91, which showed a very high reliability value.

Table 3.3 The Confirmatory Factor Analysis (CFA) for the Compensatory Behavior Self-efficacy Scale

Observable variables	Factor Loading		S.E.	C.R.	R^2
	Going on a diet	Physical activities			
1		.72	1.00	***	.52
2	.66		1.00	***	.43
3		.70	.050	20.80	.49
4	.54		.069	13.47	.29
5		.81	.050	24.20	.66
6	.66		.064	15.96	.44
7	.61		.056	16.27	.37
8		.85	.060	20.71	.73
9	.84		.072	16.99	.71
10	.82		.069	17.14	.67
11		.75	.056	17.98	.56
12		.75	.062	14.79	.56

Part 4: Health Goal Self-concordance Scale – This scale was utilized for evaluating health goal self-concordance that individuals had defined, the freedom to define their own goal, and the intrinsic motivation to behave to achieve the goal. The health goal self-concordance scale was formed based on the self-concordance concept, which was developed by Sheldon and Elliot (2001) by expanding the concept of the self-determination theory of Ryan and Deci (2000a). This scale consisted of 15 items, under which health goal self-concordance was divided into three types: (1) External health goal self-concordance (Items 1, 2, 3, 8, 11, and 14), (2) Introjected health goal self-concordance (Items 5, 6, 7, and 12), and (3) Identified health goal self-concordance (Items 4, 9, 10, 13, and 15).

Preliminarily, the reliability value of the health goal self-concordance scale (n = 45) was checked by identifying Cronbach's alpha coefficient. Overall, the Cronbach's alpha coefficient of the health goal self-concordance scale was 0.88. As for Cronbach's alpha coefficient in respective aspects, the reliability value of external

health goal self-concordance was α = 0.85; introjected health goal self-concordance was α = 0.68; and identified health goal self-concordance was α = 0.70.

An analysis was conducted to identify if the data was suitable for factor analysis before confirmatory factor analysis was conducted for the 15 items of the health goal self-concordance scale. The KMO value equaled 0.92 and Barlett's test value had a statistical signifinance level of (Sig.) = 0.00. This showed that the data analysed was suitable for factor analysis. After the confirmatory factor analysis was conducted for the 15 items, it was found that observable variables in Items 1, 2, 3, 8, 11, and 14 had a relationship with external health goal self-concordance. Observable variables in Items 4, 9, 10, 13 and 15 had a relationship with the identified health goal self-concordance. Observable variables in Items 5, 6, 7 and 12 had a relationship with the introjected health goal self-concordance. The factor loading of the three sub-components had positive values, ranging from 0.54 to 0.93, and all had a statistical significance level of 0.05 (shown in Table 3.4). In addition, the consistency of health goal self-concordance scale after the model adjustment consisted of Chi-square (X^2) = 130.66, df = 48, X^2/df = 2.72, GFI = 0.98, AGFI = 0.95, NFI = 0.98, CFI = 0.99 and RMSEA = 0.04. This manifested that the scale had construct validity and consistency with empirical data.

In addition, after the reliability value by finding Cronbach's alpha coefficient was reexamined for 788 student samples, it was found that Cronbach's alpha coefficient of health goal self-concordance scale increased to 0.91, which was a very high value. As for the reliability values of health goal self-concordance scale under respective dimensions, identified health goal self-concordance had the highest reliability value (α = 0.85), followed by introjected health goal self-concordance (α = 0.84) and external health goal self-concordance, which had the lowest reliability value (α = 0.83). However, the reliability value of the three sub-scales still was at a high level.

Table 3.4 The Confirmatory Factor Analysis (CFA) for the Health Goal Self Concordance Scale

Observable variables	Factor Loading			S.E.	C.R.	R^2
	External	Identified	Introjected			
1	.63			1.00	***	.39
2	.74			.084	14.81	.55
3	.76			.074	17.30	.57
4		.80		1.00	***	.64
5			.84	1.00	***	.70
6			.84	.05	16.63	.43
7			.66	.04	20.20	.56
8	.54			.077	12.15	.29
9		.66		.04	17.32	.43
10		.66		.06	17.13	.43
11	.84			.100	14.40	.70
12			.93	.07	21.44	.87
13		.77		.05	20.79	.56
14	.67			.088	14.12	.45
15		.84		.060	20.88	.70

Part 5: Response to motivational conflict – This part of the questionnaire was used for assessing methods that individuals used to reduce frustration arising from the conflict between desirability and health goal that they had defined. The questions measured the response to motivational conflict, which were developed based on the concept presented in the compensatory beliefs model by Rabiau et al. (2006). It presents that when individuals encounter the conflict between desirability and the health goal they have defined, they will feel frustrated and they will adopt a strategy to respond to the motivational conflict. Such strategies are divided to three strategies: (1) Resisting desire, (2) Adapting risk perception/outcome expectancy when individuals are influenced by their desirability or predict their expectation about the results that will occur again, and (3) Activating compensatory

health beliefs. Under circumstances, individuals adopt only one motivational conflict resolution strategy. When they adopt the first strategy, they do not adopt the second or third one. Accordingly, in this study, the questionnaire was developed to measure the response to motivational conflict through a scenario, which stimulated conflict between individuals' desirability and weight control goal. When the research participants read the scenario, they had to select one of the three motivational conflict resolution strategies.

Part 6: Compensatory Health Beliefs Scale – The scale was used to assess the individuals' beliefs when they justify their implementation or non-implementation of weight control behavior. Compensatory planning is new behavior that individuals believe will be able to compensate and help to result in their weight control in achieving the goal. The compensatory belief scale was developed based on the concept of compensatory health beliefs introduced by Rabiau et al. (2006). The compensatory belief scale is a 10-level rating scale, ranging from 0-10 points (0 = Completely disagree and 10 = Strongly agree). There were 10 items. The compensatory beliefs were divided two aspects: compensatory beliefs about eating (Items 1, 2, 3, 5, and 9) and compensatory beliefs about doing physical activities (Items 4, 6, 7, 8, and 10). Preliminarily, the reliability value of the compensatory belief scale was calculated from 45 student samples, were used for testing the tool. The Cronbach's alpha coefficient was found to be 0.87, which was a high reliability value.

After that, exploratory factors were analyzed to test the structure of the relationship among the variables based on the values of KMO and Bartlett's test of sphericity. Their values were standard values (KMO = 0.90 and Bartlett's test had statistical significance (Sig.) = 0.00). This means the statement items of this scale had a realtionship with one another and was suitable for factor analysis. As for the results of the confirmatory factor analysis (CFA) for the compensatory beliefs scale and 788 samples, it was found that observable variables in Items 1, 2, 3, 5, and 9 had a relationship with compensatory beliefs about eating, and observable variables in Items 4, 6, 7, 8, and 10 had a relationship with compensatory beliefs about doing physical activities. The factor loading of both sub-components ranged from 0.61 to 0.80, and all had a statistical significance level of 0.05 (Table 3.5). In addition, after the model was adjusted, the consistency of the compensatory beliefs scale consisted of Chi-square

(X^2) = 32.09, df = 12, X^2/df = 2.67, GFI = 0.99, AGFI = 0.96, NFI = 0.99, CFI = 0.99, and RMSEA = 0.04. This manifested that the scale had consistency with empirical data. In other words, the compensatory belief scale had construct validity.

In addition, the reliability value of the compensatory beliefs scale was recalculated using 788 samples. The analysis results showed that the Cronbach's alpha coefficient increased to 0.88, which was a high reliability level.

Table 3.5 The Confirmatory Factor Analysis (CFA) for the Compensatory Beliefs Scale

Observable variables	Factor Loading		S.E.	C.R.	R^2
	Going on a diet	Physical activities			
1	.62		1.00	***	.38
2	.67		.08	13.53	.45
3	.64		.08	14.03	.41
4		.76	1.00	***	.58
5	.80		.08	15.59	.63
6		.65	.06	14.13	.42
7		.66	.07	12.75	.44
8		.67	.06	14.35	.45
9	.61		.080	11.941	.37
10		.68	.049	16.963	.46

Part 7: Compensatory Behavior Intention Scale – The scale was used for assessing the attention, intention and attempt to implement compensatory behavior for weight control. This scale was a 10-level rating scale, ranging from 0-10 points (0 = No intention at all and 10 = Strongest intention). There were 10 questions. Testing the reliability value of the scale with 45 students revealed that Cronbach's alpha coefficient equaled 0.82. This revealed that the compensatory behavior intention scale had a high reliability value.

As in other scales, confirmatory factor analysis was conducted for the ten items of the compensatory behavior intention scale. Preliminarily, the data was

analyzed to identify if the data was suitable for factor analysis, based on the values of KMO and Bartlett's test of sphericity. It was found that the value of KMO equaled 0.91 and that of Barlett's test of sphericity had a statistical signifinance level of (Sig.) = 0.00. This showed that the statements of the compensatory behavior intention scale was suitable for factor analysis. As for the results of the confirmatory factor analysis (CFA) for the compensatory behavior intention scale with 788 samples. It was found that observable variables in Items 1-10 had a relationship with compensatory behavior intention. The factor loading of all observable variables ranged from 0.55 to 0.79, and all had a statistical significance level of 0.05 (See Table 3.6). In addition, the consistency of the compensatory behavior intention scale after the model was adjusted consisted of Chi-square (X^2) = 42.28, df = 18, X^2/df = 2.35, GFI = 0.99, AGFI = 0.97, NFI = 0.99, CFI = 0.99, and RMSEA = 0.04. This manifested that the compensatory behavior intention scale had construct validity or had consistency with empirical data.

Table 3.6 The Confirmatory Factor Analysis (CFA) for the Compensatory Behavior Intention Scale

Observable variables	**Factor Loading**	**S.E.**	**C.R.**	**R^2**
1	.68	1.00	***	.46
2	.64	.056	14.95	.41
3	.74	.058	17.09	.55
4	.65	.057	16.47	.43
5	.55	.053	13.96	.30
6	.79	.057	18.56	.63
7	.66	.054	16.48	.43
8	.72	.059	17.08	.52
9	.77	.054	20.03	.59
10	.68	.065	15.95	.46

After the confirmatory factor analysis, the reliability of the compensatory behavior intention scale was reanalyzed. The repeated analysis was conducted with 788 students. It was found that Cronbach's alpha coefficient of the compensatory behavior intention scale increased to 0.90, which was a very high reliability value.

Part 8: Actual Behavioral Control Scale – This scale was used for assessing compensatory behavior in the past. The scale was 10-level rating scale, ranging from 0-10 points (0 = Never implementing the compensatory behavior and 10 = Used to implement the compensatory behavior the most frequently), with 10 items. Actual behavioral control scale was divided into two aspects: actual behavioral control about eating (Items 1, 3, 4, 6, 8, 9, and 10) and actual behavioral control about doing physical activities (Items 2, 5, 7). The analysis of the scale reliability with 45 students, who were samples used for testing the tool in this study, revealed that the Cronbach's alpha coefficient of the scale was 0.92, which was a very high reliability value.

After the data collection was completed, confirmatory factor analysis was conducted for the ten items of the actual behavioral control scale. As for KMO and Bartlett's test of sphericity, which were used for testing the relationship structure among the variables, the value of KMO equaled 0.90 and that of Barlett's test had a statistical signifinance level of (Sig.) = 0.00. This showed that the statements of the scale were suitable for conducting factor analysis. When confirmatory factor analysis of the actual behavioral control scale was condcuted with 788 samples, observable variables in Items 1, 3, 4, 6, 8, 9, and 10 had a relationship with the actual behavioral control about going on a diet, and observable variables in Items 2, 5, and 7 had a relationship with the actual behavioral control about exercise. The factor loading of both sub-components ranged from 0.71 to 0.86, which were relatively high, and all had a statistical significance level of 0.05 (Table 3.7) In addition, the consistency of the actual behavioral control scale after the model was adjusted consisted of Chi-square (X^2) = 43.57, df = 19, X^2/df = 2.29, GFI = 0.99, AGFI = 0.97, NFI = 0.99, CFI = 0.99, and RMSEA = 0.04. This manifested that the scale had consistency with empirical data. It can be said that the actual behavioral control scale had construct validity. After the scale reliability was measured again among 788 students, who samples of the research, the Cronbach's alpha coefficient of the actual behavioral control scale equaled 0.91, which showed a high reliability level.

Table 3.7 The Confirmatory Factor Analysis (CFA) for the Actual Behavioral Control Scale

Observable variables	Factor Loading		S.E.	C.R.	R^2
	Going on a diet	Physical activities			
1	.74		1.00	***	.55
2		.82	1.00	***	.67
3	.71		.04	25.41	.50
4	.71		.05	17.94	.51
5		.83	.04	25.64	.68
6	.79		.05	19.77	.62
7		.86	.04	26.89	.74
8	.81		.05	20.56	.66
9	.74		.05	18.47	.55
10	.76		.051	19.72	.57

3.3 Data Collection

The data collection method in this study involved asking respective samples (students) to complete a self-administered questionnaire in classes. The author distributed the questionnaires to the samples and collected the data to gain data with the highest quality. Data collection was conducted in steps as follows:

(1) The author requested a self-introduction letter from the Department of Society and Health, the Faculty of Social Science and Humanities, Mahidol University and a project research certificate issued by the Research Ethics Committee, Mahidol University. This aimed to inform the objectives of the research and request permission for data collection at Mae Fah Luang University through the Dean of the School of Liberal Arts and instructors responsible for the randomly selected courses to collect data in classes.

(2) Upon receiving permission letters for data collection from the Dean of the School of Liberal Arts and instructors responsible for the randomly selected

courses, the author made an appointment with the instructors for data collection, which occurred after each class was finished.

(3) As for the procedure for data collection in each class, after self-introduction, the author asked foreign students and students who had completed the questionnaire in another class to raise their hand and asked them to leave the classroom. Only Thai students who had never completed the questionnaire in another class remained in the class. The author informed the students of the objectives and benefits of the research. In addition, the author told them that all the data in this research was overall data – no individual data would be publicized. When they consented to participate in the research, the author asked them to sign the inform consent form to participate in the research as evidence.

(4) The author asked the samples to complete the questionnaire. The author gave them the instruction for the questionnaire in details and allowed them to ask any questions. They were given 30 minutes to complete it.

(5) After that, the author checked the validity and completeness of the data.

3.4 Data Analysis and Statistics for Analysis

After the questionnaires were returned, the author checked the validity and completeness of the data in all questionnaires again and then encoded, processed and analyzed it. The details of the statistical analysis are described below:

The author conducted primary data analysis to learn about the demographic characteristics and other data about the samples, which included gender, class year, school, residence, extra money per month, medical problem, weight perception, weight control status, weight control in the past, weight control in the future, and weight control methods. Basic statistics consisted of frequency and percentage.

Concerning age, money earned per month, extra money per month, weight, height, and BMI, and the scores of the scales used for the analysis utilized frequency, percentage, mean, and standard deviation.

The exploratory factor analysis of variables serving as the scales in the study involved factor analysis, value of Kaiser-Meyer-Olkin (KMO), and value of Bartlett's test of sphericity. The statistic package for the social science (SPSS) was

employed, and confirmatory factor analysis for different variables used the AMOS 21 program.

In addition, correlation coefficients between variables were used to prevent multicollinearity of the variables using the Pearson's correlation, eigen value, tolerance value, and variance inflation value (VIF).

The analysis of the causal relationships of different variables in the compensatory health beliefs model was based on path analysis using the AMOS 21 program. The steps of the analysis are outlined below:

(1) Examine the prerequisites of the path analysis, e.g. normal distributions and correlation coefficients between variables to prevent multicollinearity.

(2) Analyze the consistency and adjust the model based on statistical values to support that the model was in line with empirical data, i.e. chi-Squares: X^2, root mean square residual (RMSR), root mean square error of approximation (RMSEA), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and comparative fit index.

3.5 Ethics in Research and Samples' Right Protection

This research was approved by the Human Research Ethics Committee of the Faculty of Social Sciences and Humanities Research, No. SSIRB 2014/346.0212. The author protected the samples' right from data collection until presentation of the research results. The samples' participation in the research was based on a voluntary basis. In order to make them feel safe, free, and comfortable, they were not forced to specify their name in the questionnaire, to keep the data confidential. The author informed them of the objectives of the research, expected benefits of the research, and research methodology in an introduction document. The author informed them of relevant details before collecting the data in class. In addition, the author informed the samples that they were allowed to terminate the cooperation and request the return of the data any time without giving reasons. The author presented the research results as the overall picture.

CHAPTER IV
RESULTS

The main objectives of this research were to test hypotheses presented in the CHBs model by Rabiau et al. (2006), which had not been empirically studied yet, and to expand this model under different conditions of weight control behavior among undergraduate students. The data analysis results in this Chapter are divided into ten parts – Part 1: Demographic and personal data of the research samples; Part 2: Degree of Desirability; Part 3: Weight control self-efficacy; Part 4: Health goals self-concordance; Part 5: Responses to motivational conflict; Part 6: Compensatory health beliefs and compensatory behavior self-efficacy; Part 7: Compensatory behavior intention and actual behavioral control; Part 8: Test of the CHBs model presented by Rabiau et al.; Part 9: Test of the expansion of the model; and Part 10: Test of the ability to explain weight control behavior of the expanded model with adjusted causal relationships among the variables under different situations. The analysis results for Part 1-7 are presented using descriptive statistics, such as frequency, percentage, mean, and standard deviation. The results of the analysis of the causal relationship of different variables in the original model and expanded model for Part 8-10 involved path analysis using the AMOS 21 Program.

4.1 Demographic and Personal Data of the Research Samples

This study collected data by mean of self-administered questionnaires completed in class by undergraduate students at Mae Fah Luang University. Questionnaires with complete data came from 788 students, representing 97.40 percent of all student samples (809). A data analysis indicated that two-thirds of the samples were female (77.7 percent) and more than half were 17-19 years old (58.6 percent), with an average age of 19.51 years (SD = 1.07 years). The lowest age of the samples was 17 years and the highest was 24 years. The ages were consistent with the year of

study at the university – 59.4 percent were freshmen; 17.9 percent, sophomores; 16.8 percent, juniors; and six percent, seniors. Over half of them were studying at a school in the fields of humanities and social sciences (66 percent), followed by health science and medicine (23.7 percent), as well as science and technology (10.3 percent).

With regard to their residences, over half of them stay in the university dormitories (63.6 percent), followed by off-campus private apartment (34.5 percent), with a minority staying at their own house (1.9 percent). As for monthly allowance, almost half of them received approximately 4,001-6,000 baht per month (45.4 percent), which was 6,511 baht on average (SD = 2,325.8 Baht), and 3.4 percent of them received over 10,000 baht per month. In addition, 15.1 percent of them received extra money, the sources of which were student loans for education (76.5 percent), followed by extra work (14.3 percent), and scholarships (9.2 percent) (Table 4.1).

Table 4.1 Frequencies and Percentage of Respondents Classified by Personal Characteristics

Personal characteristics		**Frequency**	**Percentage**
Gender (n = 788)	Male	176	22.3
	Female	612	77.7
Age (n = 788)	17-19	462	58.6
	17	1	0.1
	18	112	14.2
	19	349	44.3
	20-24	326	41.4
	20	170	21.5
	21	126	16.0
	22	25	3.2
	23	3	0.4
	24	2	0.3
Mean = 19.51, SD = 1.07, Min = 17, Max = 24.			

Table 4.1 Frequencies and Percentage of Respondents Classified by Personal Characteristics (cont.)

Personal characteristics		Frequency	Percentage
Year (n =788)	1	468	59.4
	2	141	17.9
	3	132	16.7
	4	47	6.0
School (n =788)	**Humanities and social science**	520	66.0
	Liberal Arts	99	12.6
	Management	205	26.0
	Law	89	11.3
	Sinology	114	14.5
	Social Innovation	13	1.6
	Health sciences and medicine	187	23.7
	Cosmetic Science	23	2.9
	Health Science	76	9.6
	Nursing	31	3.9
	Medicine	28	3.6
	Dentistry	29	3.7
	Science and technology	81	10.3
	Science	32	4.1
	Information Technology	33	4.2
	Agro-Industry	16	2.0
Types of	Own house	15	1.9
residence	University dormitory	501	63.6
(n = 788)	Off-campus apartment	272	34.5

Table 4.1 Frequencies and Percentage of Respondents Classified by Personal Characteristics (cont.)

Personal characteristics		Frequency	Percentage
Monthly allowance (baht) (n = 788)	2,000-4,000	116	14.7
	4,001-6,000	358	45.5
	6,001-8,000	179	22.7
	8,001-10,000	108	13.7
	10,001-12,000	14	1.8
	12,001-15,000	13	1.6
	Mean = 6,511.9, S.D. = 2325.8, Min = 2,000, Max = 15,000		
Extra money (baht) (n = 788)	No	669	84.9
	Yes	119	15.1
	Mean = 2,764.70, S.D. = 1502.3, Min = 500, Max = 12,000		
Sources of extra money (n = 119)	Student loan for education	91	76.5
	Scholarship	11	9.2
	Extra work	17	14.3

As for health conditions, most samples had no chronic disease (84.5 percent). Among those suffering from chronic diseases, more than half suffered from allergy (81.2 percent), followed by migraine (11.5 percent) and asthma (7.3 percent).

In terms of weight, approximately half of the male samples weighed over 64 kg (51.1 percent) – their average weight was 68.06 kg (S.D. = 15.04), the highest weight was 126 kg, and the lowest weight was 47 kg. As for their female counterparts, more than half of them (68.1 percent) weighed 41-57 kg weight and 29 percent of them weighed over 57 kg, which was higher than the standard weight of Thai women aged 17-25 years (Department of Health, Ministry of Public Health, Thailand, 2000). As for height, the average height among the male samples was 173.45 cm (S.D. = 6.11 cm), the lowest height was 155 cm, and the highest height was 195 cm. The height of nearly three-quarters of the male samples (71.6 percent) was within the standard height range of Thai men aged 17-25 years – 160 to 177 cm (Department of Health, Ministry of Public Health, Thailand, 2000). The average height of the female samples

was 160.20 (S.D. = 5.74 cm), which was approximately 13 cm lower than that of their male counterparts. Almost three-quarters of the female samples (70.8 percent) were 150-164 cm high, which were within the standard height range of Thai women aged 17-25 years (Department of Health, Ministry of Public Health, Thailand, 2000).

Based on the samples' weight and height data, the body mass index (BMI) value of over half of all the samples (58.5 and 68.3 percent, male and female respectively) was within the normal BMI values, between 18.51 and 22.99 (WHO, 2000b). The percentage of male samples whose BMI was over the normal BMI values (over 22.99) was higher than that of their female counterparts (31.3 and 21.7 percent, respectively) (Table 4.2).

Table 4.2 Frequencies and Percentage of Respondents Classified by Personal Health Characteristics

Personal characteristics	Details	Frequency	Percentage
Weight (kg)	Male (n = 176)		
	≤ 46	0	0
	47-64	86	48.9
	> 64	90	51.1
	Mean = 68.06, S.D. = 15.04, Min = 47, Max = 126		
	Female (n = 612)		
	≤ 40	18	2.9
	41-57	417	68.1
	> 57	177	29.0
	Mean = 54.44, S.D. = 11.39, Min = 34, Max = 130		

Table 4.2 Frequencies and Percentage of Respondents Classified by Personal Health Characteristics (cont.)

Personal characteristics	Details	Frequency	Percentage
Height (cm)	Male (n = 176)		
	≤ 160	6	3.4
	160-177	126	71.6
	> 177	44	25
	Mean = 173.45, S.D. = 6.11, Min = 155, Max = 195		
	Female		
	≤ 150	30	4.9
	150-164	433	70.8
	> 164	149	24.3
	Mean = 160.20, S.D. = 5.74, Min = 133, Max = 180		
Body mass index (BMI)	Male (n = 176)		
	≤ 18.50	26	14.8
	18.51-22.99	92	52.2
	> 22.99	58	33.0
Mean = 22.60, S.D. = 4.81, Min = 15.35, Max = 40.77			
	Female		
	≤ 18.50	148	24.2
	18.51-22.99	329	53.8
	> 22.99	135	22.0
	Mean = 21.18, S.D. = 4.10, Min = 14.17, Max = 47.75		

In terms of weight perception, an analysis revealed that 38.1 percent of the male samples perceived that their weight was (slightly or much) higher than the standard weight range – the percentage was similar to that of the ones whose BMI value was above the standard BMI values (33.3 percent); 28.4 percent of the male samples perceived that their weight was lower than the standard weight range – the percentage was higher than that of the ones whose BMI value was lower than the

standard BMI values (10.2 percent). This indicated that the male samples were more likely to recognize their weight as being lower than their actual weight. As for their female counterparts, 14.9 percent of them recognized that their weight was (slightly or much) lower than the standard weight value – the percentage was lower than that of the ones whose BMI value was below the standard BMI values (17 percent); more than half of the female samples (57.8 percent) perceived that their weight was slightly or much higher than the standard height range – the percentage was over twice as much as that of the ones whose BMI value was higher the standard BMI values (21.7 percent). The data indicated that the female samples were more likely to recognize their weight as being higher than their actual weight. In other words, they perceived that they were fat (Table 4.3).

In terms of weight control, almost half of the samples reported that they were controlling their weight (44.8 percent). There were more female samples that were controlling weight than their male counterparts (48.2 percent and 16.4 percent, respectively). In addition, over half of the samples (59.3 percent) had controlled their weight. There were more female samples than their male counterparts that had controlled their weight (62.6 percent and 47.7 percent respectively). An interesting finding was that many of the samples expected to control their weight in the future (83.6 percent). There were more female samples than their male counterparts that expected to control their weight in the future (86.8 percent and 72.7 percent, respectively) (Table 4.3).

Their top three weigh control methods consisted of exercising (84.6 percent), being on a diet (percentage 72.8), and skipping some meals (57.6 percent). Both male and female samples controlled their weight by exercising (84.5 percent and 84.6 percent, respectively). There were more male samples than female ones who were on a diet (77.4 percent and 71.8 percent, respectively). There were more female samples than male ones who skipped some meals (61.1 percent and 41.7 percent, respectively). Other weight control methods consisted of dietary supplements, diet pills, fat-burning devices, and putting fingers down the throat to vomit for weight control (16.1, 8.6, 0.4, and 0.6 percent, respectively), which were mostly used by female samples (Table 4.3).

Table 4.3 Frequencies and Percentage of Respondents Classified by Weight Perception, Past, Present and Future Weight Control, and Weight Control Methods

Personal characteristics	Description	Male		Female	
		Frequency	Percentage	Frequency	Percentage
Weight perception	Much lower than the standard value.	16	9.1	25	4.1
	Slightly lower than the standard value.	34	19.3	66	10.8
	Balanced.	59	33.5	167	27.3
	Slightly higher than the standard value.	39	22.2	238	38.8
	Much higher than the standard value.	28	15.9	116	19.0
Present weight control	I am controlling my weight.	58	32.9	295	48.2
	I am not controlling my weight.	118	67.1	317	51.8
Past weight control	I controlled my weight.	84	47.7	383	62.6
	I never controlled my weight.	92	52.3	229	37.4
Future weight control	I plan to control my weight in the future.	128	72.7	531	86.8
	I never plan to control my weight in the future.	48	27.3	81	13.2
Weight control methods*	Being on a diet	65	77.4	275	71.8
	Exercising	71	84.5	324	84.6
	Skipping some meals	35	41.7	234	61.1
	Taking dietary supplements	10	11.9	65	17.0
	Taking diet pills	4	4.8	36	9.4
	Using fat-burning devices	0	0	2	0.5
	Putting fingers down the throat to vomit	0	0	3	0.8

* Calculated based on the Frequency of students who controlled their weight in the past (n = 467) because more than one method was allowed.

4.2 Degree of Desirability

This part discusses the analysis of desirability data collected using the desirability scale. Desire was divided into two groups – desire for eating and desire for doing physical activities. The desirability scale is a rating scale consisting of 10 levels: 0-10 points (0 = Not desire at all and 10 = Desire the most). There were 28 statements, 15 of which were about desire for eating and 13 were concerned about desire for doing physical activities. The lowest and highest values of the scale of desirability for eating were between 0 (0 x 15) and 150 (10 x 15). The lowest and highest values of the scale of desirability for doing physical activities were between 0 (0 x 13) and 130 (10 x 13). The lowest and highest values of the scale of the overall degree of desirability were between 0 (0 x 28) and 280 (10 x 28).

An analysis of desirability revealed that the samples' highest score was 265 and lowest score was 28. The average score was 151.79 and the standard deviation was 38.77. The data distribution was skewed slightly to the left (with a skewness value of -0.11) and was slightly flatter than a normal curve (with a kurtosis value of -0.08). This showed that almost all the samples evaluated the degree of desirability as being high, so the answers stayed very close to each other in high scores. However, the skewness and kurtosis values of the desirability scale were at acceptable levels. In general, the skewness value should not be over 3, and the kurtosis value should not be over 10 (Poonpong Suksawang, 2013). This demonstrated that the distribution of data of variables was close to a normal curve, so the data obtained could be further analyzed. Based on data distribution characterized by a normal curve, the desirability scores were divided, with group-based criteria using the mean ($\bar{X}$ = 151.79) and standard deviation (S.D. = 38.77), into three groups – low scores (28-113.01), representing 16.6 percent of the samples; high scores (190.57 or more), representing 15.3 percent; and medium scores (113.02-190.56), representing 68.1 percent (Table 4.4).

Table 4.4 Frequencies and Percentage of the Degree of Desirability (n = 788)

Degree of desirability	Frequency	Percentage
Low scores (28-113.01 points)	131	16.6
Medium scores (113.02-190.56 points)	537	68.1
High scores (190.57 points or more)	120	15.3
$\bar{X}$ = 151.79, S.D. = 38.77, Min = 28, Max = 265		

Because the Frequency of statements for respective aspects of desirability was not equal, the means of desirability scores of respective aspects needed to be adjusted to be similar to one another – the mean of each aspect was divided by the Frequency of statement items of that aspect. For example, there were 15 statement items for desirability for eating, so the average score, 71.08 (S.D. = 19.78) was divided by 15. An analysis revealed that the average scores divided by the Frequency of desirability-related statement items of each aspect were different. That is, the samples' average score of desirability for doing low-energy consuming physical activities ($\bar{X}$ = 6.21, S.D. = 1.52) was higher than that of desirability for eating ($\bar{X}$ = 4.74, S.D. = 1.66) (Table 4.5). This manifested that the samples had desirability for doing low-energy consuming physical activities, such as surfing the Internet, watching television, playing games, or taking a lift instead of stairs, rather than eating food they wanted.

Table 4.5 Means Scores and Standard Deviations of the Degree of Desirability (n= 788)

Desirability	Number of items	Range of scores	Normal scores		Scores divided by the Number of items	
			$\bar{X}$	S.D.	$\bar{X}$	S.D.
Eating	15	0-150	71.08	24.95	4.74	1.66
Physical activities	13	0-130	80.71	19.78	6.21	1.52
Total	28	0-280	151.79	38.77	5.42	1.38

In addition, to provide details of the samples' desirability for eating, each aspect of desirability was analyzed based on the data of each statement item. As for desirability for eating, the samples desired to eat sweets or snacks, such as ice cream, cake with favorite flavor, beverages with whipping cream such as chocolate, tea, and coffee ($\overline{X}$ = 5.37, S.D. = 3.23), as well as food popularly eaten in a group, such as buffet grilled meat ($\overline{X}$ = 6.31, S.D. = 3.02). Their degree of desirability for eating ice cream was the highest ($\overline{X}$ = 6.72, S.D. = 2.92), followed by cakes with their favorite flavor ($\overline{X}$ = 6.69, S.D. = 2.86). It was noted that the degree of desirability for drinking beer was the lowest ($\overline{X}$ = 1.87, S.D. = 2.96) (Table 4.6). It was also noted that their desirability for foreign foods, such as pizza and crepe ($\overline{X}$ = 5.10 and 4.68, respectively) was higher than that for a single dish or Thai sweet, e.g. stewed pork hocks on rice ($\overline{X}$ = 3.66, S.D. = 2.90), boiled chicken with oily rice ($\overline{X}$ = 4.67, S.D. = 2.86), sticky rice with ripe mango ($\overline{X}$ = 4.97, S.D. = 3.24), and sticky rice with durian ($\overline{X}$ = 2.88, S.D. = 3.30).

Table 4.6 Means Scores and Standard Deviations of the Degree of Desirability Classified by Items about Eating (n =788)

Desire for eating	$\overline{X}$	**S.D.**
Cake with favorite flavor	6.69	2.86
Pizza	5.10	3.14
Crepe	4.68	2.97
Stewed pork hocks on rice	3.66	2.90
Boiled chicken with oily rice	4.67	2.86
Ice cream	6.72	2.92
Sticky rice with ripe mango	4.97	3.24
Sticky rice with durian	2.88	3.30
Sugary soda	3.75	3.18
Beverages with whipping cream, such as chocolate, tea, and coffee	5.37	3.23
Smoothies	5.17	3.09
Milked tea with black pearls	4.97	3.18
Beer	1.87	2.96
Buffet grilled meat	6.31	3.02
Snacks	4.31	2.95

The mean of desirability for doing low-energy consuming physical activities was relatively high ($\bar{X}$ = 4.70-8.59). Most of the samples would like to do activities related to communication via social networks and other media the most, such as the surfing the Internet, watching television, or listening to music at home during holidays or chatting with friends through Line ($\bar{X}$ = 6.55, S.D. = 2.73). The samples desired to surf the Internet ($\bar{X}$ = 8.59, S.D. = 1.87), followed by watching television or listening to music at home during holidays ($\bar{X}$ = 7.57, S.D. = 2.59). In addition, they desired to park their vehicle as close as possible to the destination to shorten their walk ($\bar{X}$ = 6.94, S.D. = 2.63), to sit on vehicles for long-distance travel ($\bar{X}$ = 5.99, S.D. = 2.96), as well as to socialize with friends in the evening and at night and go to bed late at night and wake up late in the morning (= 6.30, SD = 3.12) at a high level (Table 4.7).

Table 4.7 Means Scores and Standard Deviations of the Degree of Desirability Classified by Items about Doing Physical Activities (n =788)

Desire for low-energy consuming physical activities	$\bar{X}$	**S.D.**
Playing computer games	5.08	5.59
Doing no activities	5.35	3.37
Sitting on vehicles for long-distance travel	5.99	2.96
Parking a vehicle as close as possible to the destination	6.94	2.63
Taking a lift when going up to floor 3 or above	5.86	3.01
Watching television or listening to music at home	7.57	2.59
Reading at home	6.17	2.66
Chatting with friends via Line	6.55	2.73
Surfing the Internet	8.59	1.87
Socializing with friends in the evening	6.30	2.73
Doing low-energy consuming activities	4.70	2.70
Going to bed late at night and waking up late in the morning	6.30	3.12
Sleeping during daytime	5.32	3.23

4.3 Weight Control Self-efficacy

This study involved collection of data on weight control self-efficacy using the weight control self-efficacy scale, which consisted of eight statement items. The weight control self-efficacy was divided into two aspects – self-efficacy for controlling weight by being on a diet (5 items) and self-efficacy for controlling weight by doing physical activities (3 items).

As for the samples' overall weight control self-efficacy, their highest score was 80, lowest score was 1 point, and average score was 44.33, with a standard deviation of 14.82. The collected data had a skewness value of -0.15 and kurtosis value of -0.19. As the data distribution was characterized by a normal curve, the weight control self-efficacy scores were divided, using the mean ($\bar{X}$ = 44.33) and standard deviation (S.D. = 14.82), into three groups – low scores (1-29.50), representing 16.1 percent; high scores (59.16 or more), representing 15.9 percent; and medium scores (29.51-59.15), representing 68 percent (Table 4.8).

Table 4.8 Frequencies and Percentage of the Weight Control Self-efficacy (n = 788)

Weight control self-efficacy	Frequency	Percentage
Low scores (1-29.50 points)	127	16.1
Medium scores (29.51-59.15 points)	536	68.0
High scores (59.16 points or more)	125	15.9
$\bar{X}$ = 44.33, S.D. = 14.82, Min = 1, Max = 80		

After the weight control self-efficacy means of respective aspects were adjusted by being divided by the Frequency of statement items of each aspect, it was found that the means of respective aspects were different. The mean of self-efficacy for controlling weight by being on a diet ($\bar{X}$ = 5.58, S.D. = 1.94) was higher than the mean of self-efficacy for controlling weight by doing physical activities ($\bar{X}$ = 5.47, S.D. = 2.64) (Table 4.9). This demonstrated that the samples perceived that they could control their weight by being on a diet, e.g. refrain from eating some kinds of food or skipping some meals or controlling the amount of food rather that by doing high-energy consuming activities, e.g. exercise.

Table 4.9 Means Scores and Standard Deviations Classified by Weight Control Self-efficacy Scores in Respective Dimensions (n =788)

Weight control self-efficacy	Number of items	Range of scores	Normal scores		Scores divided by the Number of items	
			$\bar{X}$	S.D.	$\bar{X}$	S.D.
Eating	5	0-50	27.90	16.41	5.58	1.94
Physical activities	3	0-30	16.41	7.93	5.47	2.64
Total	8	0-80	44.33	14.82	5.54	1.85

In addition, the weight control self-efficacy was analyzed based on data of individual items under each aspect. The analysis revealed that the samples' average score of weight control self-efficacy was not very high ($\bar{X}$ = 5.27-6.12). The samples perceived that they could refrain from eating after 9 pm the most ($\bar{X}$ = 6.12, S.D. = 3.19). The average score was lower for refraining from eating food rich in starch and fat ($\bar{X}$ = 5.40, S.D. = 2.33), and the lowest average score went to refraining from eating their favorite sweets ($\bar{X}$ = 5.27, S.D. = 2.81) (Table 4.10).

Table 4.10 Means Scores and Standard Deviations of the Weight Control Self-efficacy Classified by Items about Being on a Diet (n =788)

Self-efficacy for weight control by being on a diet	Mean	S.D.
Able to refrain from eating food rich in starch and fat.	5.40	2.33
Able to refrain from eating favorite sweets.	5.27	2.81
Able to refrain from eating after 9 pm.	6.12	3.19
Able to refrain from eating something between meals.	5.57	2.74
Able to refrain from eating a lot of food rich in starch and fat.	5.57	2.50

As for self-efficacy for controlling weight by physical activities, the samples reported that they could exercise at least 30 minutes a day ($\bar{X}$ = 5.83, S.D. = 3.24) the most. However, their weight control self-efficacy significantly reduced for controlling themselves to exercise regularly and continually for three months ($\bar{X}$ = 4.90, S.D. = 2.79). This indicated that their weight control self-efficacy was not very

high for implementing behavior that consumes a lot of energy and time for self-control (Table 4.11).

Table 4.11 Means Scores and Standard Deviations of the Weight Control Self-efficacy Classified by Items about Doing Physical Activities (n =788)

Self-efficacy for weight control by doing physical activities	Mean	S.D.
Able to exercise at least 30 minutes a day.	5.83	3.24
Able to control myself to exercise at least 3 days a week.	5.68	2.99
Able to control myself to exercise regularly and continually for three months.	4.90	2.79

4.4 Health Goals Self-concordance

The study involved collecting data on health goals self-concordance in weight control using the health goals self-concordance scale consisting of 15 statement items. The health goals self-concordance was divided into three types: (1) External self-concordance, with six statement items, (2) Introjected self-concordance, with four statement items, and (3) Identified self-concordance, with five statement items. Although the variables were measured as traits, the conceptual basis of health goals self-concordance was developed based on the self-determination theory (Ryan and Deci, 2000a), which believes that individuals undergo different levels of motivation – non-motivation, extrinsic motivation, and intrinsic motivation. Any actions of individuals result from their self-determination based on their motivational levels. Thus, when the concept is applied to the concept of health goals self-concordance, it is regarded that individuals undergo only one level or one type of health goals self-concordance. In this study, types of individuals' health goals self-concordance were considered based on the highest score of their characteristics. A data analysis revealed that almost half of the samples had identified self-concordance (46.07 percent), followed by external self-concordance (40.86 percent) and introjected self-concordance (13.07 percent) (Table 4.12). This indicated that some of them had a goal to control their weight because of their true awareness of the value and benefits of

weight control. However, some wanted to control their weight because of extrinsic motivation with similar Frequency. There was a minority of them who wanted to control their weight because they wanted to reduce negative feelings and create positive value or feelings to themselves.

Table 4.12 Frequencies and Percentage of Respondents Classified by Health Goals Self-concordance (n =788)

Health goals self-concordance	Frequency	Percentage
External self-concordance	322	40.86
Introjected self-concordance	103	13.07
Identified self-concordance	363	46.07

After that, the average scores of respective items of respective types of health goals self-concordance were calculated. The data analysis demonstrated that the average scores of external self-concordance ranged from 4.25 to 6.19 points, which indicated that their external self-concordance was not very high. However, they wanted to control their weight because they did not want people around them to blame them for not controlling weight the most ($\bar{X}$ = 6.19, S.D. = 3.27), followed by because they did not want people around them to feel bad about them for not controlling their weight ($\bar{X}$ = 6.06, S.D. = 3.31) and because their friends suggested that they should reduce their weight ($\bar{X}$ = 4.25, S.D. = 3.35) (Table 4.13).

Table 4.13 Means Scores and Standard Deviations of the External Self-Concordance (n = 788)

External self-concordance	Mean	S.D.
I want people around me to admire me.	5.86	3.10
I do not want people around me to feel disappointed by me.	5.63	3.23
I do not want people around me to blame me for my weight.	6.19	3.27
My friends suggest that I should lose my weight.	4.25	3.35
I do not want people around me to feel bad about me for not controlling my weight.	6.06	3.31
I do not want people to look at me in a negative way.	5.21	3.58

As for introjected self-concordance, its average score ranged from 4.91-5.72 points, which indicated that their introjected self-concordance in weight control was relatively low. The samples had motivation for controlling weight because weight control helped them to feel more self-confident the most ($\bar{X}$ = 5.72, S.D. = 2.59). In addition, they wanted to control their weight because it made them feel more proud of themselves ($\bar{X}$ = 4.94, S.D. = 2.60), because it made them feel that they had more value ($\bar{X}$ = 4.91, S.D. = 2.29), and because having a good body shape made them feel good about themselves ($\bar{X}$ = 4.83, S.D. = 2.65) (Table 4.14).

Table 4.14 Means Scores and Standard Deviations of the Introjected Self Concordance (n = 788)

Introjected self-concordance	Mean	S.D.
If I succeed in controlling weight, I will feel more proud of myself.	4.94	2.60
If I succeed in controlling weight, I will feel better about myself.	4.83	2.65
Controlling weight helps me to feel more self-confident.	5.72	2.59
If I succeed in controlling weight, I will feel I have more value.	4.91	2.29

The average score of identified self-concordance ranged from 6.35 to 8.32 points, which manifested that the samples' identified self-concordance in weight control was relatively high. They controlled their weight because they viewed that weight control improved their health ($\bar{X}$ = 8.32, S.D. = 2.29), followed by because weight control proved their self-discipline ($\bar{X}$ = 7.20, S.D. = 2.93), and because weight control was a challenge (intrinsic motivation) ($\bar{X}$ = 6.35, S.D. = 3.06). An interesting finding was that the average scores of identified self-concordance were higher than those of external self-concordance and introjected self-concordance in all items. This indicated that they wanted to control their weight because they realized the benefits and value of weight control rather than because they wanted to get reward, avoid punishment, or reduce bad feelings about themselves (Table 4.15).

Table 4.15 Means Scores and Standard Deviations of the Identified Self-Concordance (n = 788)

Identified self-concordance	Mean	S.D.
Weight control allows me to practice controlling myself more.	7.05	2.60
Weight control helps to improve my heath.	8.32	2.29
Weight control is a challenge.	6.35	3.06
Weight control proves my self-discipline.	7.20	2.93
Weight control makes my goal of life become clearer.	6.79	3.12

4.5 Response to Motivational Conflict

This study also involved measuring response to motivational conflict, which stemmed from the disagreement between desirability and weight control, their health goal. The samples had to answer a question to identify their response to motivational conflict. The question was a scenario question that stimulated conflict between the motivation to control weight and desirability. This part aimed to identify how the samples would respond to a desire that resulted in them failing to achieve their goal to control their weight. To measure this variable, the samples had to read the scenario question and select only one of the three conflict resolution strategies: (1) Resisting desire, (2) Adapting risk perception/outcome expectancy, and (3) Activating compensatory health beliefs.

The analysis results revealed that almost half of the samples resolved motivational conflict by resisting desire (47.1 percent), followed by activating compensatory health beliefs (35.3 percent) and adapting risk perception/outcome expectancy (17.6 percent) (Table 4.16).

Table 4.16 Frequencies and Percentage of Respondents Classified by Conflict Resolution Strategies (n =788)

Response to motivational conflict	Frequency	Percentage
Resisting desire	371	47.1
Adapting risk perception/outcome expectancy	139	17.6
Activating compensatory health beliefs	278	35.3

Moreover, more than half of samples who perceived that their weight lower than standard and had BMI value lower than standard range chose to response to motivational conflict by resisting desire (51.1 and 51.7 percent respectively). In addition, samples who perceived that their weight higher than standard had a tendency to activate CHBs as the highest level (38.7 percent) and samples who had BMI value at a standard range chose to activate CHBs as the highest level (38 percent) (Table 4.17).

Table 4.17 Frequencies and Percentage of Responses to Motivational Conflict Classified by Weight Perception, BMI and Weight Control Status

Personal Characteristics	Description	Resisting Desire		Adapting Risk/Goal		Activating CHBs	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Weigh perception	Lower than standard	72	51.1	23	16.3	46	32.6
	Balance	110	48.7	46	20.4	70	31
	Higher than standard	188	44.7	70	16.6	163	38.7
BMI	Lower than standard	90	51.7	36	20.7	48	27.6
	Standard	190	45.1	71	16.9	160	38.0
	Higher than standard	90	46.6	32	16.6	71	36.8
Weight Control Status	Controlling weight	168	47.6	52	14.7	133	37.7
	Not controlling weight	202	46.4	87	20.0	146	33.6

4.6 Compensatory Health Beliefs and Compensatory Behavior Self efficacy

(1) Compensatory Health Beliefs

Compensatory health beliefs in this study were measured using the weight control specific compensatory beliefs scale, which was a rating scale consisting of ten levels, from 0-10 points (0 = Completely disagree and 10 = Strongly agree). There were 10 statement items under two aspects: compensatory beliefs about eating and compensatory beliefs about doing physical activities, each consisting of five statement items.

An analysis of the overall compensatory beliefs manifested that the samples' highest score was 100 and lowest one was 0. The average score of the overall compensatory beliefs was 45.41 and the standard deviation was 18.83. This indicated that their overall compensatory beliefs were relatively low. On the other hand, their logical thinking about compensation was relatively low. The data distribution had a skewness value of 0.04 and kurtosis value of -0.18, which indicated that data distribution was close to the normal curve. The scores of compensatory beliefs were therefore divided using the mean ($\bar{X}$ = 45.41) and standard deviation (S.D. = 18.83) into three groups: low scores (0-26.57 points), representing 16.5 percent; high scores (64.25 points or more), representing 15.7 percent; and medium scores (26.58-64.24 points), presenting 67.8 percent (Table 4.18).

Table 4.18 Frequencies and Percentage of the Compensatory Health Beliefs (n =788)

Compensatory Health Beliefs	Frequency	Percentage
Low scores (0-26.57 points)	130	16.5
Medium scores (26.58-64.24 points)	534	67.8
High scores (64.25 points or more)	124	15.7
$\bar{X}$ = 45.41, S.D. = 18.83, Min = 0, Max = 100		

The average scores of respective aspects of compensatory health beliefs were slightly different. That is, the samples' average score of compensatory beliefs about being on a diet ($\bar{X}$ = 23.6, S.D. = 10.22) was higher than that of compensatory beliefs about doing physical activities ($\bar{X}$ = 21.77, S.D. = 10.15) (Table 4.19). This indicated that the samples' compensatory beliefs about eating in terms of weight control were higher than the compensatory beliefs about doing physical activities. For example, they believed that those controlling weight could compensate for eating food rich in starch or fat with eating only vegetables or fruits in the evening ($\bar{X}$ = 5.29, S.D. = 2.81) rather than they a lack of exercise any day could be compensated for exercise the following day ($\bar{X}$ = 4.49, S.D. = 2.74) (Table 4.19).

Table 4.19 Means Scores and Standard Deviations of the Compensatory Health Beliefs in Each Dimension (n =788)

Compensatory Health Beliefs	**Number of questions**	**Range of scores**	$\bar{X}$	**S.D.**
About eating	5	0-50	23.64	10.22
About doing physical activities	5	0-50	21.77	10.15
Total	10	0-100	45.41	18.86

An analysis of respective items of compensatory beliefs under each aspect showed that the samples believed that those controlling weight could eat food rich in starch or fat if they ate vegetables or fruits in the evening ($\bar{X}$ = 5.29, S.D. = 2.81), followed by those controlling weight could eat food rich in starch or fat if they exercised more ($\bar{X}$ = 5.25, S.D. = 2.75), and those controlling weight could eat food rich in starch or fat if they skipped the following meal ($\bar{X}$ = 3.68, S.D. = 2.64) (Table 4.20). In addition, most of them believed that compensating for eating a lot of food or food rich in starch or fat with eating vegetables and fruits or doing high-energy consuming activities, e.g. exercise at least 30 minutes a day ($\bar{X}$ = 5.15, S.D. = 2.73) would have a better effect on weight control than reducing the amount of food or skipping the next meal ($\bar{X}$ = 4.27, S.D. = 2.79; $\bar{X}$ = 3.68, S.D. = 2.64, respectively).

Table 4.20 Means Scores and Standard Deviations of Compensatory Health Beliefs Classified by Items about Eating (n =788)

Compensatory beliefs about Eating	Mean	S.D.
Those who are controlling weight can eat a lot of food if they reduce the amount of food in the next meal.	4.27	2.79
Those who are controlling weight can eat food rich in starch or fat if they exercise more.	5.25	2.75
Those who are controlling weight can eat food rich in starch or fat if they eat vegetables or fruits in the evening.	5.29	2.81
Those who are controlling weight can eat food rich in starch or fat if the skip the next meal.	3.68	2.64
Those who are controlling weight can eat food rich in starch or fat if they exercise at least 30 minutes a day every day.	5.15	2.73

As for the samples' compensatory beliefs about doing physical activities, overall, they were relatively low ($\bar{X}$ = 3.87-4.92 points). An analysis demonstrated that the samples believed that if they did not do high-energy consuming activities, e.g. exercise, they could compensate for this by exercising or doing other high-energy consuming activities more ($\bar{X}$ = 4.92 and 4.49 scores, respectively). On the contrary, they believed that they did not need to exercise on the day when they did not eat food rich in starch or fat ($\bar{X}$ = 4.00 points) and that if they did not do high energy-consuming activities any day, they could compensate for this by skipping meals that day ($\bar{X}$ = 3.87 points). This manifested that they tended to believe that compensation for a lack of physical activities with doing physical activities more would have a better effect on weight control than skipping meals (Table 4.21).

Table 4.21 Means Scores and Standard Deviations of Compensatory Beliefs Classified by Items about Physical Activities (n =788)

Statement	Mean	S.D.
If those who are controlling weight do not exercise any day, they can compensate for this by more exercise the next day.	4.49	2.74
If those who are controlling weight do not exercise any day, they can compensate for this by eating food low in starch and fat that day.	4.49	2.66
If those who are controlling weight do not exercise any day, they can compensate for this by skipping dinner that day.	3.87	2.65
Those who are controlling weight do not need to exercise every day if they do not eat food rich in starch or fat that day.	4.00	2.71
On the day when those who are controlling weight do activities that involve low energy or low movement, they can compensate for this by exercising or doing activities with more movement the next day.	4.92	2.56

(2) Compensatory Behavior Self-Efficacy

Compensatory behavior self-efficacy is individuals' confidence in their ability to implement compensatory behavior to achieve their goal. This study used the compensatory behavior self-efficacy scale, whereby compensatory behavior self-efficacy was divided into two aspects as other variables – compensatory behavior self-efficacy through being on a diet and compensatory behavior self-efficacy through doing physical activities. Each aspect consisted of six statement items – there were totally 12 statement items.

An analysis revealed that the samples' highest score for overall compensatory behavior self-efficacy was 120 points, lowest score was 0 point, average score was 60.89 points, and standard deviation was 22.62 points. This indicated that their overall compensatory behavior self-efficacy overall was at a moderate level. Although the skewness value was equal to -0.05 and the kurtosis value was -0.009, the data distribution was close to the normal curve. Thus, the compensatory behavior self-efficacy scores were divided, using the mean and standard deviation, into high scores (83.52 points or more), representing 14.6 percent; low scores (0-38.26 points),

representing 16.1 percent; and medium scores (38.27-83.51 points), representing 69.3 percent (Table 4.22).

Table 4.22 Frequencies and Percentage of the Compensatory Behavior Self-Efficacy (n =788)

Compensatory Behavior Self-Efficacy	Frequency	Percentage
Low scores (0-38.26 points)	127	16.1
Medium scores (38.27-83.51 points)	546	69.3
High scores (83.52 points or more)	115	14.6
$\bar{X}$ = 60.89, S.D. = 22.62, Min = 0, Max = 1		

An analysis on compensatory behavior self-efficacy under each aspect revealed that the average scores of respective aspects were not significantly different. The samples' average score of compensatory behavior self-efficacy through being on a diet was similar to that of compensatory behavior self-efficacy through doing physical activities ($\bar{X}$ = 30.23 and 30.66, respectively) (Table 4.23). In conclusion, based on the means, their compensatory behavior self-efficacy under both aspects was at a moderate level.

Table 4.23 Means Scores and Standard Deviations Classified by the Compensatory Behavior Self-Efficacy Scores in Each Dimension (n =788)

Compensatory Behavior Self-Efficacy	Number of items	Ranges of scores	$\bar{X}$	S.D.
Being on a diet	6	0-60	30.23	12.34
Doing physical activities	6	0-60	30.66	12.23
Total	12	0-120	60.89	22.62

As mentioned earlier, the means of compensatory behavior self-efficacy under each aspect was not very high. To clarify details of compensatory behavior self-efficacy among the samples, respective items of compensatory behavior self-efficacy under each aspect were analyzed. It was found that the samples perceived that if they

ate food rich in starch and fat in a meal, they could refrain from eating food rich in starch and fat in the next meal ($\bar{X}$ = 5.85, S.D. = 2.58) and that if they not exercise any day, they could refrain from eating food rich in starch and fat the next day ($\bar{X}$ = 4.53, S.D. = 2.47). The average scores of respective items of both aspects ranged from 4.83-5.85 points. That is, the samples had relatively low self-efficacy for compensatory behavior. The average scores of respective items also indicated that if the desire was related to eating (eating a lot of food or food rich in starch and fat), the samples were more likely to perceive that they could implement compensatory behavior by being on a diet better than doing low energy-consumption physical activities (no exercise) (Table 4.24).

Table 4.24 Mean Scores and Standard Deviations of the Compensatory Behavior Self-efficacy Classified by Items about Being on a Diet (n =788)

Compensatory behavior self-efficacy with being on a diet	Mean	S.D.
I can refrain from eating food rich in starch and fat in the next meal if I eat food rich in starch and fat earlier.	5.85	2.58
I can refrain from eating food in the next meal after eating a lot of food.	4.90	2.94
I can refrain from eating the next meal after eating food rich in fat.	4.38	2.65
I can control myself to eat less after eating a lot of food in the meal earlier.	5.72	2.59
I can refrain from eating food rich in starch and fat the next day if I do not exercise the day earlier.	4.53	2.47
I can control myself to eat a small amount of food rich in starch and fat if I do not exercise that day.	4.84	2.48

Compensatory behavior self-efficacy through doing physical activities was similar to that with being on a diet. The means of respective items were also low ($\bar{X}$ = 4.80-5.62). Under respective items, the samples perceived that they could implement compensatory behavior with physical activities using more energy or more exercise if they implemented tempting behavior by doing low-energy consuming physical

activities (no exercise) better than eating, e.g. eating a lot of food or eating food rich in starch and fat ($\bar{X}$ = 4.96-4.99) (Table 4.25)

Table 4.25 Mean Scores and Standard Deviations of the Compensatory Behavior Self-efficacy Classified by Items about Doing Physical Activities (n =788)

Compensatory behavior self-efficacy with controlling physical activities	Mean	S.D.
I can exercise more after I eat a lot of food that day.	4.96	2.58
I can exercise at least 30 minutes the next day after eating a lot of dinner.	4.99	2.83
I can exercise more after eating food rich in starch and fat.	4.94	2.60
I can exercise more the next day if I do not exercise that day.	4.80	2.62
I can control myself to do activities that involve a lot of energy or body movement more if I do not exercise that day.	5.62	2.52
I can control myself to stop doing activities that involve a low energy or low body movement if I do not exercise that day.	4.91	2.29

4.7 Compensatory Behavior Intention and Actual Behavioral Control

(1) Compensatory behavior intention

The analysis of data derived from the compensatory behavior intention scale revealed that the samples' highest score was 100 point, lowest score was 0 point, and average score was 54.17 points. This indicated that the samples' compensatory behavior intention was at a moderate level. The standard deviation was 20.33 points. The data distribution was skewed slightly to the left (skewness value of -0.36) and was kurtosis was slightly sharper than the normal curve (kurtosis value of 0.02). This demonstrated that samples' scores were moderate- slightly low. However, the skewness and kurtosis values were at an acceptable level. Therefore, the compensatory behavior intention scores were divided, using the mean ($\bar{X}$ = 54.17) and standard deviation (S.D. = 20.33), into moderate scores (33.84-74.50 points), representing 67.8

percent; low scores (0-33.83 points), representing 14.8 percent; and high scores (70.7 points or more), representing 14.5 percent (Table 4.26).

Table 4.26 Frequencies and Percentage of the Compensatory Behavior Intention (n =788)

Compensatory Behavior Intention	Frequency	Percentage
Low scores (0-33.83 points)	117	14.8
Medium scores (33.84-74.50 points)	557	70.7
High scores (74.51 points or more)	114	14.5
$\bar{X}$ = 54.17, S.D. = 20.33, Min = 0, Max = 100		

An analysis on compensatory behavior intention based on data of respective statements revealed that mostly, samples intended to implement compensatory behavior by eating only vegetable or fruit for dinner after eating food rich in starch or fat the most ($\bar{X}$ = 6.24, S.D. = 2.88), followed by reducing the amount of food in the next meal after eating a lot of food in the meal earlier ($\bar{X}$ = 6.08, S.D. = 2.66) and by skipping dinner if they do not exercise that day ($\bar{X}$ = 4.59, S.D. = 3.04) (Table 4.27).

Table 4.27 Mean Scores and Standard Deviations of the Compensatory Behavior Intention Classified by Items (n =788)

Compensatory behavior intention	Mean	S.D.
I intend to refrain from eating in the next meal after eating food rich in starch and fat in the meal earlier.	4.88	2.92
I intend to exercise more after eating food rich in starch or fat.	5.94	2.61
I intend to reduce the amount of food in the next meal after eating a lot of food in the meal earlier	6.08	2.66
I intend to eat only vegetable or fruit for dinner after eating food rich in starch or fat.	6.25	2.88
If I do not exercise any day, I intend to exercise more the next day.	5.12	2.69

Table 4.27 Mean Scores and Standard Deviations of the Compensatory Behavior Intention Classified by Items (n =788) (cont.)

Compensatory behavior intention	Mean	S.D.
After eating food rich in starch or fat, I intend to reduce the amount of food in the next meal.	5.25	2.66
I intend to exercise more the next day after I eat a lot of dinner.	5.54	2.71
If I do not exercise any day, I intend not to eat food rich in starch or fat.	5.28	2.79
I intend to refrain from eating food in the next meal after I eat a lot of food in the meal earlier.	5.24	2.78
I intend not to eat dinner if I do not exercise.	4.59	3.04

The average scores of compensatory behavior intention of respective items ranged from 4.59-6.24, which were not high. Compensatory behavior intention sharing some characteristics was divided into four groups – Group 1: Compensatory behavior intention of being on a diet when they implemented tempting behavior related to food (Items 1, 3, 4, 6, and 9); Group 2: Compensatory behavior intention of doing physical activities when they implemented tempting behavior related to food (Items 2 and 7); Group 3: Compensatory behavior intention of being on a diet when they implemented tempting behavior related to physical activities (Items 8 and 10); and Group 4: Compensatory behavior intention of doing physical activities when they implemented tempting behavior related to physical activities (Items 5). After that, the scores were adjusted by dividing them by the Frequency of statement items of each sub-group of the compensatory behavior intention. An analysis revealed that the samples had compensatory behavior intention of doing physical activities (exercise) when they implemented tempting behavior related to food (eat a lot of food or food rich in fat and starch) the most ($\bar{X}$ = 5.74, S.D. = 2.66), followed by compensatory behavior intention of being on a diet when they implemented tempting behavior related to food ($\bar{X}$ = 5.53, S.D. = 2.22) and compensatory behavior intention of being on a diet after implementing tempting behavior about doing low-energy consuming physical activities ($\bar{X}$ = 4.93, S.D. = 2.91). All these indicated that types of desires (for food and physical activities) and types of compensatory behavior (by being on a diet and

doing physical activities) had influence on compensatory behavior intention of the samples (Table 4.28).

Table 4.28 The Compensatory Behavior Intention Classified by Items Sharing Some Characteristics (4 Sub-groups) (n =788)

Compensatory behavior intention	Mean	S.D.
Compensating by being on a diet when I implement tempting behavior about food.	5.53	2.22
Compensating by doing physical activities when I implement tempting behavior about food.	5.74	2.66
Compensating by being on a diet when I implement tempting behavior about physical activities.	4.93	2.91
Compensating by physical activities when I implement tempting behavior about physical activities.	5.12	2.69

(2) Actual behavioral control

This study evaluated actual behavioral control based on actual behavioral control scale. Actual behavioral control was divided into two aspects – actual behavioral control about eating (7 items) and actual behavioral control about doing physical activities (3 items).

Based on an analysis of the samples' overall actual behavioral control, the highest score was 100 points, lowest score was 0, and average score was 50.12. This means that most samples' actual behavioral control was not very high. The data had a standard deviation of 23.12 points, with skewness and kurtosis values at acceptable levels (-0.26 and -0.59, respectively). The overall actual behavioral control scores were divided, using the mean ($\bar{X}$ = 50.12) and standard deviation (S.D. = 23.12), into low scores (0-26.99 points), representing 17.6 percent; medium scores (27.00-73.24 points), representing 66.2 percent; and high scores (73.25 points or more), 16.2 percent (Table 4.29).

Table 4.29 Frequencies and Percentage of the Actual Behavioral Control (n =788)

Compensatory beliefs	Frequency	Percentage
Low scores (0-26.99 points)	139	17.6
Medium scores (27.00-73.24 points)	522	66.2
High scores (73.25 points or more)	127	16.2
$\bar{X}$ = 50.12, S.D. = 23.12, Min = 0, Max = 100		

To show difference in actual behavioral control in terms of eating and doing physical activities, the scores under respective aspects were adjusted to be similar by dividing each of them by the Frequency of statement items. An analysis revealed that the average scores of respective aspects were not different. That is, the samples' average score of actual behavioral control about eating was equal to the average score of actual behavioral control about doing physical activities ($\bar{X}$ = 5.01). This indicated that the samples' actual behavioral control by being on a diet and actual behavioral control by doing physical activities were at an equal rate (Table 4.30).

Table 4.30 Means Scores and Standard Deviations of the Actual Behavioral Control in Each Dimension (n =788)

Actual behavioral control	Frequency of items	Ranges of scores	Normal scores		Scores divided by the Frequency of items	
			$\bar{X}$	S.D	$\bar{X}$	S.D.
On a diet	7	0-70	35.07	17.30	5.01	2.47
Physical activities	3	0-30	15.05	7.95	5.01	2.65
Total	10	0-100	50.12	23.12	5.01	2.31

An analysis of respective items of actual behavioral control about eating revealed that the samples "ate only vegetable or fruit for dinner after eating food rich in starch or fat in the meal earlier" the most ($\bar{X}$ = 5.71, S.D. = 3.20), followed by "reduced the amount of food after eating a lot of food in the meal earlier" ($\bar{X}$ = 5.45, S.D. = 2.87) and "refrained from eating food rich in starch or fat on the day I did not

exercise" ($\bar{X}$ = 4.48, S.D. = 3.24) (Table 4.31). Their average scores of respective statement items ranged from 4.52-5.71, which were not very high. This indicated that their actual behavioral control by being on a diet was at a low level.

Table 4.31 Means Score and Standard Deviations of the Actual Behavioral Control Classified by Items about Eating (n =788)

Actual behavioral control about eating	Mean	S.D.
I refrained from eating food in the next meal after eating food rich in starch or fat.	4.52	3.31
I refrained from eating food in the next meal after eating a lot of food.	5.08	3.22
I ate only vegetable or fruit for dinner after eating food rich in starch or fat in the meal earlier.	5.71	3.20
I reduced the amount of food in the next meal after eating food rich in starch or fat in the meal earlier.	5.33	2.90
I refrained from eating food in the next meal after eating food rich in starch or fat.	4.52	3.31
I refrained from eating food in the next meal after eating a lot of food.	5.08	3.22
I ate only vegetable or fruit for dinner after eating food rich in starch or fat in the meal earlier.	5.71	3.20
I reduced the amount of food in the next meal after eating food rich in starch or fat in the meal earlier.	5.33	2.90
I refrained from eating food rich in starch or fat on the day I did not exercise.	4.51	3.00
I reduced the amount of food after eating a lot of food in the meal earlier.	5.45	2.87
I refrained from eating dinner if I did not exercise on the same day.	4.48	3.24

Actual behavioral control by doing physical activities was not different from actual behavioral control by being on a diet. The samples' average scores of respective items were also low ($\bar{X}$ = 4.86-5.13). This means their actual behavioral control by doing physical activities was at a low level. The samples "exercised more after eating a lot of food" the most ($\bar{X}$ = 5.13, S.D. = 2.96), followed by "exercised more after eating food rich in starch or fat" ($\bar{X}$ = 5.07, S.D. = 2.98) and "exercised more the next day if they did not exercise on the day before" ($\bar{X}$ = 4.86, S.D. = 2.94) (Table 4.32). It was evident that they implemented compensatory behavior by doing physical activities (exercise) after they implemented tempting behavior related to physical activities (no exercise) less than eating.

Table 4.32 Means Scores and Standard Deviations of the Actual Behavioral Control Classified by Items about Doing Physical Activities (n =788)

Actual behavioral control about physical activities	**Mean**	**S.D.**
I exercised more after eating food rich in starch or fat.	5.07	2.98
I exercised more the next day if they did not exercise on the day before.	4.86	2.94
I exercised more after eating a lot of food.	5.13	2.96

Based on the actual behavioral control scale, statement items sharing some characteristics could be divided into four sub-groups – Group 1: "I implemented compensatory behavior by being on a diet when I implemented tempting behavior related to food" (Items 1, 3, 4, 6, and 9); Group 2: "I implemented compensatory behavior by doing physical activities when I implemented tempting behavior related to food" (Items 2 and 7); Group 3: "I implemented compensatory behavior by being on a diet when I implemented tempting behavior related to physical activities" (Items 8 and 10); and Group 4: "I implemented compensatory behavior by doing physical activities when I implemented tempting behavior related to physical activities" (Item 5). To compare the four sub-groups, the scores were adjusted to be similar by dividing them by the Frequency of statement items. It was identified that the samples "implemented compensatory behavior by being on a diet when implementing tempting behavior related to food," e.g. eating a lot of food or food rich in fat and starch the most ($\bar{X}$ =

5.21, S.D. = 3.10), followed by "implemented compensatory behavior by doing physical activities when implementing tempting behavior related to food" ($\bar{X}$ = 5.10, S.D. = 2.97) and "implemented compensatory behavior by being on a diet when implementing tempting behavior related to low-energy consuming physical activities" ($\bar{X}$ = 4.50, S.D. = 3.12) (Table 4.33).

Table 4.33 The Actual Behavioral Control Classified by Items Sharing Some Characteristics (4 Sub-groups)

Actual behavioral control	Mean	S.D.
I implemented compensatory behavior by being on a diet when I implemented tempting behavior related to food.	5.21	3.10
I implemented compensatory behavior by doing physical activities when I implemented tempting behavior related to food.	5.10	2.97
I implemented compensatory behavior by being on a diet when I implemented tempting behavior related to physical activities.	4.50	3.12
I implemented compensatory behavior by doing physical activities when I implemented tempting behavior related to physical activities.	4.86	2.94

4.8 Test of the Compensatory Health Beliefs Model

Concerning the test of the compensatory health beliefs model presented by Rabiau et al. (2006), the causal relationships among the variables in the compensatory health beliefs model were analyzed based on the path analysis method by means of the AMOS 21 program. Preliminarily, to identify the relationship between variables in the compensatory health beliefs model, Pearson's correlation coefficients were analyzed to serve as the basic data for the analysis of the causal relationship model in the compensatory health beliefs model. The model consisted of 12 variables, namely degree of desirability (DD), weight control self-efficacy (SE I), compensatory behavior self-efficacy (SE II), external self-concordance (ET), introjected self-concordance (IT), identified self-concordance (ID), response to motivational conflict by resisting desire (RD), response to motivational conflict by adapting risk

perception/outcome expectancy (AD), response to motivational conflict by using compensatory beliefs (UCB), compensatory health beliefs (CHB), compensatory behavior intention (CI), as well as actual behavioral control (ABC).

Based on data analysis results, the correlation coefficients of different pairs of variables ranged between -0.69 and 0.75, at a statistical significance level of $p < 0.01$ and $p < 0.05$ for almost all variables. The sample size of the study was large (788 samples). In addition, there were six pairs of variables whose relationship was quite high ($r > 0.50$) with a statistical significance level, which could result in multicollinearity. However, the fact that weight control self-efficacy (SE I) and compensatory behavior self-efficacy (SE II) had a high relationship resulted from the fact that both variables were used for evaluating the samples' self-efficacy for implementing weight control. They were different in terms of situational conditions of two groups of sub-behaviors (one group consisted of compensation, but the other did not). As for the three types of health goals self-concordance – external self-concordance (ET), introjected self-concordance (IT), and identified self-concordance (ID), they had relative high relationship because they were derived from the same variable, but they were different in terms of levels of motivation for health goals self-concordance, from extrinsic to intrinsic motivation. As for the response to motivational conflict by resisting desire (RD) and by using compensatory beliefs (UCB), they had negative relationship, which partly resulted from the nature of questionnaire used for evaluating the variables. In each statement, the respondents were allowed to choose only one alternative from three alternatives. This means, if they chose an alternative, the other two alternatives were not chosen. The fact that compensatory behavior intention (CI) and actual behavioral control had high relationship was in line with the Ajzen's Theory of Planned Behavior (Ajzen, 1991), which suggests that individuals' behavior intention results from their perceived behavioral control, which has high relationship with actual behavioral control (Table 4.34).

The relationships among the six pairs of variables were tested to identify if they had multicollinearity, based on the variance inflation factor (VIF) value, or tolerance value, or Eigen value. The optimal VIF value should not exceed 5 (some said it should not exceed 10); the tolerance value should not be lower than 0.2; and the highest Eigen value should be ≥ 10. (Chatsiri Piyapimonsit, 2005).

Table 4.34 Correlation Coefficients of Variables in the Compensatory Health Belief Model (n =788)

Variables	DD	SE I	SE II	ET	IT	ID	RD	AD	UCB	CHB	CI	ABC
DD	1											
SE I	-.248**	1										
SE II	-.245**	.754**	1									
ET	.074*	.176**	.230**	1								
IT	.027	.196**	.229**	.693**	1							
ID	-.061*	.321**	.314**	.579**	.701**	1						
RD	-.144**	.095**	.086**	.022	.095**	.042	1					
AD	.142**	-.137**	-.154**	-.067*	-.144**	-.110**	-.437**	1				
UCB	.037	.010	.033	.030	.016	.044	-.696**	-.342**	1			
CHB	.151**	.104**	.235**	.268**	.179**	.215**	-.102**	.065*	.054	1		
CI	-.116**	.358**	.468**	.474**	.430**	.449**	.080*	-.175**	.056	.387**	1	
ABC	-.186**	.351**	.452**	.391**	.392**	.391**	.041	-.115**	.048	.319**	.710**	1

** $p < 0.01$, * $p < 0.05$

An analysis revealed that these values were within the normal standard values. That is, the highest Eigen value was less than 10, the tolerance values of all variables were higher than 0.02 (0.378-4.98), and the VIF values of all variables did not exceed 5 (2.113-2.632). This means that the variables with high correlation coefficients in this research had no multicollinearity (Table 4.35).

Table 4.35 Eigen Values, Tolerance Values, and VIF Values for Testing for Multicollinearity (n =788)

Variables	Eigen Value	Collinearity Statistics	
		Tolerance	VIF
(Constant)	8.351		
Weight control self-efficacy (SE I)	1.000	.420	2.382
Compensatory behavior self-efficacy (SE II)	.190	.380	2.632
External self-concordance (ET)	.157	.473	2.113
Introjected self-concordance (IT)	.118	.378	2.649
Identified self-concordance (ID)	.060	.453	2.209
Resisting desire (RD)	.042	.491	2.387
Using compensatory beliefs (UCB)	.036	.498	2.009
Compensatory behavior intention (CI)	.026	.419	2.387
Actual behavioral control (ABC)	.020	.469	2.132

Remark: The above table presents only variables with high correlation coefficients to test for multicollinearity.

The next section discusses the analysis of the causal relationships between different variables in the compensatory health beliefs model by Rabiau et al. (2006). Responses to motivational conflict by using compensatory beliefs (UCB) and compensatory health beliefs (CHB) in this study were measured using different statements. Responses to motivational conflict by using compensatory beliefs were measured based on the statements from which the respondents had to choose only one alternative, while compensatory health beliefs were measured using the rating scale. Therefore, both variables were separated. When they were analyzed in the causal relationship model, compensatory health beliefs (CHB) served as the major variable for analysis. The causal relationships among the variables were defined under the hypotheses of Rabiau et al., as illustrated the Figure 4.1.

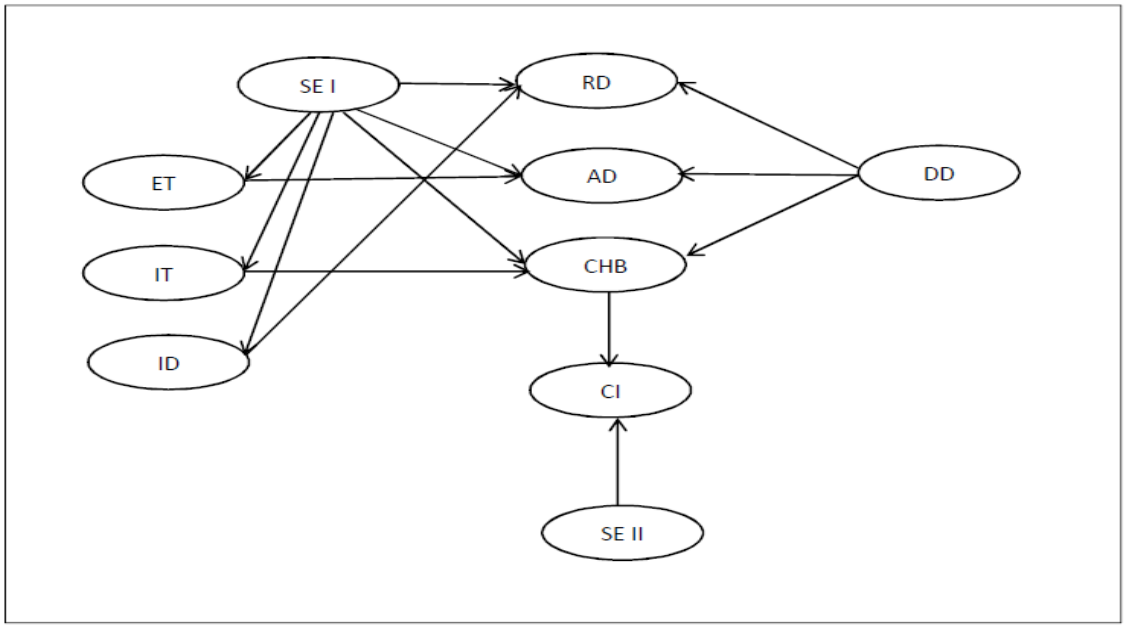

Figure 4.1 Compensatory Health Beliefs Model by Rabiau et al. (2006)

The compensatory health belief model by Rabiau et al. (2006) consisted of ten variables with a causal relationship. However, as mentioned in Chapter 1 and 2, the causal relationships among the variables have not been tested to identify if they are in line with the concept presented by Rabiau et al. (2006) in the model. Thus, this led to data analysis to test the hypotheses, as described below:

Hypothesis 1: The degree of desirability of tempting behavior (DD) has influence on the difference in adopted motivational conflict resolution strategies. Its sub-hypotheses are described below:

Hypothesis 1.1: The degree of desirability of tempting behavior (DD) has negative influence on resolving motivational conflict by resisting desire (RD).

Hypothesis 1.2: The degree of desirability of tempting behavior (DD) has positive influence on resolving motivational conflict by adapting risk perception/outcome expectancy (AD).

Hypothesis 1.3: The degree of desirability of tempting behavior (DD) has positive influence on resolving motivational conflict by activating compensatory health beliefs (CHB).

Based on data analysis, Hypotheses 1.1 and 1.2 were in line with hypotheses in the compensatory health beliefs model by Rabiau et al. (2006). Desirability had negative influence on resolving motivational conflict by resisting desire and had positive influence on resolving motivational conflict by adapting risk perception/outcome expectancy when implementing tempting behavior or adapting outcome expectancy at a statistical significance level of $p < 0.001$. This means that when individuals have high desirability, they are less likely to resist desire or more likely to adapt risk perception/outcome expectancy. However, the findings did not comply with Hypothesis 1.3. That is, desirability had no influence on individuals' resolving motivational conflict by activating compensatory health beliefs with a statistical significance level (Table 4.36).

Hypothesis 2: Difference in persons' health goals self-concordance has influence on the difference in adopted motivational conflict resolution strategies. Its sub-hypotheses are described below:

Hypothesis 2.1: External self-concordance (ET) has positive influence on resolving motivational conflict by adapting risk perception/outcome expectancy (AD).

Hypothesis 2.2: Introjected self-concordance (IT) has positive influence on resolving motivational conflict by activating compensatory health beliefs (CHB).

Hypothesis 2.3: Identified self-concordance (ID) has positive influence on resolving emotional conflict by resisting desire (RD).

Based on data analysis, only Hypothesis 2.3 complied with hypotheses in the compensatory belief model by Rabiau et al. (2006). It was found that identified self-concordance (ID) had influence on resolving conflict by resisting desire (RD) at a statistical significance level of $p < 0.05$. This indicated that the samples had a goal to control their weight because of their intrinsic motivation (truly realizing the benefits and value of weight control) were more likely to respond to desire by resisting it (Table 4.36).

Hypothesis 3: Weight control self-efficacy (SE I) has influence on the difference in adopted motivational conflict resolution strategies. Its sub-hypotheses are described below:

Hypothesis 3.1: Weight control self-efficacy (SE I) has positive influence on resolving emotional conflict by resisting desire (RD).

Hypothesis 3.2: Weight control self-efficacy (SE I) has negative influence on resolving motivational conflict by adapting risk perception/outcome expectancy (AD)

Hypothesis 3.3: Weight control self-efficacy (SE I) has negative influence on resolving motivational conflict by activating compensatory health beliefs (CHB).

Based on data analysis, Hypotheses 3.1 and 3.2 complied with hypotheses in the model. It was found that weight control self-efficacy had positive influence on resolving motivational conflict by resisting desire and had negative influence on adapting risk perception/outcome expectancy when implementing tempting behavior at a statistical significance level of $p < 0.05$ and $p < 0.001$, respectively. That is, the samples who perceived that they could weight control well were more likely to respond to desire that might have an adverse impact on weight control by resisting the desire or less likely to adapt risk perception/outcome expectancy after implementing the tempting behavior. However, this study revealed that weight control self-efficacy had no influence on activating compensatory health beliefs (Table 4.36).

Hypothesis 4: Weight control self-efficacy (SE I) has influence on person's health goals self-concordance in weight control. Its sub-hypotheses are described below:

Hypothesis 4.1: Weight control self-efficacy (SE I) has negative influence on external self-concordance (ET).

Hypothesis 4.2: Weight control self-efficacy (SE I) has negative influence on introjected self-concordance (IT).

Hypothesis 4.3: Weight control self-efficacy (SE I) has positive influence on identified self-concordance (ID).

The results of data analysis revealed that only Hypothesis 4.3 complied with a hypothesis in the model. It was found that weight control self-efficacy had positive influence on identified self-concordance with a statistical significance level of $p < 0.001$. This means if the samples perceived that they had high efficacy for weight control, this would determine their motivation for weight control, which would be intrinsic motivation. Although the finding was not in line with Hypotheses 4.2 and 4.3, based on data analysis, weight control self-efficacy had positive influence on external self-concordance and introjected self-concordance at a statistical significance level of $p < 0.001$ (Table 4.36).

Hypothesis 5: Compensatory behavioral self-efficacy (SE II) has positive influence on compensatory behavior intention (CI).

The results of the test identified that compensatory behavior self-efficacy had positive influence on compensatory behavior intention at a statistical significance level of $p < 0.001$. This manifested that if the samples perceived they could implement compensatory behavior to control their weight, their compensatory behavior intention would be at a high level (Table 4.36).

Table 4.36 Causal Relationships of the Compensatory Health Beliefs Model Based on the Conceptual Framework of Rabiau et al. (2006) (n = 788)

Variables			Estimate	S.E.	C.R.
Independent variables		**Dependent variables**			
DD	>>	RD	-.144	.000	-4.096***
DD	>>	AD	.142	.000	4.030***
DD	>>	CHB	.037	.000	1.051
ET	>>	AD	-.093	.002	-1.680
IT	>>	CHB	.049	.005	.493
ID	>>	RD	.146	.003	2.799**
SE I	>>	RD	.096	.001	2.698**
SE I	>>	AD	-.137	.001	-3.880**
SE I	>>	CHB	.010	.001	0.267
SE I	>>	ET	.176	.035	5.015***
SE I	>>	IT	.321	.026	9.515***
SE I	>>	ID	.196	.021	5.612***
SE II	>>	CI	.141	.040	3.176***

Remark *** $p < 0.001$, ** $p < 0.05$

Based on the test of Hypotheses 1-5, the causal relationships of the CHBs model by Rabiau et al. (2006) can be illustrated in Figure 4.2.

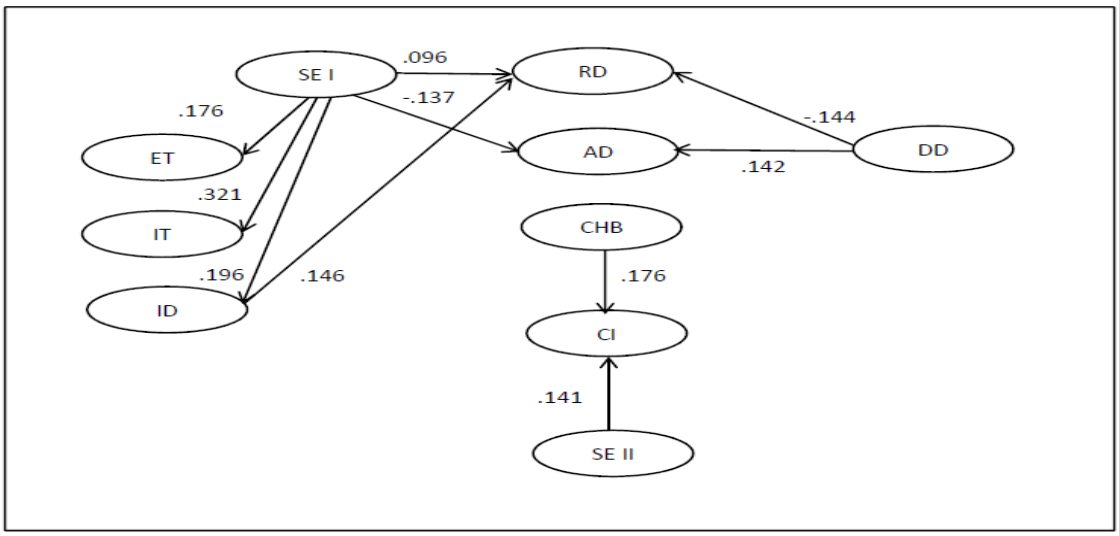

Figure 4.2 Causal Relationships of the CHBs Model by Rabiau et al. (2006).

After that, the causal relationships among the variables in the compensatory health beliefs model were adjusted to present the causal relationships that were in line with empirical data of 788 samples. The statistical values identifying the concordance between the causal relationship in the model and empirical data in the generic model did not meet the standard values (p-value = 0.00, X^2/df = 86.33, RMR = 65.49, GFI = 0.66, AGFI = 0.25, NFI = 0.21, CFI = 0.20, and RMSEA = 0.33) (Figure 4.3).

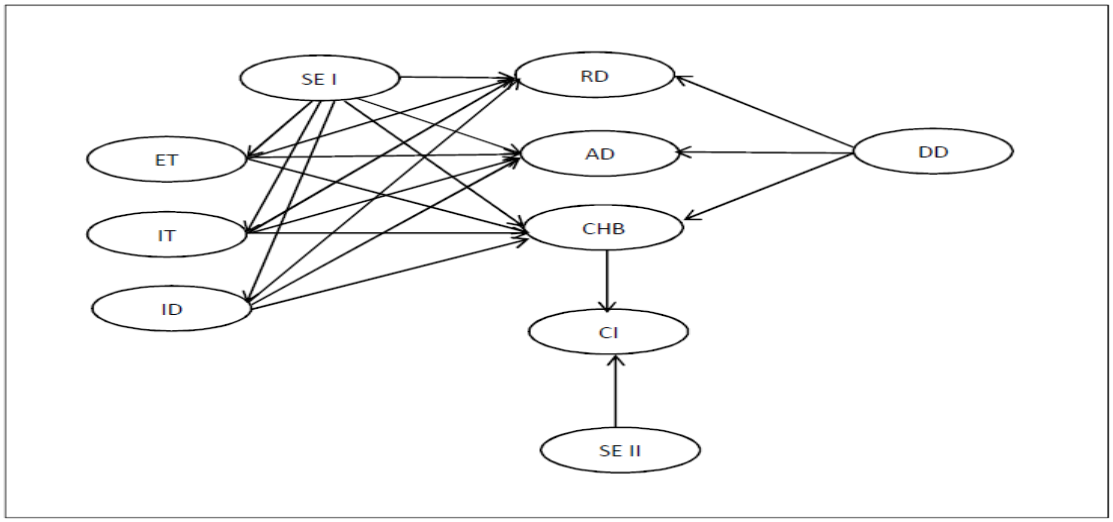

Figure 4.3 Compensatory Health Beliefs Model with Adjusted Causal Relationships among the Variables (Pre-adjusted model)

This model thus was adjusted in line with recommendations for the model adjustment index so as to achieve the causal relationship model that was in accordance with empirical data, with the p-value of 0.03; relative Chi-square (X^2/df) of 1.92; RMR value of 6.17 (This did not meet the standard value. However, because the highest value has not been defined, other statistics should be considered) (Kanlaya Vanichbuncha, (in Thai), 2014); the GFI value of 0.99; AGFI value of 0.97; NFI value of 0.99; CFI value of 0.99; and RMSEA value of 0.03 (Figure 4.4).

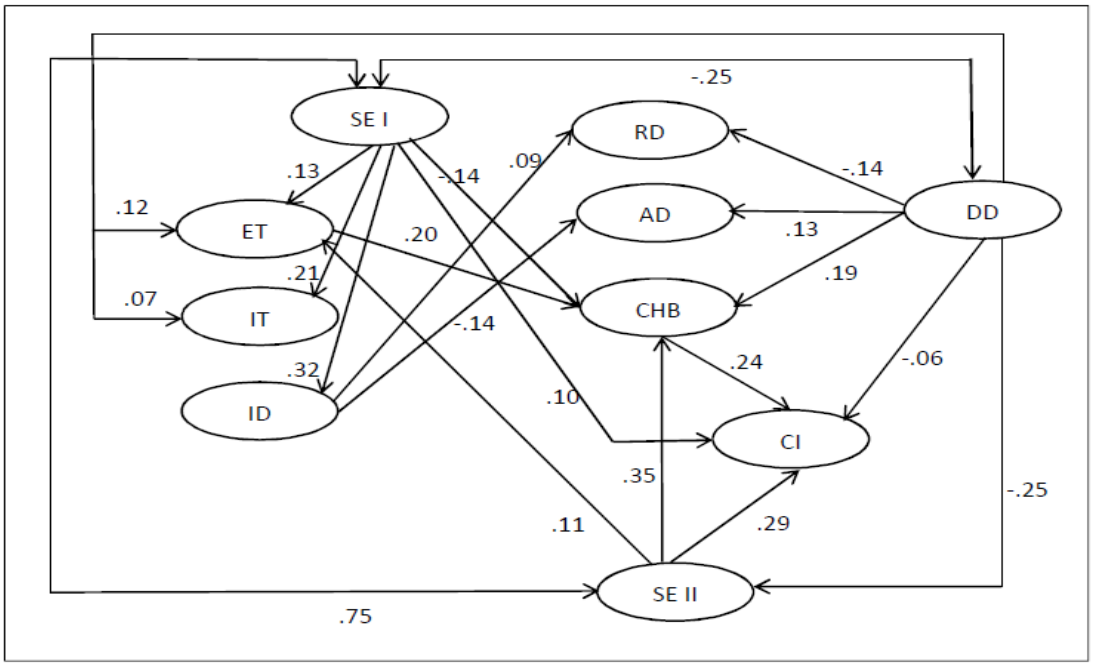

Figure 4.4 Compensatory Health Beliefs Model with Adjusted Causal Relationships among the Variables (Post-adjusted Model)

By virtue of this study focused on variables related to compensatory health beliefs, and among 788 samples, there were 278 who chose to resolve motivational conflict by activating compensatory health beliefs. Thus, the causal relationships among the variables in the compensatory belief model were analyzed among the 278 samples. It was found that the statistical values that identified the concordance between causal relationships in the original model and empirical data did not meet the standard values (p-value = 0.00, X^2/df = 35.22, RMR = 62.11, GFI = 0.64, AGFI = 0.27, NFI = 0.19, CFI = 0.18, and RMSEA = 0.35) (Figure 4.5).

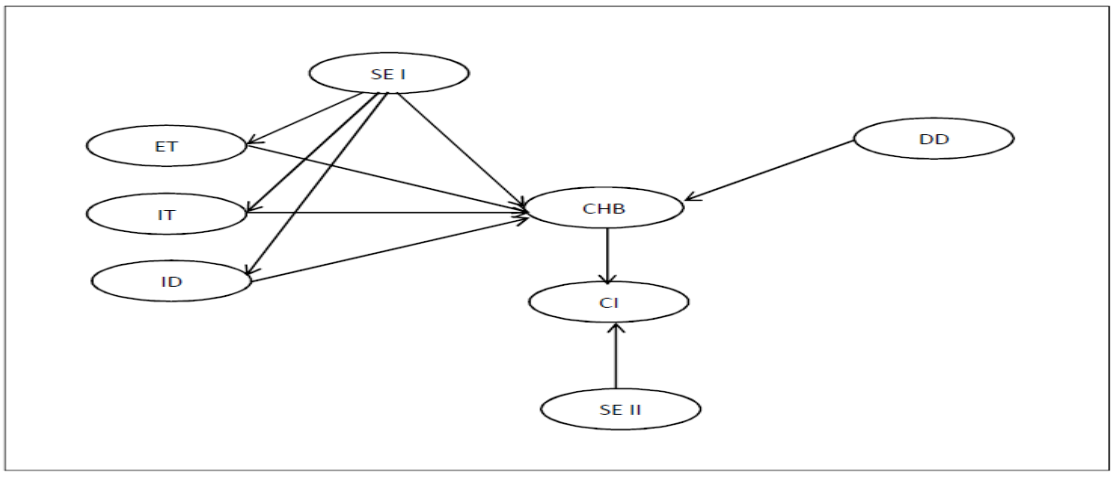

Figure 4.5 Original Model Identifying Causal Relationships among Samples Using Compensatory Health Beliefs with Adjusted Causal Relationships among the Variables (Pre-adjusted Model)

This model then was adjusted in line with recommendations for the model adjustment index so as to achieve the causal relationship model that was in accordance with empirical data, with the p-value of 0.01; relative Chi-square (X^2/df) of 2.33; RMR value of 21.26 (This did not meet the standard value. However, because the highest value has not been defined, other statistics should be considered) (Kanlaya Vanichbuncha (in Thai), 2014); the GFI value of 0.98; AGFI value of 0.93; NFI value of 0.97; CFI value of 0.98; and RMSEA value of 0.06 (Figure 4.6).

Based on data analysis results, the degree of desirability (DD) had positive influence on resolving motivational conflict by activating compensatory health beliefs (CHBs) at a statistical significance level of $p < 0.05$ ($\beta = 0.12$). This demonstrated that if the samples had great desirability, they would be more likely to activate compensatory health beliefs. In addition, desirability had positive influence on external self-concordance (ET) ($\beta = 0.17$). This manifested that when they had high desirability, they would tend to control their weight with extrinsic motivation. It was also found that desirability had a negative relationship with weight control self-efficacy (SE I) and compensatory behavior self-efficacy (SE II) ($\beta = -0.12$ and -0.10). This means if the samples had great desirability, they would tend to perceive that they had low efficacy for weight control or perceive that they could implement compensatory behavior to control their weight to a lesser extent. On the other hand,

when they perceived that they had high efficacy for controlling their weight or implementing compensatory behavior to control their weight, their desirability would become less (Figure 4.6).

Weight control self-efficacy (SE I) had negative influence on compensatory health beliefs ($\beta = -0.22$). This means that if the samples perceived that they had high efficacy for weight control, they would be less likely to activate compensatory health beliefs. In addition, weight control self-efficacy had positive influence on identified self-concordance (ID) ($\beta = 0.22$). Furthermore, weight control self-efficacy and compensatory behavior self-efficacy (SE II) had positive influence on each other ($\beta = 0.65$). This means that if the samples perceived that they had high efficacy for weight control, they would be more likely to perceive that they had high efficacy for implementing compensatory behavior to control their weight too (Figure 4.6).

Concerning health goals self-concordance in weight control, it was witnessed that external self-concordance (ET) had positive influence on compensatory health beliefs (CHB) at a statistical significance level of $p < 0.05$ ($\beta = 0.28$). This means that if the samples controlled their weight with extrinsic motivation, they would tend to resolve motivational conflict by activating compensatory health beliefs (Figure 4.6).

As for the causal relationship among compensatory health beliefs (CHB), compensatory behavior intention (CI), and compensatory behavior self-efficacy (SE II), it was found that compensatory health beliefs and compensatory behavior self-efficacy had positive influence on compensatory behavior intention at a statistical significance level of $p < 0.05$ ($\beta = 0.24$ and 0.29, respectively). This demonstrated that if the samples had high compensatory health beliefs or perceived that they had high efficacy for implementing compensatory behavior to control their weight, they would tend to have high compensatory behavior intention too. It was found that compensatory behavior self-efficacy has positive influence on compensatory health beliefs at a statistical significance level of $p < 0.05$ ($\beta = 0.33$). This indicated that when the samples perceived that they had high efficacy for implementing compensatory behavior to control their weight, they would be more likely to activate compensatory health beliefs (Figure 4.6).

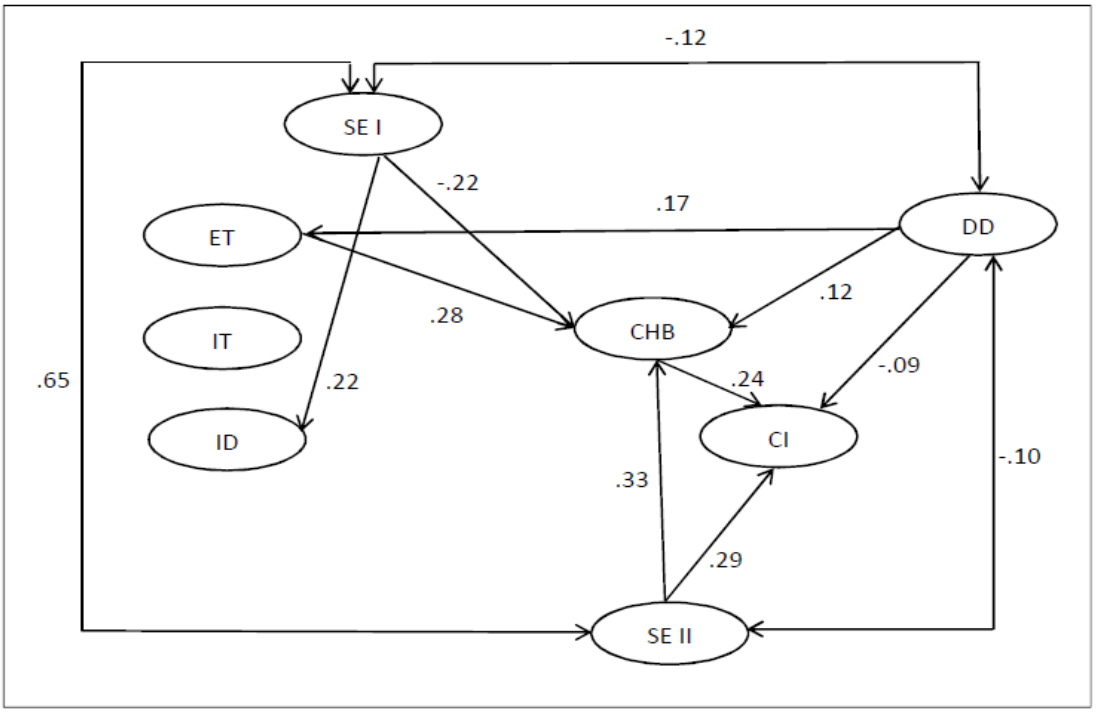

Figure 4.6 Original Model Identifying Causal Relationships among Samples Using Compensatory Health Beliefs with Adjusted Causal Relationships among the Variables (Post-adjusted Model)

4.9 Test of the expansion of the CHBs model

Because the present study aimed to expand the original compensatory belief model by adding actual behavioral control (ABC) to the model in order to achieve a more perfect understanding and explanation about individuals' behavior, which led to testing Hypotheses 6 and 7, as follows:

Hypothesis 6: Actual behavioral control (ABC) has positive influence on compensatory behavior intention (CI).

The results of analysis of the causal relationship between actual behavioral control and compensatory behavior intention complied with a hypothesis. It was found that actual behavioral control had influence on compensatory behavior intention at a statistical significance level of $p < 0.001$. This means if the samples had implemented compensatory behavior for weight control in the past, they would be more likely to have compensatory behavior intention to control their weight too (Table 4.37).

Hypothesis 7: Actual behavioral control (ABC) has positive influence on compensatory behavior self-efficacy (SE II).

As in Hypothesis 6, data analysis revealed that actual behavioral control had influence on compensatory behavioral self-efficacy (SE II) at a statistical significance level of $p < 0.001$. The data indicated that the samples' compensatory behavioral self-efficacy partly resulted from actual compensatory behavior in the part. That is, if the samples had implemented compensatory behavior to control their weight, they would be more likely to perceive that they could implement compensatory behavior to control their weight too (Table 4.37).

Table 4.37 Causal Relationships of the Expanded Compensatory Health Belief Model (n =788)

Variables			Estimate	S.E.	C.R.
Independent variables		**Dependent variables**			
ABC	>>	CI	.646	.038	14.508***
ABC	>>	SE II	.414	.052	7.573***

Remark *** $p < 0.001$.

After the compensatory belief model by Rabiau et al. (2006) was expanded, an analysis on the causal relationships among the variables in the model was conducted again among 788 samples. It was found that statistical values that identified the concordance between the causal relationships in the original model and empirical data did not meet the standard values (p-value = 0.00, $X^2/df = 67.76$, RMR = 71.59, GFI = 0.67, AGFI = 0.34, NFI = 0.33, CFI = 0.33, and RMSEA = 0.29) (Figure 4.7).

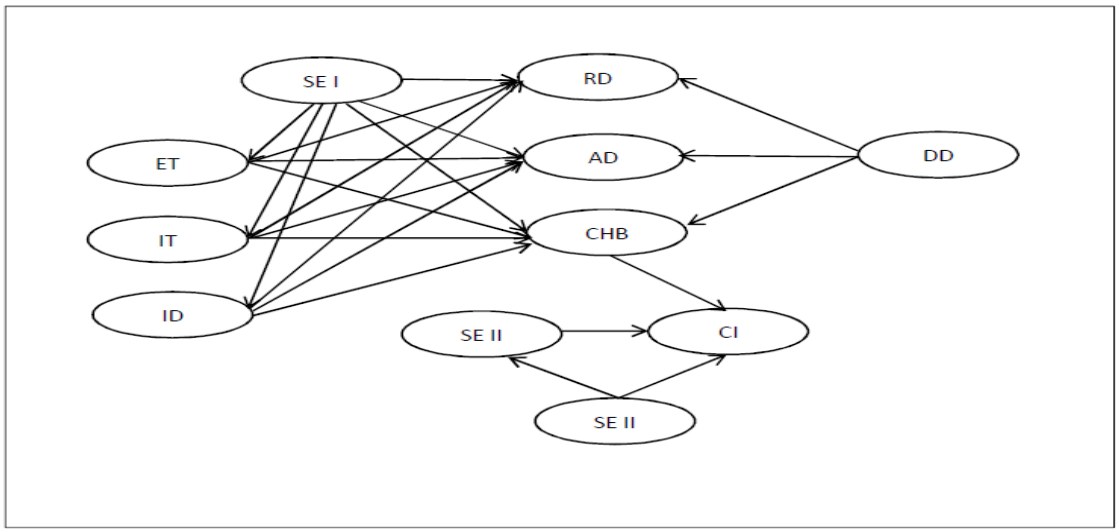

Figure 4.7 Original Compensatory Health Belief Model with Adjusted Causal Relationships among the Variables (Pre-adjusted Model)

This model then was adjusted in line with recommendations for the model adjustment index so as to achieve the causal relationship model that was in accordance with empirical data, with the p-value of 0.22; relative Chi-square (X^2/df) of 1.22; RMR value of 7.09 (This did not meet the standard value. However, because the highest value has not been defined, other statistics should be considered) (Kanlaya Vanichbuncha (in Thai), 2014); the GFI value of 0.99; AGFI value of 0.98; NFI value of 0.99; CFI value of 0.99; and RMSEA value of 0.02 (Figure 4.8).

Based on data analysis results, the degree of desirability (DD) had influence on the three motivational conflict resolution strategies at a statistical significance level of $p < 0.05$. It was found that desirability had negative influence on resisting desire ($\beta = -0.14$). In addition, it had positive influence on adapting risk perception/outcome expectancy (AD) and compensatory health beliefs (CHB) ($\beta = 0.13$ and 0.21, respectively). It was also found that desirability had positive influence on external self-concordance (ET) and introjected self-concordance (IT) ($\beta = 0.13$ and 0.08, respectively). Furthermore, desirability had a negative relationship with weight control self-efficacy (SE I) and actual behavioral control (ABC) ($\beta = -0.25$ and -0.19, respectively) (Figure 4.8).

As for weight control self-efficacy (SE I), it had positive influence on identified self-concordance (ID) ($\beta = 0.15$) and on compensatory behavior self-efficacy (SE II) ($\beta =$

0.68). It was found that weight control self-efficacy and actual behavioral control (ABC) had a positive relationship with each other (β = 0.35) (Figure 4.8).

In terms of health goals self-concordance in weight control, it was found that external self-concordance (ET) had positive influence on compensatory health beliefs (CHB) at a statistical significance level of $p < 0.05$ (β = 0.12). In addition, identified self-concordance (ID) had positive influence on resisting desire (RD) (β = 0.09) and had negative influence on adapting risk perception/outcome expectancy (AD) (β = -0.13) (Figure 4.8).

As for compensatory health beliefs (CHB), compensatory behavior self-efficacy (SE II), and actual behavioral control (ABC), they were found to have positive influence on compensatory behavior intention (CI) at a statistical significance level of $p < 0.05$ (β = 0.14, 0.14, and 0.60, respectively). It was also found that actual behavioral control (ABC) had positive influence on compensatory health beliefs and compensatory behavior self-efficacy (β = 0.31 and 0.22, respectively). It was further found that actual behavioral control had positive influence on external self-concordance (ET), introjected self-concordance (IT), and identified self-concordance (ID) at a statistical significance level of $p < 0.05$ (β = 0.42, 0.41 and 0.34, respectively) (Figure 4.8).

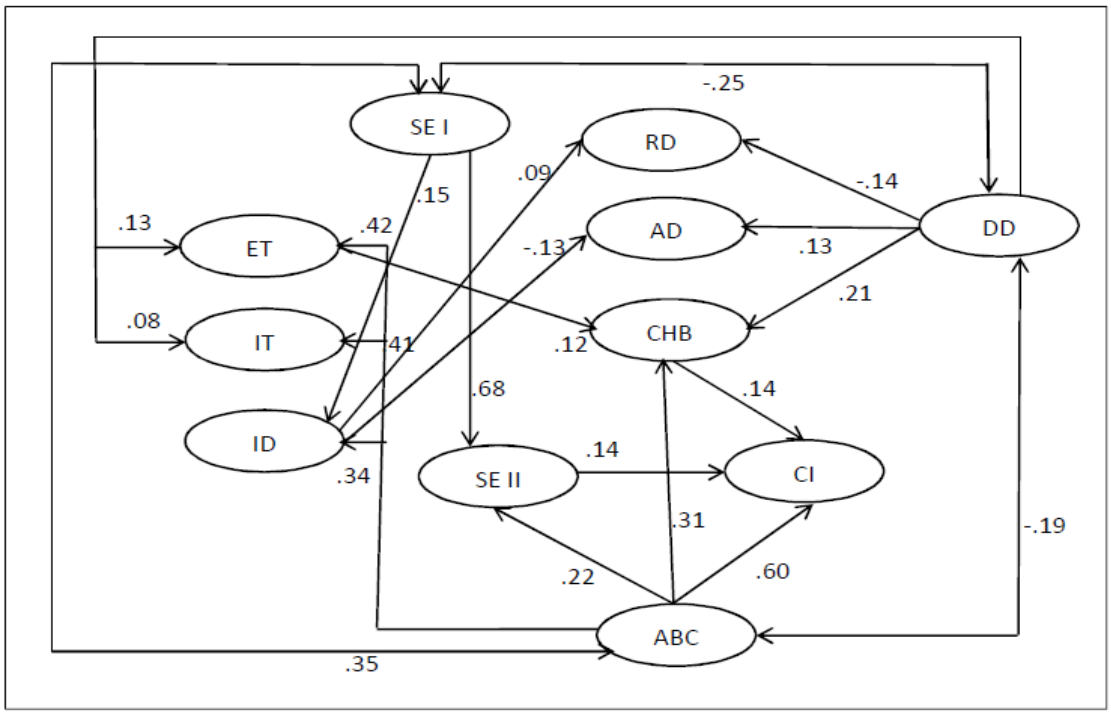

Figure 4.8 Expanded Compensatory Health Belief Model with Adjusted Causal Relationships among the Variables (Post-adjusted Model)

An analysis on the values of direct effect, indirect effect, and total effect of different variables in the causal relationship model for compensatory beliefs, with adjusted causal relationships among some variables, is discussed below (Table 4.38).

The degree of desirability (DD) had direct effect (without indirect effect) on external self-concordance (ET) and introjected self-concordance (IT) (β = 0.050 and 0.017, respectively). In addition, it had direct effect (without indirect effect) on the response to motivational conflict by resisting desire (RD) and adapting risk perception/outcome expectancy (AD) (β = -0.002 and 0.001, respectively). Furthermore, it had direct effect on compensatory health beliefs (CHB). This indicated that when the samples had high desirability, they would activate compensatory health beliefs at a greater extent (β = 0.102). In addition, it was found that desirability had indirect effect on compensatory health beliefs and compensatory behavior intention (CI). The indirect effect of desirability on compensatory beliefs passed on external self-concordance (β = 0.007), and its indirect effect on compensatory behavior intention was passed on through compensatory health beliefs (β = 0.016). This means that if the samples had high desirability, apart from resulting in them activating compensatory health beliefs to a great extent, this would result in them having high compensatory behavior intention (Table 4.38).

As for weight control self-efficacy (SE I), it had direct effect (without indirect effect) on identified self-concordance (ID) and compensatory behavior self-efficacy (SE II) (β = 0.116 and 1.029, respectively). This means if the samples perceived that they had high efficacy for weight control, they would be more likely to set a goal to control their weight with intrinsic motivation (truly realizing the value of weight control) and to recognize that they had high efficacy for implementing compensatory behavior to control their weight too. At the same time, weight control self-efficacy had indirect effect (without direct effect) on the response to motivational conflict by adapting risk perception/outcome expectancy (AD) and compensatory behavior intention (CI). The indirect effect of weight control self-efficacy on adapting risk perception/outcome expectancy passed on identified self-concordance (ID) (β = -0.001). This means that if the samples perceived that they had high efficacy for weight control, this would result in them setting a goal to control their weight with intrinsic motivation, thus making them less likely to adapt risk perception/outcome expectancy. The indirect effect on compensatory behavior intention passed on compensatory behavior self-

efficacy (SE II) (β = 0.016). This means that if the samples perceived that they had high efficacy for weight control, they would be more likely to perceive that they had high efficacy for implementing compensatory behavior to control their weight too, which would result in them having high compensatory behavior intention as well (Table 4.38).

In terms of external self-concordance (ET), it had direct effect on compensatory health beliefs (CHB) (β = 0.149), which did not receive indirect effect from other variables. This demonstrated that when the samples set a goal to control their weight with extrinsic motivation (expecting reward or avoiding punishment), they would be more likely to activate compensatory health beliefs. It was further found that external self-concordance had indirect effect on compensatory behavior intention (CI), which was passed on through compensatory health beliefs (β = 0.022). This indicated that if the samples set a goal to control their weight by expecting reward or avoiding punishment, apart from resulting in them being more likely to activate compensatory health beliefs, this would result in them having higher compensatory behavior intention too (Table 4.38).

As for identified self-concordance (ID), it had direct effect (without indirect effect) on the response to motivational conflict by resisting desire (RD) and adapting risk perception/outcome expectancy (AD) (β = 0.004 and -0.005, respectively). This indicated that if the samples set a goal to control their weight with intrinsic motivation, they would be more likely to respond to motivational conflict by resisting desire or less likely to adapt risk perception/outcome expectancy (Table 4.38).

It was found that compensatory health beliefs (CHB) and compensatory behavior self-efficacy (SE II) had direct effect (without indirect effect) on compensatory behavior intention (CI) (β = 0.149 and 0.127, respectively). This means that if the samples had compensatory health beliefs or perceived that they had high efficacy for implementing compensatory behavior, they would tend to have high compensatory behavior intention as well (Table 4.38).

Finally, it was found that actual behavioral control (ABC) had direct effect (without indirect effect) on the three types of health goals self-concordance (ET, IT, and ID) (β = 0.267, 0.154, and 0.164, respectively) and compensatory behavior self-efficacy (SE II) (β = 0.211). It was further found that actual behavioral control had indirect effect (without direct effect) on the response to motivational conflict by

resisting desire (RD) and adapting risk perception/outcome expectancy (AD) (β = 0.001 and -0.001, respectively). In addition, actual behavioral control had direct effect on compensatory health beliefs and compensatory behavior intention (β = 0.255 and 0.528, respectively) and had indirect effect on both variables. The indirect effect of actual behavioral control on compensatory health beliefs passed on external self-concordance (ET) (β = 0.040), and the indirect effect on compensatory behavior intention was passed on through compensatory health beliefs and compensatory behavior self-efficacy (β = 0.071) (Table 4.38).

Table 4.38 Direct Effect (DE), Indirect Effect (IE), and Total Effect (TE) of the Compensatory Health Beliefs Model with Additional Variables (n =788)

Variables	Influence	Cause variables						
		DD	SE I	ET	ID	CHB	SE II	ABC
ET	DE	.050	-	-	-	-	-	.267
	IE	-	-	-	-	-	-	-
	TE	.050	-	-	-	-	-	.267
IT	DE	.017	-	-	-	-	-	.154
	IE	-	-	-	-	-	-	-
	TE	.017	-	-	-	-	-	.154
ID	DE	-	.116	-	-	-	-	.164
	IE	-	-	-	-	-	-	-
	TE	-	.116	-	-	-	-	.164
RD	DE	-.002	-	-	.004	-	-	-
	IE	-	-	-	-	-	-	.001
	TE	-.002	-	-	.004	-	-	.001
AD	DE	.001	-	-	-.005	-	-	-
	IE	-	-.001	-	-	-	-	-.001
	TE	.001	-.001	-	-.005	-	-	-.001
CHB	DE	.102	-	.149	-	-	-	.255
	IE	.007	-	-	-	-	-	.040
	TE	.109	-	.149	-	-	-	.295
SE II	DE	-	1.029	-	-	-	-	.211
	IE	-	-	-	-	-	-	-
	TE	-	1.029	-	-	-	-	.211
CI	DE	-	-	-	-	.149	.127	.528
	IE	.016	.130	.022	-	-	-	.071
	TE	.016	.130	.022	-	.149	.127	.599

As mentioned above, this study focused on the causal relationships between compensatory health beliefs and other variables in the compensatory health belief model. Next, an analysis was conducted on the causal relationships among the variables in the compensatory belief model expanded for 278 samples, who resolved motivational conflict by activating compensatory health beliefs. Preliminarily, some statistical values that identified the concordance between the causal relationship in the model and empirical data did not meet the standard values (p-value = 0.00, X^2/df = 28.27, RMR = 68.77, GFI = 0.64, AGFI = 0.33, NFI = 0.34, CFI = 0.34, and RMSEA = 0.31) (Figure 4.9).

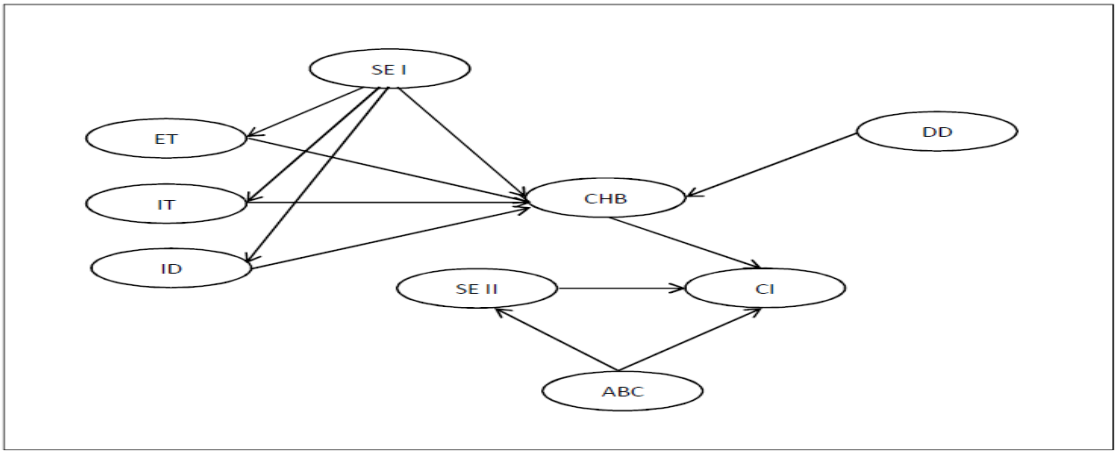

Figure 4.9 Expanded Causal Relationship Model for Samples Activating Compensatory Health Beliefs with Adjusted Causal Relationships among the Variables (Pre-adjusted Model)

Therefore, this model was adjusted in line with recommendations for the model adjustment index so as to achieve the causal relationship model that was in accordance with empirical data, with the p-value of 0.67; relative Chi-square (X^2/df) of 1.59; RMR value of 12.45 (This did not meet the standard value. However, because the highest value has not been defined, other statistics should be considered) (Kanlaya Vanichbuncha (in Thai), 2014); the GFI value of 0.98; AGFI value of 0.95; NFI value of 0.98; CFI value of 0.99; and RMSEA value of 0.04 (Figure 4.10).

Based on data analysis results, the degree of desirability (DD) had positive influence on resolving motivational conflict by activating compensatory health beliefs (CHB) at a statistical significance level of $p < 0.05$ ($\beta = 0.18$). In addition, desirability

had positive influence on external self-concordance (ET) ($\beta = 0.20$), and it also had a negative relationship with weight control self-efficacy (SE I) and actual behavioral control (ABC) ($r = -0.12$ and -0.07) (Figure 4.10).

As for weight control self-efficacy (SE I), it had positive influence on identified self-concordance (ID) ($\beta = 0.22$). In addition, weight control self-efficacy and actual behavioral control had positive relationship on each other ($r = 0.22$). It was also identified that weight control self-efficacy had positive influence on compensatory behavior self-efficacy (SE II) at a statistical significance level of $p < 0.05$ ($\beta = 0.60$) (Figure 4.10).

As for health goals self-concordance in weight control, external self-concordance (ET) had positive influence on compensatory health beliefs (CHB) at a statistical significance level of $p < 0.05$ ($\beta = 0.08$), and it also had positive influence on compensatory behavior intention (CI) ($\beta = 0.14$) (Figure 4.10).

As for the causal relationships among compensatory health beliefs (CHB), compensatory behavior intention (CI), compensatory behavior self-efficacy (SE II), and actual behavioral control (ABC), it was indicated that compensatory health beliefs, compensatory behavior self-efficacy, and actual behavioral control had positive influence on compensatory behavior intention at a statistical significance level of $p < 0.05$ ($\beta = 0.15$, 0.14 and 0.56, respectively). In addition, actual behavioral control had positive influence on compensatory health beliefs and compensatory behavior self-efficacy ($\beta = 0.31$ and 0.28, respectively). Actual behavioral control had positive influence on external self-concordance (ET), introjected self-concordance (IT), and identified self-concordance (ID) at a statistical significance level of $p < 0.05$ ($\beta = 0.48$, 0.49, and 0.33, respectively) (Figure 4.10).

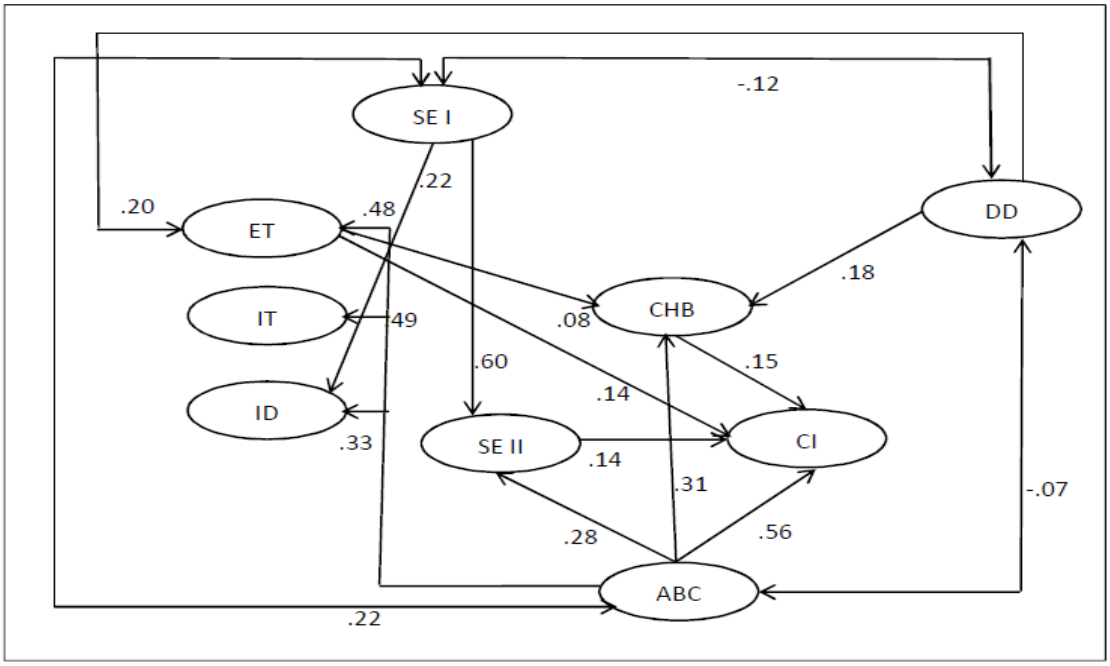

Figure 4.10 Expanded Causal Relationship Model for Samples Activating Compensatory Health Beliefs with Adjusted Causal Relationships among the Variables (Post-adjusted Model)

The direct effect, indirect effect, and total effect of different variables in the causal relationship model of activating compensatory health beliefs with adjusted causal relationships of some variables are discussed below: (Table 4.39)

The degree of desirability (DD) had direct effect (without indirect effect) on external self-concordance (ET) (β = 0.083) and had direct effect on the response to compensatory health beliefs (CHB). This manifested that the more desirability the samples had, the more they would activate compensatory health beliefs (β = 0.094). It was also found that desirability had indirect effect on compensatory health beliefs and compensatory behavior intention (CI). The indirect effect of desirability on both variables passed on external self-concordance (β = 0.008 and 0.031, respectively). This means that if the samples had high desirability, apart from resulting in them setting a goal to control their weight with extrinsic motivation, this would result in them in activating compensatory health beliefs and having high compensatory behavior intention (Table 4.39).

Weight control self-efficacy (SE I) had direct effect (without indirect effect) on identified self-concordance (ID) and compensatory behavior self-efficacy (SE II) (β = 0.176 and .907, respectively). This means if the samples perceived that they had high efficacy for weight control, they would be more likely to set the goal to control their weight (truly aware of the value of weight control) and to recognize that they had high efficacy for implementing compensatory behavior to control their weight. At the same time, weight control self-efficacy had indirect effect but no direct effect on compensatory behavior intention (CI); it passed on compensatory behavior self-efficacy (SE II) (β = 0.118). This means that if the samples perceived that they had high efficacy for weight control, they would be more likely to perceive that they had high efficacy for implementing compensatory behavior to control their weight. This would result in them having high compensatory behavior intention (Table 4.39).

External self-concordance (ET) had direct effect but no indirect effect on compensatory health beliefs (CHB) (β = 0.098). This indicated that when the samples set a goal to control their weight with extrinsic motivation, they would tend to activate compensatory health beliefs to a greater extent. It was also witnessed that external self-concordance had direct effect (β = 0.177) and indirect effect on compensatory behavior intention (CI). The indirect effect was passed on via compensatory health beliefs (β = 0.016). This indicated that if the samples established a goal to control their weight with extrinsic motivation, apart from being more likely to activate compensatory health beliefs, they would be more likely to have high compensatory behavior intention (Table 4.39).

Compensatory health beliefs (CHB) and compensatory behavior self-efficacy (SE II) had direct effect (without indirect effect) on compensatory behavior intention (CI) (β = 0.160 and 0.130, respectively). This means that if the samples had compensatory health beliefs or perceived that they had high efficacy for implementing compensatory behavior, they would be more likely to have high intention to implement compensatory behavior (Table 4.39).

Actual behavioral control (ABC) had direct effect (without indirect effect) on the three types of health goals self-concordance (ET, IT, and ID) (β = 0.326, 0.192, and 0.163, respectively) and compensatory behavior self-efficacy (SE II) (β = 0.264). It was also found that actual behavioral control had direct effect on compensatory

health beliefs and compensatory behavior intention (β = 0.260 and 0.500, respectively), and they had indirect effect on both variables. The indirect influence of actual behavioral control on compensatory health beliefs passed on external self-concordance (ET) (β = 0.032). The indirect effect on compensatory behavior intention was passed on via compensatory health beliefs and compensatory behavior self-efficacy (β = 0.139) (Table 4.39).

Table 4.39 Direct Effect (DE), Indirect Effect (IE), and Total Effect (TE) of the Compensatory Health Beliefs Model with Additional Variables (only CHBs) (n =278)

Variables	**Influence**	**Variables**					
		DD	**SE I**	**ET**	**CHB**	**SE II**	**ABC**
ET	DE	.083	-	-	-	-	.326
	IE	-	-	-	-	-	-
	TE	.083	-	-	-	-	.326
IT	DE	-	-	-	-	-	.192
	IE	-	-	-	-	-	-
	TE	-	-	-	-	-	.192
ID	DE	-	.176	-	-	-	.163
	IE	-	-	-	-	-	-
	TE	-	.176	-	-	-	.163
CHB	DE	.094	-	.098	-	-	.260
	IE	.008	-	-	-	-	.032
	TE	.102	-	.098	-	-	.292
SE II	DE	-	.907	-	-	-	.264
	IE	-	-	-	-	-	-
	TE	-	.907	-	-	-	.264
CI	DE	-	-	.177	.161	.130	.500
	IE	.031	.118	.016	-	-	.139
	TE	.031	.118	.193	.161	.130	.639

4.10 Test of the Ability to Explain Weight Control Behavior of the Expanded Model with Adjusted Causal Relationships among the Variables under Different Situations

The data analyzed to answer Hypotheses 1-7 was collected from 788 samples, which were a general population consisting of overweight and underweight students and students with a normal weight. They perceived that they had a normal weight, or were underweight, or were overweight. Some were controlling their weight, and others were not. The next section discusses analysis of data to test Hypothesis 8 – to identify how the causal relationships of the compensatory belief model expanded from the original model by Rabiau et al. (2006) will be if samples have specific conditions as mentioned above.

Hypothesis 8: The compensatory health beliefs model expanded from the original model by Rabiau et al. (2006) can be used for explaining the data only in the case when overweight individuals perceive that they are overweight and are controlling weight.

Based on the hypothesis, the test of the hypothesis can be divided into eight cases, which are discussed below:

(1) Compensatory belief model in the case when samples' BMI value is lower than normal BMI values

An analysis of data on samples whose BMI value was lower than normal BMI values (BMI < 18.50) revealed that the causal relationships among most variables were similar to those of the compensatory health beliefs model expanded from the original model by Rabiau et al. There were some variables whose causal relationships were slightly different. External health goals self-concordance in weight control (ET) had no influence on activating compensatory health beliefs (CHB) or compensatory behavior intention (CI) at a statistical significance level of $p < 0.05$. In addition, actual behavioral control (ABC) had influence at a statistical significance level of $p < 0.05$ only on introjected self-concordance (IT) (Table 4.39 and Figure 4.11).

(2) Compensatory belief model in the case when samples have a normal BMI value

An analysis of the causal relationships among samples with a normal BMI value (BMI 18.51-22.99) identified that the causal relationships among all variables were in line with those in the compensatory health belief model expanded from the original model by Rabiau et al. This manifested that the expanded compensatory health belief model can be effectively used for explaining the data in the case when individuals have a normal BMI value (Table 4.39 and Figure 4.11).

(3) Compensatory belief model in the case when samples' BMI value is higher than normal BMI values

An analysis of the causal relationships among variables in the expanded compensatory health belief model among samples whose BMI value was higher than normal BMI values (BMI > 22.99) identified that the degree of desirability (DD) had no influence on activating compensatory health beliefs (CHB) or external self-concordance (ET); external self-concordance had no influence on activating compensatory health beliefs (CHB) or compensatory behavior intention (CI); actual behavioral control (ABC) had no influence on compensatory health beliefs; and compensatory behavior self-efficacy (SE II) had no influence on compensatory health beliefs (Table 4.40 and Figure 4.11).

Table 4.40 Causal Relationships of the CHBs Model in Samples with Lower than Normal BMI, Normal BMI, and Higher than Normal BMI

Variables			Lower than normal (n = 36)			Normal BMI (n = 173)			Higher than normal (n = 69)		
			Estimate	S.E.	C.R.	Estimate	S.E.	C.R.	Estimate	S.E.	C.R.
DD	>>	ET	.306	.046	2.567**	.227	.023	4.220***	.145	.033	1.845
DD	>>	CHB	.379	.067	3.086**	.246	.036	3.558***	-.070	.062	-.605
ET	>>	CHB	-.076	.176	-.619	.115	.053	2.795**	.203	.170	1.522
ET	>>	CI	.069	.137	.751	.150	.075	2.644**	.157	.127	1.673
SE I	>>	ID	.112	.100	1.031	.253	.042	4.440***	.216	.072	2.616**
SE I	>>	SE II	.516	.187	4.759***	.643	.071	12.657***	.507	.155	5.332***
CHB	>>	CI	.249	.122	2.118**	.148	.056	2.801**	.107	.090	1.264
SE II	>>	CI	.344	.104	2.962**	.146	.048	2.732**	.018	.093	.205
ABC	>>	CI	.382	.118	2.805**	.553	.051	9.266***	.613	.105	6.048***
ABC	>>	SE II	.451	.106	4.118***	.247	.050	4.675***	.293	.095	3.062**
ABC	>>	CHB	.727	.103	5.923***	.248	.064	3.114**	.153	.129	1.153
ABC	>>	ET	.280	.093	1.768	.492	.042	7.628***	.496	.079	4.766***
ABC	>>	IT	.397	.068	2.558**	.498	.024	7.534***	.465	.047	4.333***
ABC	>>	ID	.250	.085	1.514	.305	.035	4.383***	.425	.056	4.024***

Remark *** $p < 0.001$, ** $p < 0.05$

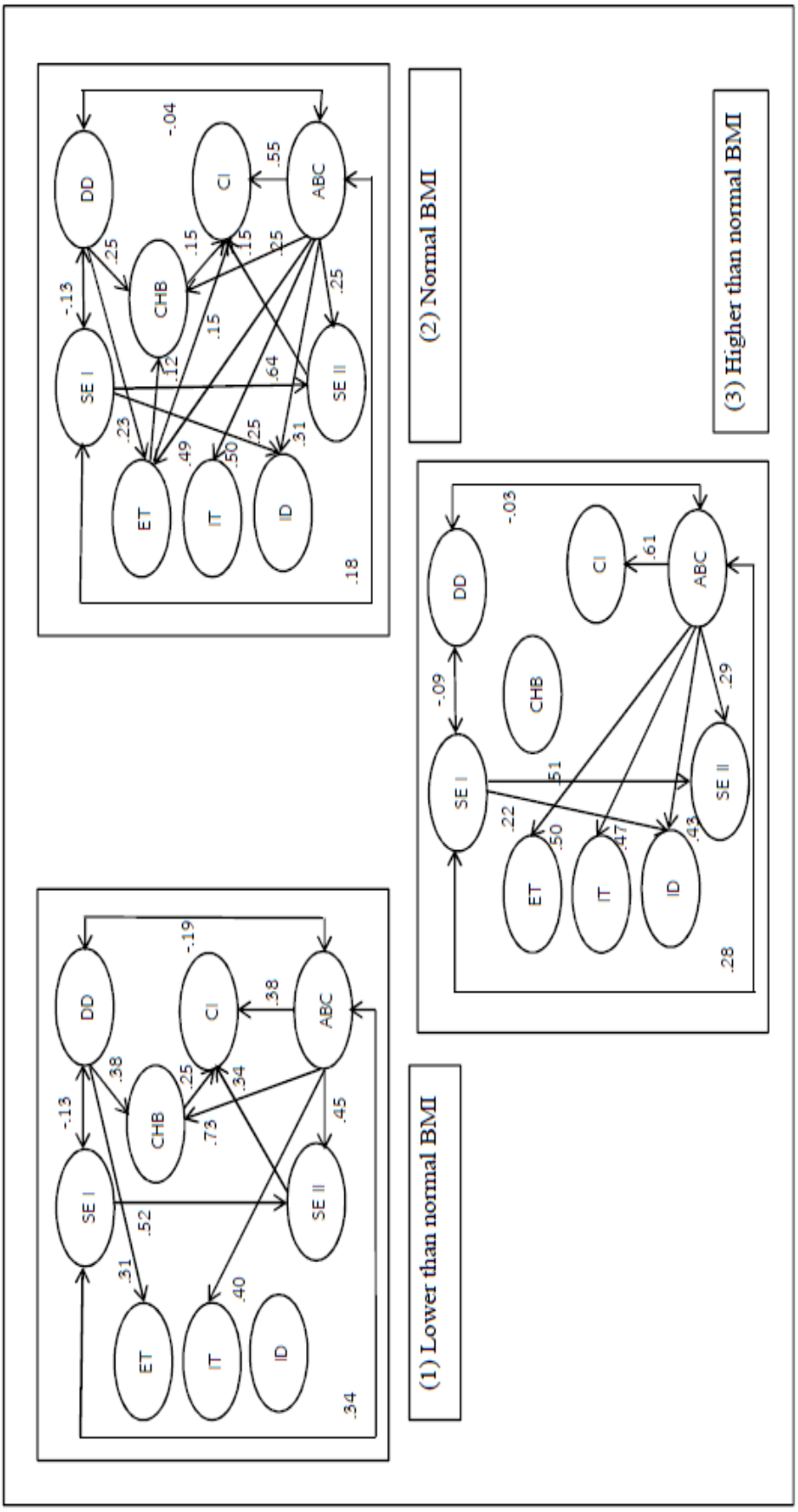

Figure 4.11 Expanded Compensatory Health Beliefs Model for Samples with Lower than normal BMI, Normal BMI, and Higher than normal BMI

(4) Compensatory belief model in the case when samples perceive that they are underweight

An analysis of data from samples who perceived that they were underweight identified that the causal relationships among most variables were similar to those of the compensatory health beliefs model expanded from the original model. However, the degree of desirability (DD) had no influence on activating compensatory health beliefs (CHB) or external self-concordance (ET); external self-concordance had no influence on activating compensatory health beliefs (CHB) or compensatory behavior intention (CI); compensatory health beliefs had no influence on compensatory behavior intention; and actual behavioral control (ABC) had no influence on identified self-concordance (ID) (Table 4.41 and Figure 4.12).

(5) Compensatory belief model in the case when samples perceive that they have a normal weight

An analysis of data from samples who perceived that they had a normal weight indicated that only external self-concordance (ET) that had no influence on compensatory behavior intention (CI). This manifested that the compensatory health belief model expanded from the original model can be used for explaining the data almost perfectly in the case when individuals perceive that they have a normal weight (Table 4.41 and Figure 4.12).

(6) Compensatory belief model in the case when samples perceive that they are overweight

An analysis of data from samples who perceived that they were overweight revealed that the causal relationships among most variables were similar to those of the compensatory health belief model expanded from the original model by Rabiau et al. There were some variables with a different causal relationship. That is, the degree of desirability (DD) had no influence on activating compensatory health beliefs (CHB); external self-concordance (ET) had no influence on activating compensatory health beliefs (CHB) or compensatory behavior intention (CI); and compensatory behavior self-efficacy (SE II) had no influence on compensatory health beliefs (Table 4.41 and Figure 4.12).

Table 4.41 Causal Relationships of the CHBs Model for Samples Perceiving that They Have a Normal Weight, Are Underweight, or Are Overweight

Variables			Perceived underweight (n = 46)			Perceived a normal weight (n = 69)			Perceived overweight (n = 163)		
			Estimate	**S.E.**	**C.R.**	**Estimate**	**S.E.**	**C.R.**	**Estimate**	**S.E.**	**C.R.**
DD	>>	ET	.174	.044	1.634	.326	.036	3.810***	.200	.023	3.640***
DD	>>	CHB	.181	.062	1.501	.235	.060	2.053**	.127	.041	1.687
ET	>>	CHB	.020	.162	.159	.155	.093	2.080**	.103	.110	1.221
ET	>>	CI	.326	.127	4.040***	.077	.097	1.156	.101	.079	1.553
SE I	>>	ID	.141	.087	1.372	.044	.064	.529	.321	.044	5.525***
SE I	>>	SE II	.578	.124	6.725***	.618	.115	7.825***	.600	.089	10.236***
CHB	>>	CI	-.021	.114	-.229	.118	.061	2.075**	.237	.057	3.886***
SE II	>>	CI	.436	.108	4.447***	.147	.064	2.207**	.072	.052	1.176
ABC	>>	CI	.362	.103	3.351***	.713	.063	9.777***	.487	.062	7.079***
ABC	>>	SE II	.427	.077	4.829***	.316	.073	3.9918***	.215	.063	3.637***
ABC	>>	CHB	.549	.100	4.202***	.262	.093	2.084**	.237	.081	2.847**
ABC	>>	ET	.357	.083	2.587**	.486	.060	4.849***	.446	.051	6.508***
ABC	>>	IT	.355	.060	2.550**	.528	.036	5.124***	.459	.028	6.584***
ABC	>>	ID	.199	.075	1.350	.378	.055	3.323***	.303	.037	4.344***

Remark *** $p < 0.001$, ** $p < 0.05$

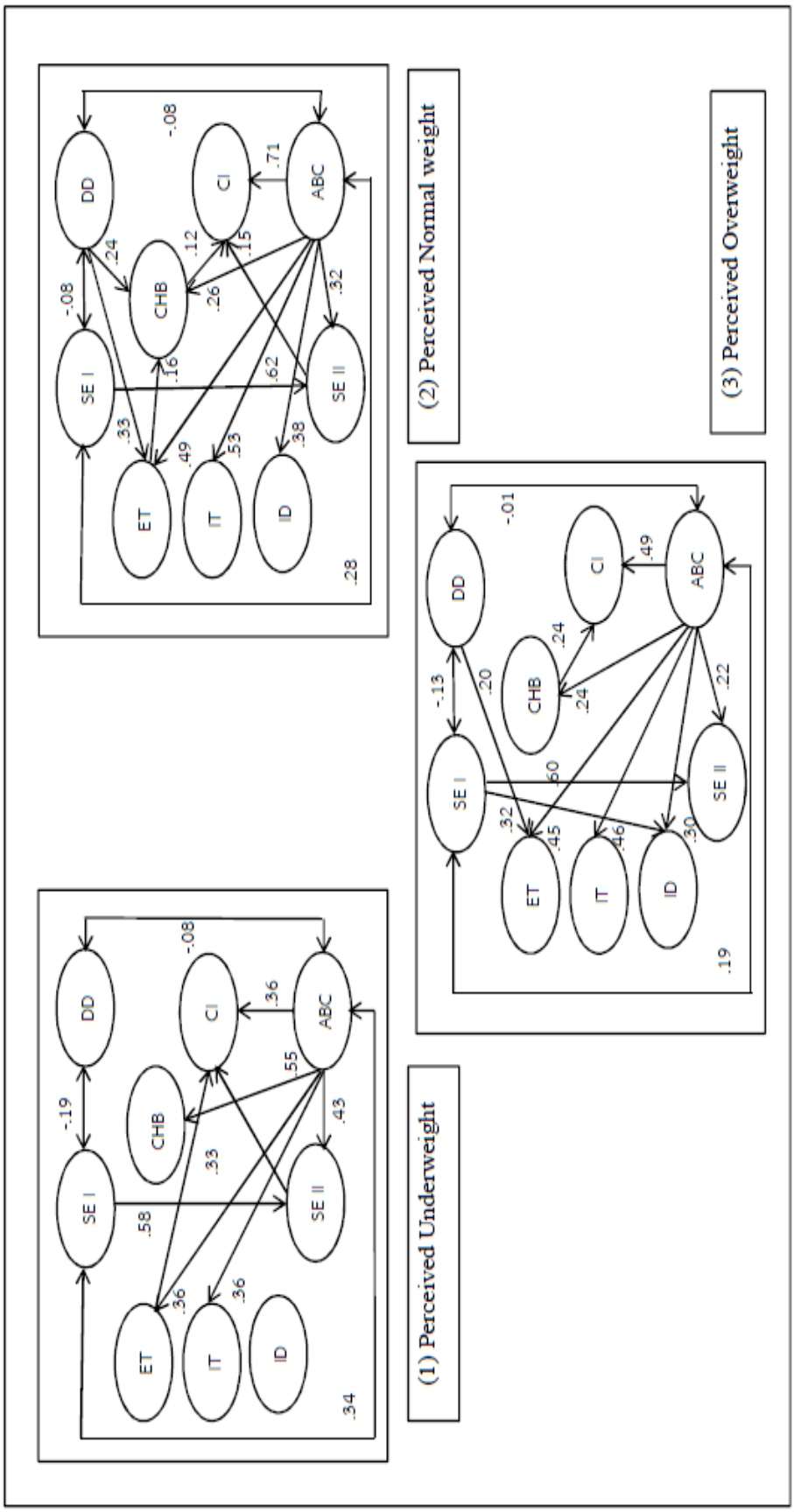

Figure 4.12 Expanded Compensatory Health Belief Model for Samples Perceiving that They Have a Normal Weight, Are Underweight, or Are Overweight

7) Compensatory belief model in the case when samples are controlling weight

An analysis of data from samples who were controlling weight identified that the causal relationships among most variables were similar to those of the compensatory health belief model expanded from the original model by Rabiau et al. There were some variables with a different causal relationship. That is, the degree of desirability (DD) had no influence on activating compensatory health beliefs (CHB); external self-concordance (ET) had no influence on activating compensatory health beliefs (CHB) or compensatory behavior intention (CI); compensatory behavior self-efficacy (SE II) had no influence on compensatory health beliefs; and actual behavioral control (ABC) had no influence on identified self-concordance (ID) (Table 4.41 and Figure 4.13)

(8) Compensatory belief mode in the case when samples are not controlling weight

An analysis of data from samples who were not controlling weight identified that the causal relationships among most variables were similar to those of the compensatory health belief model expanded from the original model by Rabiau et al. There were some variables with a different causal relationship. That is, external self-concordance (ET) had no influence on compensatory behavior intention (CI); compensatory behavior self-efficacy (SE II) had no influence on compensatory health beliefs; and actual behavioral control had no influence on identified self-concordance (ID) (Table 4.42 and Figure 4.13).

Table 4.42 Causal Relationships of the Compensatory Health Belief Model for Samples Who Are or Are not Controlling their Weight

Variables			**Controlling Weight (n = 133)**			**Not Controlling weight (n = 145)**		
			Estimate	**S.E.**	**C.R.**	**Estimate**	**S.E.**	**C.R.**
DD	>>	ET	.240	.024	3.661***	.197	.026	3.493***
DD	>>	CHB	.150	.042	1.838	.176	.042	2.299**
ET	>>	CHB	.098	.120	1.143	.083	.030	2.164**

Table 4.42 Causal Relationships of the Compensatory Health Belief Model for Samples Who Are or Are not Controlling their Weight (cont.)

Variables			Controlling Weight (n = 133)			Not Controlling Weight (n = 145)		
			Estimate	**S.E.**	**C.R.**	**Estimate**	**S.E.**	**C.R.**
ET	>>	CI	.091	.081	1.331	.112	.079	1.924
SE I	>>	ID	.242	.054	3.292***	.207	.044	3.759***
SE I	>>	SE II	.540	.112	8.571***	.664	.072	12.244***
CHB	>>	CI	.214	.058	3.087**	.171	.062	3.113**
SE II	>>	CI	.034	.052	.476	.259	.056	4.685***
ABC	>>	CI	.519	.065	6.880***	.507	.058	7.916***
ABC	>>	SE II	.343	.076	5.330***	.266	.049	4.863***
ABC	>>	CHB	.291	.087	3.428***	.339	.069	3.915***
ABC	>>	ET	.301	.059	3.733***	.492	.047	6.965***
ABC	>>	IT	.234	.028	2.760**	.522	.031	7.338***
ABC	>>	ID	.086	.041	1.021	.376	.040	5.040***

Remark *** $p < 0.001$, ** $p < 0.05$

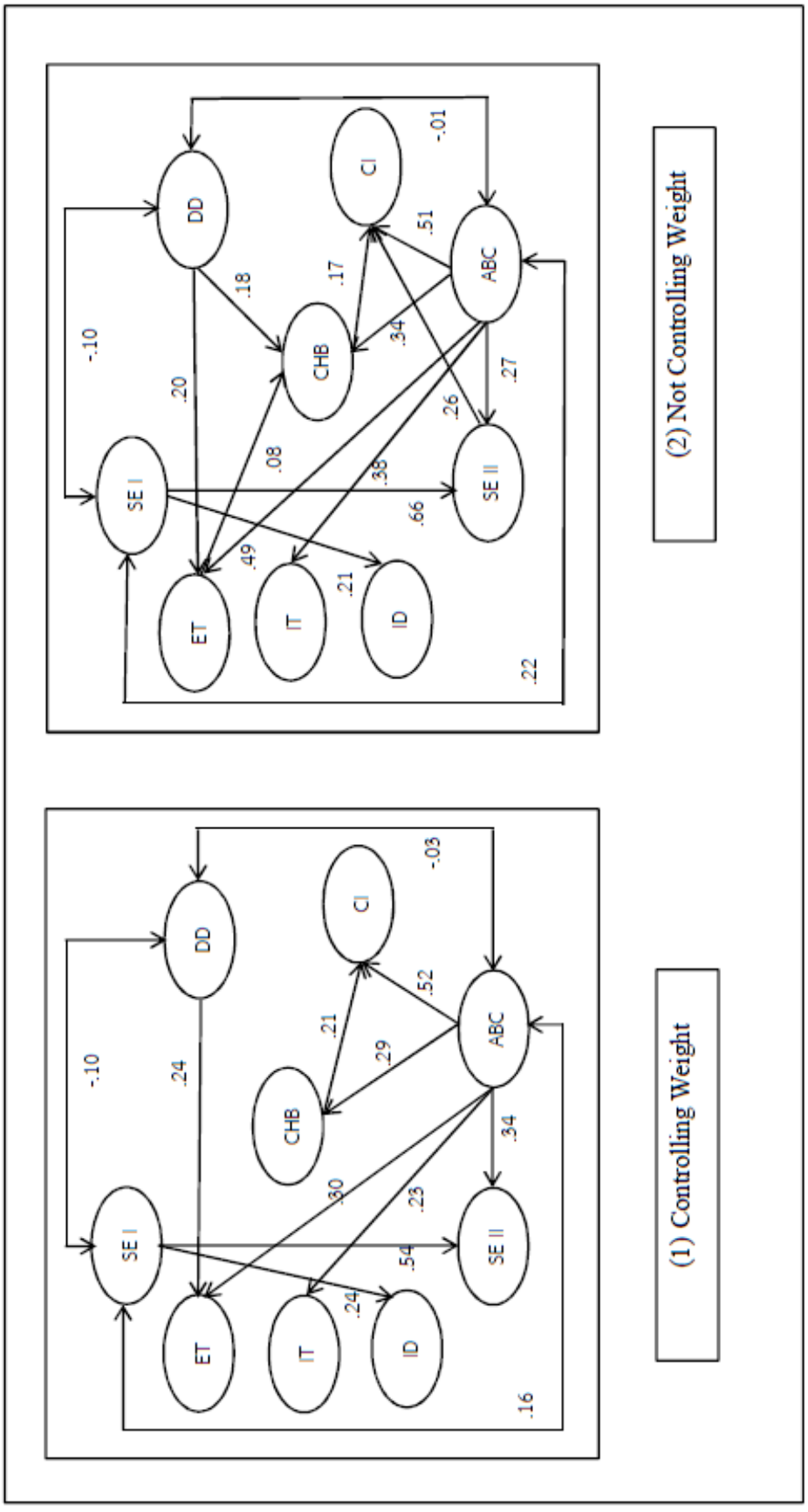

Figure 4.13 Expanded Compensatory Health Belief Model for Samples Who Are or Are Not Controlling Weight

CHAPTER V
CONCLUSION, DISCUSSION, AND RECOMMENDATION

The study had two main objectives – 1) To test hypotheses in the compensatory health beliefs model developed by Rabiau et al. (2006), which had not been empirically studied and 2) To expand the compensatory health beliefs model under weight control behaviors of undergraduate students in Thailand. This chapter consists of two major parts: 1) Conclusions and discussions and 2) Recommendations.

5.1 Conclusions and Discussions

This part presents conclusions and discussions of the results of the research "Compensatory Health Beliefs in Weight Control among Undergraduate Students." They are descried as follows:

The present study was a quantitative study that involved cross-sectional design, in which samples were 1st - 4th undergraduate students at Mae Fah Luang University, Chiang Rai province, who were selected using the multi-stage sampling technique. The data collection tool was a questionnaire developed based on relevant conceptual and theoretical frameworks, which consisted of seven parts – Part 1: Personal data and data on weight control; Part 2: Degree of desirability scale – the scale demonstrated good internal consistency ($\alpha = 0.86$); Part 3: Self-efficacy scales, which consisted of the weight control self-efficacy scale ($\alpha = 0.80$) and the compensatory behavior self-efficacy scale ($\alpha = 0.91$); Part 3: Health goals self-concordance scale, whereby self-concordance consisted of three types: external self-concordance, introjected self-concordance, and identified self-concordance ($\alpha = 0.83$, 0.84, and 0.85, respectively); Part 4: Response to motivational conflict; Part 5: Compensatory health belief scale ($\alpha = 0.88$); Part 6: Compensatory behavior intention scale ($\alpha = 0.90$); and Part 7: Actual behavioral control scale ($\alpha = 0.91$). Preliminary data analysis that aimed to identify the samples' characteristics and variable

distribution was conducted using descriptive statistics – percentage, mean, standard deviation, and correlation coefficient by means of the statistic package for the social science (SPSS). In addition, confirmatory factor analysis was conducted to investigate the construct validity of the variables, and path analysis was conducted to identify the causal relationships among different variables in the compensatory health beliefs model by means of the Analysis of Moment Structures (AMOS 21).

5.1.1 Personal Data and Data on Weight Control

Over two-thirds of the samples were females (77.7 percent) and over half of them were 17-19 years (58.6 percent), with an average age of 19.51 years. The lowest age was 17 years and highest age was 24 years. The ages were consistent with the years of study at the university. Over half of the samples were freshmen (59.4 percent); the percentage of sophomores and juniors was similar (17.9 and 16.8 percent, respectively); and only six percent of them were seniors. Over half of them were studying at a school in the fields of humanities and social sciences (65.98 percent), followed by health sciences and medicine (20.82 percent), as well as science and technology (13.20 percent).

In terms of their residences, over half of them stayed in the university dormitories (63.6 percent), followed by off-campus private apartments (34.5 percent), with a minority staying at their own house (1.9 percent). With regard to monthly allowance, almost half of them received approximately 4,001- 6,000 baht per month (45.4 percent), which was 6,511 baht on average. The data was similar to that from the study by Suthasinee Buachaban (2014), which reported that undergraduate students at Khon Kaen University received 5,000-10,000 baht a month from their parents. In addition, the data was similar to the study of personal financial management behavior (money watch) by the Ramjiti Institute, in collaboration with the Stock Exchange of Thailand (2006), reporting that in 2006, students from universities across the country were given approximately 3,000 baht by their parents. This identified that the monthly allowance that the Mae Fah Luang students received was approximately twice as much as that received by university students across the country ten years ago. In addition, 15.1 percent of the Mae Fah Luang students received extra money, the sources of

which were student loans for education (76.5 percent), followed by extra work (14.3 percent), and scholarships (9.2 percent).

Concerning their health conditions, most samples had no chronic disease (84.5 percent). As for those suffering from chronic diseases, more than half suffered from allergy (81.2 percent), followed by migraine (11.5 percent) and asthma (7.3 percent). This was in line with the study by Manee Arpanantikul et al. (2011), investigating health conditions and health practices among nursing students, which found that most of the student samples (90.87 percent) had no chronic disease and most of those with chronic disease suffered from allergy.

Concerning their weight, approximately half of the male samples weighed over 64 kg (51.1 percent) – their average weight was 68.06 kg (S.D. = 15.04), the highest weight was 126 kg, and the lowest weight was 47 kg. Among the female samples, over half of them (68.1 percent) weighed 41-57 kg weight ($\bar{X}$ = 54.44 S.D. = 11.39); 29 percent of them weighed over 57 kg, which was higher than the standard weights of Thai women aged 17-25 years (Department of Health, Ministry of Public Health, 2000). With regard to their heights, the average height among the male samples was 173.45 cm (S.D. = 6.11 cm), the lowest height was 155 cm, and the highest height was 195 cm. In addition, the height of nearly three-quarters of the male samples (71.6 percent) was within the standard height range of Thai men aged 17-25 years, which was 160-177 cm (Department of Health, Ministry of Public Health, 2000). The average height of the female samples was 160.20 (S.D. = 5.74 cm), which was approximately 13 cm lower than that of their male counterparts. Almost three-quarter of the female samples (70.8 percent) were 150-164 cm high, which were within the standard height range of Thai women aged 17-25 years (Department of Health, Ministry of Public Health, 2000).

Based on the data on the samples' weights and heights, the body mass index (BMI) of over half of them (58.5 and 68.3 percent, respectively) was within the normal BMI, which are between 18.51 and 22.99 (WHO, 2000b). The finding was similar to that from the study by Sirichai Hongsaguansri (2006), studying BMI, body satisfaction, and weight control behavior among Thai adolescents, which found that the BMIs of nearly half of male and female adolescents were within the normal BMI range. In this study, the percentage of male samples whose BMI was over the normal

BMI range (BMI > 22.99) was higher than that of their female counterparts (31.3 and 21.7 percent, respectively). This finding was in line with that from the study by Tuangporn Katanyutanon (2011), studying nutrition and three behaviors (consumption, exercise, and emotion) of undergraduate students, which revealed that there were more male samples suffering from overweight and obesity than their female counterparts.

In terms of weight perception, an analysis revealed that 38.1 percent of the male samples perceived that their weight was (slightly or much) higher than the standard weight range – the percentage was similar to that of the ones whose BMI was above the standard BMI (33.3 percent); 28.4 percent of the male samples perceived that their weight was lower than the standard weight range – the percentage was lower than that of the ones whose BMI was lower than the standard BMI values (10.2 percent). This indicated that the male samples tended to recognize their weight as being lower than their actual weight. The data was in line with that from many studies, which found that males tend to recognize their weight as being lower than their actual weight (Cheung et al, 2007; Harring et al, 20011; Po Yeng and Sedek, 2012). Among the female samples, 14.9 percent of them recognized that their weight was (slightly or much) lower than the standard weight value – the percentage was lower than that of the ones whose BMI value was below the standard BMI values (17 percent); over half of the female samples (57.8 percent) perceived that their weight was slightly or much higher than the standard height range – the percentage was over twice as much as that of the ones whose BMI value was higher the standard BMI (21.7 percent). The data identified that the female samples tended to recognize their weight as being higher than their actual weight. In other words, they perceived that they were fat. The data is in line with that from many studies, which found that females are more likely to recognize their weight as being higher lower than their actual weight than males (Cheung et al, 2007; Khor et al. 2009; Harring et al. 20011; Po Yeng and Sedek, 2012).

With regard to weight control, almost half of the samples reported that they were controlling their weight (44.8 percent). The percentage was similar to that from the study by Somsak Tinkhajee (2012), who investigated undergraduate students' weight loss behavior. In this research, there were more female samples that were

controlling weight than their male counterparts (48.2 percent and 16.4 percent, respectively). In addition, over half of them (59.3 percent) had controlled their weight in the past. There were more female samples than their male counterparts that had controlled their weight (62.6 percent and 47.7 percent respectively). An interesting finding was that many of the samples expected to control their weight in the future (83.6 percent). There were more female samples than their male counterparts that expected to control their weight in the future (86.8 percent and 72.7 percent, respectively). The data was in accordance with that of the study of the prevalence of weight control and weight loss behavior among Caribbean adolescents, which revealed the difference in the prevalence of weight control behavior between male and female adolescents. That is, female adolescents were more likely to control their weight than their male counterparts (40.5 and 25.2 percent, respectively) (McGuire et al. 2002).

As for their weight control methods, most of them chose exercising (84.6 percent), followed by being on a diet (percentage 72.8), and skipping some meals (57.6 percent). This finding was in line with that of the study by Serdula et al. (Serdula et al. 1993), examining adolescents' weight control behavior, which found that most of them controlled their weight by exercising and being on a diet. In this research, both male and female samples, with similar percentages, controlled their weight by exercising (84.5 percent and 84.6 percent, respectively). There were more male samples than female ones who were on a diet (77.4 percent and 71.8 percent, respectively). There were more female samples than male ones who skipped some meals (61.1 percent and 41.7 percent, respectively). The data was also found in many studies, which identified that female adolescents were usually on a diet by skipping meals (Suchart Isariyapankun et al., 2006; Oran Kosin et al., 2007; Nopaporn Wongmi et al., 2008). Other weight control methods consisted of dietary supplements, diet pills, fat-burning devices, and putting fingers down the throat to vomit, with low percentages (16.1, 8.6, 0.4, and 0.6 percent, respectively) – they were mostly used by female samples. The finding was in line with many studies, which found that popular improper weight control methods used by female adolescents were diet pills, skipping meals, dietary supplements, and putting fingers down the throat to vomit (Pawina Yuktanon, 2006; Waruni Sisombun, 2006; Chutima Wachrakul, 2007; Siwaluck

Kitchanapaiboon, 2007; Buntham Duangdi, 2011). The methods have adverse impacts on health, which may be fatal (Kampon Sriwatanakul, 2002).

5.1.2 Degree of Desirability

The analysis on the samples' overall desirability identified that the samples' highest score was 265 and lowest scores was 28, with an average score of 151.79 and standard deviation of 38.77. The degree of desirability of over half of them was at a moderate level (68.1 percent). With regard to respective aspects of desirability, the average score of desirability for doing physical activities (low-energy consuming) was higher than that of desirability for eating ($\bar{X}$= 80.7 and 71.08, respectively). This manifested that they desired to do low energy consuming activities, e.g. surfing the Internet, watching television or listening to music at home during holidays, or chatting with friends via Line rather than eating food rich in starch and fat.

As for the degree of desirability under respective aspects, the samples desired to eat sweets or snacks, such as ice cream, cake with favorite flavor, beverages with whipping cream, such as chocolate, tea, and coffee ($\bar{X}$ = 5.37, S.D. = 3.23), as well as food popularly eaten in a group, such as buffet grilled meat the most. They desired to eat ice cream ($\bar{X}$ = 6.72), followed by cake with favorite flavor ($\bar{X}$ = 6.69) and beer ($\bar{X}$ = 1.87), respectively. This might result from the fact that most of the samples were female students (77.7 percent). It was also noted that their desirability for foreign foods, such as pizza and crepe ($\bar{X}$ = 5.10 and 4.68, respectively) was higher than that for a single dish or Thai sweet, e.g. stewed pork hocks on rice ($\bar{X}$ = 3.66, S.D. = 2.90), boiled chicken with oily rice ($\bar{X}$ = 4.67, S.D. = 2.86), sticky rice with ripe mango ($\bar{X}$ = 4.97, S.D. = 3.24), and sticky rice with durian ($\bar{X}$ = 2.88, S.D. = 3.30). This consumption behavior was consistent with that in many studies on dietary habits of Thai adolescents, which found that Thai adolescents' food consumption behavior has changed drastically. As a result of socio-cultural changes and technological advancement; lifestyles of families, friends, society and the environment; and racing against time to learn, adolescents have adjusted their dietary habits – they have eaten fast foods. Fast food is ready-to-eat food, which is convenient, fast, and time saving for customers, e.g. hamburger, sandwich, pizza, fried

chicken, sausage, donut, cake, and ice cream (Somruedee Weeraphong, 1992; Nattaporn Yotkrasi, 2000; Suni Lilitwarangkun, 2011; Itthikorn Khadetch, 2011). In addition, advertisements have great influence on Thais' consumption behavior. Affecting adolescents' attitudes towards fast food, in general, advertisements present that consuming fast food represents modernity, new generation, vibrancy and good taste. Advertisements result in the consumption behavior among the population (Obcheuy Wongton, 1998; Prayad Saiwichian, 2004; Suwanna Chaingkuntod et al., 2013)

In terms of desirability for doing physical activities (low-energy consuming), most samples' mean of desirability for doing low-energy consuming physical activities was moderate-relatively high ($\bar{X}$ = 4.70-8.59). They desired to do activities related to communication via social networks and other media the most, such as the surfing the Internet, watching television, or listening to music at home during holidays or chatting with friends through Line. They desired to surf the Internet ($\bar{X}$ = 8.59), followed by watching television or listening to music at home during holidays ($\bar{X}$ = 7.57), respectively. This finding was in line with that from the survey on households' having and using information technology by the National Statistical Office of Thailand (National Statistical Office of Thailand, 2011). The survey reported that adolescents aged 15-24 years used the Internet the highest among all age groups, increasing from 39.7 percent in 2007 to 51.9 percent in 2011. It was expected that the Internet use among adolescents would see a steady rise. Adolescents often surfed the Internet to search for general information/goods or services (79.6 percent), followed by to play or download games (65.4 percent), read newspapers and magazines (57.4. percent), download movies or music, watch television or videos and listen to radio (56.4 percent), as well as receive and send e-mails (55.9 percent), respectively. The finding was also in line with that from the study of exercise among Thai adolescents (Srisakdi Charmonman) et al., 2013), which found that among all age groups, adolescents were using computers to access the Internet the most and that the time for which they spent on the computer was longer than that on other activities, including playing sports or exercising, which would have a detrimental impact on both physical and mental health in the long run.

This study also analyzed the causal relationships between individuals' desirability and motivational conflict strategies – resisting desire, adapting risk perception/outcome expectancy when implementing tempting behavior, and activating compensatory health beliefs – by means of the path analysis method to test Hypothesis 1. The analysis revealed that desirability had negative influence on resisting desire and had positive influence on adapting risk perception or adapting outcome expectancy when implementing tempting behavior at the statistical significance level of $p < 0.001$. This finding was in line with the hypothesis of Rabiau et al. (2006) indicating that individuals tend to resisting desire when the degree of their desirability is not very high. On the contrary, adapting risk perception/outcome expectancy when implementing tempting behavior tends to be used when the degree of desirability is high. However, desirability had no influence on activating compensatory health beliefs. This might result from the fact that the samples were not limited to only those who wanted to control their weight. The BMI of almost all the samples was within the normal BMI range and they perceived that they had a normal weight. Thus, when they experienced tempting desire, conflict in their mind was not very high, so they did not activate compensatory health beliefs to resolve the conflict.

Furthermore, the compensatory beliefs model by Rabiau et al. (2006) was expanded, and the causal relationships among the variables in the model were adjusted. The analysis revealed that desirability had influence on all of the three motivational conflict resolution strategies at the statistical significance level of $p < 0.05$. In addition, desirability had negative influence on resisting desire ($\beta = -0.14$) and had positive influence on adapting risk perception/outcome expectancy when implementing tempting behavior and activating compensatory health beliefs ($\beta = 0.13$ and 0.21, respectively). This was in accordance with the hypothesis of Rabiau et al. (2006). It was also found that desirability had positive influence on the external self-concordance and the introjected self-concordance ($\beta = 0.13$ and 0.08, respectively). It can be explained that the concept of health goals self-concordance has been developed based on the self-determination theory (Ryan & Deci, 2000), which proposed that there are three needs that result in individuals' self-motivation – the need for competence, need for relatedness, and need for autonomy. The three needs have great influence on individuals' self-motivation, especially the need for autonomy. That is,

the degree of autonomy of individuals with extrinsic motivation is lower than that of those with intrinsic motivation. Thus, it is possible that desirability will have positive influence on external self-concordance and introjected self-concordance. This is because the higher the degree of desirability is, the lower the degree of the three needs will be, which results in reduced goal self-concordance – the goal results from extrinsic motivation rather than intrinsic motivation.

Desirability also had a negative relationship with weight control self-efficacy ($r = -0.25$). The finding was in line with that from some studies, which identified that when individuals have desirability, drives, or need for implementing a behavior at a high level, they tend to have less behavioral control self-efficacy. On the contrary, if their behavioral control self-efficacy is high, they are more likely to have less desirability (Hutchison et al. 2006; Eccles & Wigfield, 2002). In addition, desirability had a negative relationship with actual behavioral control ($r = -0.19$). Based on the finding, this may result from the fact that actual behavioral control is a variable in the theory of planned behavior, the structure of which partly overlaps with perceived behavioral control (Armitage & Conner, 2001). Perceived behavioral control is usually used in replacement of actual behavioral control (Ajzen, 1991). How well individuals' perceived behavioral control can replace actual behavioral control depends on their accurate perception (Ajzen, 1985). At the same time, perceived behavioral control overlaps with self-efficacy (Ajzen, 1991). Thus, desirability has a negative relationship with actual compensatory behavioral control as it does with weight control self-efficacy.

The analysis on the value of direct effect, indirect effect, and total effect of desirability revealed that desirability had direct effect (no indirect effect) on external self-concordance and introjected self-concordance ($\beta = 0.050$ and 0.017, respectively) and had direct effect (no indirect effect) on the response to motivational conflict by resisting desire and adapting risk perception/outcome expectancy when implementing tempting behavior ($\beta = -0.002$ and 0.001, respectively). Desirability also had direct effect on compensatory health beliefs. It was manifested that when the samples had high desirability, they would activate compensatory health beliefs at a greater extent ($\beta = 0.102$). In addition, desirability had indirect effect on compensatory health beliefs and compensatory behavior intention. Desirability's indirect effect on compensatory

health beliefs passed on external self-concordance (β = 0.007). Indirect effect on compensatory behavior intention passed on compensatory health beliefs (β = 0.016). This means that if the samples had high desirability, in addition to resulting in them in activating compensatory health beliefs to a great extent, this would result in them having high compensatory behavior intention.

5.1.3 Weight Control Self-Efficacy

The analysis revealed that the samples' highest score of weight control self-efficacy was 80 and lowest score was 1, with an average score of 44.33 and standard deviation of 14.82. The total weight control self-efficacy of over half of the samples was at a moderate level (68 percent). As for weight control self-efficacy under respective dimensions, the samples' average score of weight control self-efficacy (after being divided by the number of items) through being on a diet was higher than the average score of weight control self-efficacy through doing physical activities (low-energy consuming) ($\bar{X}$ = 5.58 and 3.24, respectively). This indicated that the samples perceived they had capability for controlling their weight by being on a diet rather than by doing physical activities, e.g. exercise. The data was in line with that from the study by Sukuma Thosuwan et al. (2007), which was conducted on the outcomes of a program designed for enhancing practice and weight self-efficacy among overweight female adolescents, which found that their average score of self-efficacy for food consumption was higher than that of self-efficacy for exercise.

As for respective items of weight control self-efficacy under respective aspects, the samples' average score of weight control self-efficacy through being on a diet was not very high ($\bar{X}$ = 5.27-6.12). They perceived that they could refrain from eating after 9 pm the most ($\bar{X}$ = 6.12, S.D. = 3.19). However, the average score would reduce when they had to refrain from eating food rich in starch and fat ($\bar{X}$ = 5.40, S.D. = 2.33). The average score would be the lowest if they had to refrain from eating their favorite sweets ($\bar{X}$ = 5.27, S.D. = 2.81). This finding was in line with that from the report on diet and nutrition in 2003 in Thailand, which revealed that Thai children and adolescents consumed snacks and foods with high fat and sugar content to a greater extent (Ladda Mo-suwan et al., 2010).

With regard to weight control self-efficacy through low-energy consuming physical activities, the samples perceived that they could exercise at least 30 minutes a day ($\bar{X}$ = 5.83, S.D. = 3.24) the most. However, their weight control self-efficacy would significantly reduce when they had to control themselves to exercise regularly and continually for three months ($\bar{X}$ = 4.90, S.D. = 2.79). This manifested that the samples' weight control self-efficacy was not very high when they had to implement energy- and time-consuming behavior self-control in a long, continual period. The data was in line with that from some overseas studies, which found that only 11 percent of people suffering from obesity could maintain weight loss behavior until year 5 (Toubro & Astrup, 1997). It was also found that individuals tend not to increase the level of physical activities continually (Perri et al, 1997). This may be because exercise has a higher cost (time, money, and energy) (Wandee Yamchanchai, 1995; Pitakpong Panta, Dao Wiangkam, 2011) than being on a diet does. In other words, weight control by exercising needs higher self-regulation than being on a diet. This is why the level of adolescents' self-efficacy for weight control through exercising or doing high-energy consuming physical activities was not very high compared with that through being on a diet.

The analysis of the causal relationships between weight control self-efficacy and motivational conflict strategies and health goal self-concordance by means of the path analysis method to answer Hypotheses 3 and 4 revealed that weight control self-efficacy had positive effect on resolving motivational conflict by resisting desire at the statistical significance level of $p < 0.05$. That is, the samples with higher weight control self-efficacy were more likely to respond to desire by resisting it. It was also found that weight control self-efficacy had negative effect on adapting risk perception/outcome expectancy when implementing tempting behavior at the statistical significance level of $p < 0.001$. This means that the samples with high weight control self-efficacy tended to adapt risk perception/outcome expectancy after they implement tempting behavior to a lesser extent. This finding was similar to that from many studies, which found that self-efficacy has a relationship with self-regulation to achieve a goal (Campbell, 1990; Zimmerman et al. 1992; Heasook and Ranhee, 2001). It this study, weight control self-efficacy had no influence on activating compensatory health beliefs at the statistical significance level of $p < 0.05$,

which did not comply with the hypothesis of Rabiau et al. (2006). Based on the finding, there are many factors that influence individuals' response to motivational conflict, e.g. goal self-concordance, degrees of desirability, self-efficacy, and motivational conflict – they are key variables influencing the relationships among other variables (Rabiau et al. 2006). This might be because of the fact that study involved 788 samples, who were not limited to only those having the goal to control weight. Over half of them (55.2 percent) were not controlling their weight at the time, so their motivational conflict was not high enough to make them so frustrated that they had to resolve it by using compensatory beliefs.

The study also found that weight control self-efficacy had positive effect on identified self-concordance at the statistical significance level of $p < 0.001$. This means that if the samples had high weight control self-efficacy, this would determine their self-motivation for weight control and the motivation would be intrinsic motivation. This complied with the hypothesis of Rabiau et al. (2006) that self-efficacy affects individuals' goals (no direction of the relationship has been defined). This finding was in line with that from the study of the relationship between self-efficacy and health goal self-concordance by Antl (2011), which found that self-efficacy had positive influence on health goal self-concordance.

It was also identified that weight control self-efficacy had positive influence on health goal self-concordance, external self-concordance, and introjected self-concordance at the statistical significance level of $p < 0.001$. This means that if the samples had higher weight control self-efficacy, their external self-concordance and introjected self-concordance would become higher too. This is because the concept of health goal self-concordance has been developed based on the self-determination theory (Ryan & Deci, 2000). The concept presents that the need for competence, need for relatedness, and need for autonomy have great influence on self-motivation. It is witnessed that the need for competence may have a relationship with individuals' perceived self-efficiency, so this variable has influence on the motivation for setting the goals. However, the self-determination theory (SDT) postulates that individuals' motivation is different in terms of autonomy. For example, some students pay attention to their homework because they believe that this will have a positive effect on their study in the future. Others may do homework just to avoid punishment

by their teachers or because their parents force them to do so. It is evident that both groups' homework-doing behavior is the same and their motivation for doing homework is extrinsic motivation, but with a different level of autonomy (Ryan & Deci, 2000). When the concept is applied to explain health goal self-concordance, it is evident that self-efficacy has influence on the three types of health goal self-concordance (they involve extrinsic motivation as well), but it is different in terms of levels of autonomy. That is, external self-concordance has autonomy for establishing self-goals the least, but identified self-concordance has autonomy for establishing self-goals the most.

After the model by Rabiau et al. (2006) was expanded, and the causal relationships among the variables were adjusted, it was revealed that weight control self-efficacy had influence only on identified self-concordance ($\beta = 0.15$). This finding was in line with that from the study by Antl (2011), which indicated that self-efficacy had influence on health goal self-concordance. It was identified that samples possessing high self-efficacy tended to have high health goal self-concordance.

It was also found that weight control self-efficacy had positive effect on compensatory behavior self-efficacy for weight control ($\beta = 0.68$). This might result from the fact that weight control self-efficacy and compensatory behavior self-efficacy were used for evaluating self-efficacy for implementing weight control behaviors as well, but they are different in terms of situations – compensatory behavior and non-compensatory behavior. Thus, when the samples had high weight control self-efficacy, they would perceive that they could implement weight control behavior well too. It was also identified that weight control self-efficacy and actual behavioral control had a positive relationship with each other ($r = 0.35$). This might be because of the partial overlap between the structure of actual behavioral control and that of perceived behavioral control (Armitage & Conner, 2001). At the same time, perceived behavioral control overlaps with self-efficacy (Ajzen, 1991). Therefore, weight control self-efficacy and actual behavioral control have a positive relationship with each other.

Furthermore, it was indicated that weight control self-efficacy had direct effect (without indirect effect) on identified self-concordance and compensatory behavior self-efficacy ($\beta = 0.116$ and 1.029, respectively). This means that if the samples perceived that they had high efficacy for weight control, they would tend to

set the goal to control their weight with intrinsic motivation (truly realizing the value of weight control) and have high weight control self-efficacy. At the same time, weight control self-efficacy had indirect effect (without direct effect) on the response to motivational conflict by adapting risk perception/outcome expectancy when implementing tempting behavior and compensatory behavior intention. The indirect effect of weight control self-efficacy for adapting risk perception/outcome expectancy passed on identified self-concordance ($\beta = -0.001$). This means that if the samples had high weight control self-efficacy, this would result in them setting the goal to control their weight with intrinsic motivation and adapting risk perception/outcome expectancy when implementing tempting behavior to a lesser extent. The indirect effect on compensatory behavior intention passed on compensatory behavior self-efficacy ($\beta = 0.016$). This means that if the samples had high weight control self-efficacy, they would tend to have high compensatory behavior self-efficacy for weight control and high compensatory behavior intention.

5.1.4 Health Goal Self-Concordance

Based on the data analysis, nearly half of the samples had the identified self-concordance the most (percent 46.07), followed by the external self-concordance (percent 40.86) and the introjected self-concordance the least (percent 13.07). This manifested that most of them had the goal to control weight because they truly realized the value and benefits of weight control. There were samples who wanted to control their weight because of external factors, and there was a minority of them who wanted to control their weight to reduce negative feelings and create value or positive feelings to themselves. This finding was similar to that of studies on the reasons for weight lost among adolescents. The studies found that most adolescents wanted to lose weight in order to become healthier, get a good shape, and avoid being teased by their friends, respectively (Brink & Ferguson, 1998; O'Brien et al. 2007; Lofrano-Prado et al. 2013).

As for the average scores of health goal self-concordance under respective items, it was indicated that the samples' scores of external self-concordance were not very high (score ranging from 4.25-6.19). They wanted to control their weight because they did not want people around them to blame them for not controlling weight the

most ($\bar{X}$ = 6.19, S.D. = 3.27), followed by because they did not want people around them to feel bad about them for not controlling their weight ($\bar{X}$ = 6.06, S.D. = 3.31), and because their friends suggested that they should lose their weight ($\bar{X}$ = 4.25, S.D. = 3.35). The average scores of introjected self-concordance ranged from 4.91-5.72, which indicated that their introjected self-concordance in weight control was at a moderate level. The samples had motivation for controlling weight because weight control helped them to feel more self-confident the most ($\bar{X}$ = 5.72, S.D. = 2.59). Motivation for weight control in other items was at similar levels. That is, they wanted to control their weight because it made them feel more proud of themselves ($\bar{X}$ = 4.94, S.D. = 2.60), because it made them feel that they had more value ($\bar{X}$ = 4.91, S.D. = 2.29), and because having a good shape made them feel good about themselves ($\bar{X}$ = 4.83, S.D. = 2.65). The average score of identified self-concordance ranged from 6.35-8.32, which were relatively high. The samples wanted to control their weight because they viewed that weight control improved their health ($\bar{X}$ = 8.32, S.D. = 2.29), followed by because weight control proved their self-discipline ($\bar{X}$ = 7.20, S.D. = 2.93), and because weight control was a challenge (intrinsic motivation) ($\bar{X}$ = 6.35, S.D. = 3.06). An interesting finding was that the average scores of identified self-concordance were higher than those of external self-concordance and introjected self-concordance in all items. This manifested that the samples wanted to control their weight because they realized the benefits and value of weight control rather than because they wanted to get reward, avoid punishment, or resolve bad feelings about themselves.

The analysis of the causal relationships between health goal self-concordance and motivational conflict resolution strategies to test Hypothesis 2 revealed that identified self-concordance had influence on resolving motivational conflict strategies by resisting desire at the statistical significance level of $p < 0.05$. This indicated that the samples that had the goal to control their weight as a result of intrinsic motivation (truly realizing the benefits and value of weight control) tended to resist tempting behavior that may have adverse impacts on weight control. This finding was consistent with the hypothesis of Rabiau et al. (2006) that individuals with identified self-concordance tend to be able to resist desirability for tempting behavior

and are not likely to activate compensatory health beliefs to resolve their motivational conflict.

The study found that external self-concordance had no influence on adapting risk perception/outcome expectancy when implementing tempting behavior or adapting outcome expectancy when implementing tempting behavior. Likewise, introjected self-concordance had no influence on activating compensatory health beliefs. This might be because of the fact that the response to motivational conflict by adapting risk perception/outcome expectancy when implementing tempting behavior and activating compensatory health beliefs is a process that involves cognitive reasoning. In the process, individuals use data and factors to process to respond to their motivational conflict (Rabiau et al. 2006). As stated, there are many factors that influence resolving motivational conflict and the variable that has great influence on choosing motivational conflict resolution strategies is the severity of the conflict between individuals' goal and desire that may negatively affect the goal. However, as this study did not only focus on students who were in the weight-control period, this might affect their goal self-concordance and the intensity of their motivational conflict – they might not be strong enough to result in the samples' responding to motivational conflict by using a particular strategy.

In the study, the model by Rabiau et al. (2006) was expanded, and the causal relationships among the variables were adjusted. Based on the data analysis, external self-concordance had positive effect on compensatory health beliefs at the statistical significance level of $p < 0.05$ ($\beta = 0.12$). Based on the finding, this might result from the fact that individuals with external self-concordance tend not to be able to resist desire and may adapt their risk perception/outcome expectancy. Thus, the determination to define the goal tends to be weakened when individuals confront obstacles, which finally makes it difficult to achieve their goal (Sheldon & Elliot, 1999). When individuals cannot resist desire, they have two choices to resolve their conflict – adapting risk perception/outcome expectancy for tempting behavior and using compensatory beliefs (Rabiau et al. 2006). However, implementing tempting behavior that has a potential negative impact on the goal will result in frustration and guilt within individuals. Rabiau et al. (2006) argued that activating compensatory beliefs allows individuals to implement tempting behavior with less guilt than

adapting risk perception/outcome expectancy when implementing tempting behavior. This is because using compensatory beliefs also links to the process of implementing compensatory behavior. Thus, individuals will feel that they still adhere to the goal they have defined. In addition, identified self-concordance was found to have positive effect on resisting desire ($\beta = 0.09$) and had negative effect on adapting risk perception/outcome expectancy when implementing tempting behavior ($\beta = -0.13$). This finding was in line with the hypothesis of Rabiau et al. (Rabiau et al. 2006) that individuals that have identified self-concordance tend to resist desire to a great extent and are not likely to activate compensatory health beliefs or adapt risk perception/outcome expectancy for tempting behavior.

The analysis identified external self-concordance had direct effect on compensatory health beliefs ($\beta = 0.149$) without receiving indirect effect from other variables. This manifested that when the samples set the goal to control their weight with extrinsic motivation (expecting reward or avoiding punishment), they would be more likely to activate compensatory health beliefs. It was also found that external self-concordance had indirect effect on compensatory behavior intention, which was passed on through compensatory health beliefs ($\beta = 0.022$). This manifested that if the samples set the goal to control their weight by expecting reward or avoiding punishment, apart from tending to activate compensatory health beliefs to a greater extent, they would tend to have higher compensatory behavior intention. In terms of identified self-concordance, it had direct effect (no indirect effect) on the response to motivational conflict by resisting desire and adapting risk perception/outcome expectancy when implementing tempting behavior ($\beta = 0.004$ and -0.005, respectively). This manifested that if the samples set the goal to control their weight with intrinsic motivation, they would tend to respond to motivational conflict by resisting desire to a greater extent or adapt risk perception/outcome expectancy when implementing tempting behavior to a lesser extent.

5.1.5 Response to Motivational Conflict

The analysis on the number and percentage of the samples to identify their response to motivational conflict revealed that almost half of them responded to motivational conflict by resisting desire (47.1 percent), followed by activating

compensatory health beliefs (35.3 percent) and by adapting risk perception when implementing tempting behavior (17.6 percent). Based on the finding, this might be because of the fact that nearly half of the samples (46.07 percent) wanted to control their weight because of intrinsic motivation or in other words they had identified self-concordance. This means that the samples wanted to control their weight because their true awareness of the benefits and value of weight control. Rabiau et al. (2006) suggested that individuals with identified self-concordance tend to resist desire to a great extent and are not likely to activate compensatory health beliefs or adapt risk perception/outcome expectancy for their tempting behavior.

The study also dealt with the analysis of the causal relationships among the response to motivational conflict and desirability, weight control self-efficacy, and different types of health goal self-concordance by means of the path analysis method. The results of analysis of the variables have been presented earlier.

5.1.6 Compensatory Health Beliefs

Based on the data analysis, overall, the samples activated compensatory health beliefs at a low level. In other words, their cognitive reasoning about compensation was at a low level ($\bar{X}$ = 45.41 S.D. = 18.83). This might be because of the fact that more than half of the samples were not controlling weight (51.8 percent) and had a normal BMI (53 percent). It was possible that their motivation for controlling weight and the level of frustration caused by the conflict between the desirability and goal (weight control) were not strong enough to result in conflict or guilt that forced them to use compensatory beliefs to resolve the feelings.

The analysis revealed that the average scores of compensatory health beliefs under respective aspects were slightly different. That is, the samples' average score of compensatory health beliefs about being on a diet ($\bar{X}$ = 23.6, S.D. = 10.22) was higher than that of compensatory health beliefs about doing physical activities ($\bar{X}$ = 21.77, S.D. = 10.15). This might be because individuals feel that high-energy consuming physical activities, e.g. exercise waste time and money and result in them being tired and injured (Pradit Natwichai, 1997; National Statistical Office of Thailand, 2007; Somnuek Kaewwilai, 2009). It can be said that high-energy consuming physical activities need higher self-regulation than being on a diet, so most

adolescents activate compensatory health beliefs about doing high-energy consuming physical activities less than compensatory health beliefs about being on a diet.

The analysis on compensatory health beliefs of respective aspects revealed that the samples believed that they could compensate for their tempting behavior related to food by being on a diet better than by doing physical activities. Based on the finding, this might be result from the fact that doing high-energy consuming physical activities involves a higher cost and self-regulation than being on a diet, so individuals are more likely to activate compensation for eating a lot of food and food rich in starch and fat by being on a diet than by doing high-energy consuming physical activities.

Overall, the samples' compensatory health beliefs about doing physical activities were at a relatively low level ($\bar{X}$ = 3.87-4.92). The analysis revealed that samples believed that they could compensate for tempting behavior related to doing low-energy consuming activities, such as lacking exercise, by doing more high-energy consuming physical activities rather than compensation by being on a diet. Based on this finding, this might be because of the fact that in general, individuals know that factors that influence their weight are eating and energy-using behavior (Thaksaphon Thamarangsri et al., 2009). When the body receives more energy intake, the method that creates balance of energy in the body is using more energy (WHO, 2000a). The knowledge and understanding may generate compensatory beliefs of individuals. In this study, the samples perceived that they did not get more energy from eating but they used too little energy. Thus, the activation of compensatory beliefs about being on a diet occurred less than the activation of compensatory beliefs about doing physical activities, e.g. exercising or doing more high-energy consuming activities.

In this study, the model by Rabiau et al. (2006) was expanded, and the causal relationships among the variables in the compensatory health beliefs model were adjusted. It was identified that compensatory health beliefs had positive influence on compensatory behavior intention at the statistical significance level of $p < 0.05$ (β = 0.14). This finding was in line with the hypothesis of Rabiau et al. (2006) that when individuals have compensatory health beliefs, they need to plan their compensatory behavior. The compensatory beliefs will result in individuals' compensatory behavior intention. Goal intention in the compensatory health beliefs model by Rabiau et al. (2006) is similar to the concept by Gollwitzer (1993). That is, it is determination to

achieve sub-goals. It was also found that compensatory health beliefs had direct effect (without direct effect) on compensatory behavior intention (β = 0.149). This means that if the samples had high compensatory health beliefs, they would tend to have high intention to implement compensatory behavior. This finding was in line with the hypothesis of Rabiau et al. (2006) as presented above.

5.1.7 Compensatory behavior self-efficacy

Based on data analysis, overall, the samples' compensatory behavior self-efficacy was at a moderate level ($\bar{X}$ = 60.89 S.D. = 22.62). It was also found that the samples' average score of compensatory behavior self-efficacy through being on a diet was similar to their average score of compensatory behavior self-efficacy through doing physical activities ($\bar{X}$ = 30.23 and 30.66, respectively). In terms of compensatory behavior self-efficacy in respective aspects, in the case when desire was related to eating (eating a lot of food or food rich in starch and fat), the samples' compensatory behavior self-efficacy through being on a diet was higher than compensatory behavior self-efficacy through doing low-energy consuming physical activities (no exercise). Likewise, in the case of compensatory behavior self-efficacy through doing physical activities, the samples' compensatory behavior self-efficacy through doing physical activities after implementing tempting behavior related to low-energy consuming physical activities (no exercise) was higher than compensatory behavior self-efficacy through being on a diet. Based on this finding, this might be because the samples understood that weight gain was a result of imbalance between energy intake and energy use and in order to create balance between energy intake and energy use, when they eat a lot of food or food rich in starch and fat (receiving too much energy intake), they have to compensate for this by using more energy, but if they do not receive energy intake, they may not believe that they need to use more energy or control food consumption to control energy intake.

The study also involved analysis of the causal relationships between compensatory behavior self-efficacy and compensatory behavior intention by means of the path analysis method to test Hypothesis 5. The result of the data analysis was that compensatory behavior self-efficacy had positive influence on compensatory behavior intention at the statistical significance level of $p < 0.001$. This manifested

that if the samples had compensatory behavior self-efficacy for weight control, they would have high compensatory behavior intention. This finding was in accordance with the hypothesis of Rabiau et al. (2006) presenting that preliminarily, self-efficacy (for weight control) will affect individuals' goals and when motivational conflict occurs, their self-efficacy (for weight control) will result in them resisting desire or using other cognitive strategies to resolve the conflict. In addition, appraisal of self-efficacy is important for the process of compensatory behavior development. Behavior that individuals believe (perceived that they can implement compensatory behavior) will be successfully implemented. When they have low self-efficacy, they will be less likely to implement compensatory behavior. On the contrary, the failure to implement compensatory behavior would result in them having lower self-efficacy because the failure reinforces negative feelings. On the contrary, if individuals have high self-efficacy, they will be more likely to implement compensatory behavior, which will reinforce high self-efficacy. This occurs as a cycle.

The study involved the expansion of the model by Rabiau et al. (2006) and adjustment of relationships among the variables in model. The analysis revealed that compensatory behavior self-efficacy had positive influence on compensatory behavior intention at the statistical significance level of $p < 0.05$, and compensatory behavior self-efficacy had direct effect (without direct effect) on compensatory behavior intention ($\beta = 0.127$). This finding was in line with the hypothesis of Rabiau et al. (2006) as presented above.

5.1.8 Compensatory behavior intention

The analysis suggested that the samples had compensatory behavior intention at a moderate level ($\bar{X}$ = 54.17 S.D. = 20.33). Based on the data, this might result from the fact that more than half of them were not in the weight control period; therefore, their compensatory behavior intention to control their weight was not very high.

The analysis of respective items of compensatory behavior intention under four groups: compensatory behavior intention to be on a diet when implementing tempting behavior related to food; compensatory behavior intention to do physical activities when implementing tempting behavior related to food; compensatory

behavior intention to be on a diet when implementing tempting behavior related to physical activities; and compensatory behavior intention to do physical activities intention when implementing tempting behavior related to do physical activities revealed that the samples had compensatory behavior intention to do physical activities (exercise) when implementing tempting behavior related to food (eating a lot of food or food rich in starch and fat) the most ($\bar{X}$ = 5.74, S.D. = 2.66), followed by compensatory behavior intention to be on a diet when implementing tempting behavior related to food ($\bar{X}$ = 5.53, S.D. = 2.22). Compensatory behavior intention to be on a diet when implementing tempting behavior related to low-energy consuming physical activities had the lowest mean ($\bar{X}$ = 4.93, S.D. = 2.91). All these identify that types of desires (desire for food and physical activities) and types of compensation (compensation by being on a diet and by doing physical activities) had influence on compensatory behavior intention. Based on this finding, this might result from the fact that in general, individuals know and understand that the key factor that influences overweight and obesity is consumption and energy-use behavior (Thaksaphon Thamarangsi et al., 2009). When they receive more energy intake, a method to create balance in the body is using more energy (WHO, 2000a). It can be said that when individuals eat food that gives more energy, exercise will help burn the energy intake and create balance of energy in the body. The knowledge and understanding create individuals' behavioral beliefs, as witnessed that the samples had intention to compensate for eating a lot of food or food rich in starch and fat by doing high-energy consuming physical activities the most. The fact that they had intention to compensate for doing low-energy consuming activities by being on a diet the least resulted from their perception that because they did not gain energy intake, they did not need to control food to reduce energy intake.

The study also involved analyzing the causal relationships between compensatory behavior intention and compensatory beliefs, compensatory behavior self-efficacy, and actual behavioral control by means of the path analysis method. The data analysis results are presented in the sections of relevant variables.

5.1.9 Actual behavioral control

The analysis of the overall actual behavioral control identified that most samples' actual compensatory behavior related to weight control was not very high ($\overline{X}$ = 50.12 S.D. = 23.12). This might result from the fact that almost half of them had never controlled their weight in the past (40.7 percent) and they chose to respond to motivational conflict by resisting desire (47.1 percent). This means that nearly half of them had no idea about using compensatory beliefs, so this might affect their actual compensatory behavior.

The results of analysis of actual behavioral control pertaining to eating under respective items were similar to those of compensatory health beliefs. The samples had compensated for their tempting behavior pertaining to eating by being on a diet rather than compensating for their tempting behavior pertaining to doing low-energy consuming physical activities by being on a diet. Actual behavior control by doing physical activities was similar to compensatory health beliefs. That is, the samples had implemented compensatory behavior by doing physical activities (exercise) when they implemented tempting behavior related to doing physical activities (no exercise) less than implementing compensatory behavior by doing physical activities when they implemented tempting behavior related to doing physical activities when they implemented tempting behavior related to eating. This finding can be discussed similarly to compensatory health beliefs.

The analysis of the causal relationships between actual compensatory behavior and compensatory behavior intention and compensatory behavior self-efficacy by means of the path analysis method to answer Hypotheses 6 and revealed that actual behavioral control had influence on compensatory behavior intention and compensatory behavior self-efficacy at the statistical significance level of $p < 0.001$. This means that if the samples had implemented actual compensatory behavior for weight control, their compensatory behavior intention to control weight and compensatory behavior self-efficacy for weight control would be high. This finding was similar to that from many studies, which found that actual compensatory behavior is a key factor in the prediction of behavior intention, behavior self-efficacy, and future behavior (Sheeran, 2002; Rhodes & Courneya 2003; Knussen et al. 2004; Smith et al. 2007; Kidwell & Jewell, 2008)

In addition, the study involved the expansion of the model by Rabiau et al. (2006) and adjustment of relationships among the variables in the model. It was found that actual compensatory behavior had positive effect on compensatory behavior intention at the statistical significance level of $p < 0.05$ ($\beta = 0.60$) and actual behavioral control had positive effect on compensatory health beliefs and compensatory behavior self-efficacy ($\beta = 0.31$ and 0.22, respectively). Furthermore, actual behavioral control had positive effect on external self-concordance, introjected self-concordance, and identified self-concordance at the statistical significance level of $p < 0.05$ ($\beta = 0.42$ 0.41 and 0.34, respectively)**.** This might result from the fact that actual behavioral control is a variable whose structure partly overlaps with the structure of perceived behavioral control (Armitage & Conner, 2001). Perceived behavioral control is usually used in replacement of actual behavioral control (Ajzen, 1991). At the same time, perceived behavioral control overlaps with self-efficacy (Ajzen, 1991). Thus, it is possible that actual compensatory behavior has influence on the three types of goal self-concordance in the same way that weight control self-efficacy has influence on identified self-concordance.

The analysis also identified that actual behavioral control had direct effect (without direct effect) on the three types of goal self-concordance – external self-concordance, introjected self-concordance, and identified self-concordance ($\beta = 0.267$, 0.154 and 0.164, respectively); actual compensatory behavior had direct effect (without direct effect) on compensatory behavior self-efficacy ($\beta = 0.211$); actual behavioral control had indirect effect (without direct effect) on the response to motivational conflict by resisting desire and adapting risk perception/outcome expectancy when implementing tempting behavior ($\beta = 0.001$ and -0.001, respectively); and actual behavioral control also had direct effect on compensatory health beliefs and compensatory behavior intention ($\beta = 0.255$ and 0.528, respectively) and indirect effect on both variables. The indirect effect of actual behavioral control on compensatory health beliefs passed on external self-concordance ($\beta = 0.040$). The indirect effect on compensatory behavior intention was passed on via compensatory health beliefs and compensatory behavior self-efficacy ($\beta = 0.071$).

5.1.10 Compensatory health belief model expanded under a different condition

Another main purpose of this study was to expand the original compensatory health belief model under a different condition – weight control behavior among Thai undergraduate students. The analysis of the causal relationships within the compensatory health beliefs model under a different condition revealed the findings:

(1) Compensatory health beliefs model in the case when samples' BMI is lower than normal BMI ranges

The analysis of data on samples whose BMI was lower than normal BMI range (BMI < 18.50) revealed that the causal relationships among most variables were similar to those of the compensatory health belief model expanded from the original model by Rabiau et al. (2006). There were some variables whose causal relationships were slightly different. External self-concordance in weight control had no influence on activating compensatory health beliefs or compensatory behavior intention at a statistical significance level of $p < 0.05$. This might result from the fact that the samples had a BMI that was too low – they were not overweight or obese, so they were less likely to be criticized by people around them for weight. Among them, only 13 percent were controlling weight; therefore, motivational conflict stemming from the disagreement between the desirability and goal to control weight might not be very high. When the level of motivational conflict is not very high, individuals will not activate compensatory beliefs for weight control (Rabiau et al. 2006). When the cognitive process about compensatory beliefs is low, compensatory behavior intention will become less. In addition, it was identified that actual behavioral control had significant influence on introjected self-concordance, at the statistical significance level of $p < 0.05$. Based on the finding, this might result from the fact that the samples' BMI value was lower than the normal values (they were not obese). Therefore, their actual behavioral control resulted in them having motivation for weight control to reduce guilt over themselves and others as well as to strengthen good feelings to themselves rather than setting the goal due to their true awareness of the benefits of weight control or desire for getting reward or avoiding punishment.

(2) Compensatory belief model in the case when samples have a normal BMI

The analysis of the causal relationships among samples with a normal BMI ranges (BMI 18.51-22.99) identified that the causal relationships among all variables were in line with those in the compensatory health beliefs model expanded from the original model by Rabiau et al. (2006). This indicated that the expanded compensatory health belief model can be effectively utilized for explaining the data in the case when individuals have a normal BMI value. Based on the finding, this might result from the fact that the samples had a normal BMI value and they were late adolescents and early adults – the ages when individuals pay attention to their image, especially through other people's perception (Croll, 2005; Holmqvist Gattario, 2013). In addition, the influence of peers and changing values about desirable appearance in the modern society (Cash et al. 2004) might result in the samples developing extrinsic motivation for weight control. That is, they wanted people around them to appreciate them or they wanted to prevent people around them from blaming or teasing them for their weight. When motivational conflict between the desirability and goal (from extrinsic motivation) occurred, they might activate compensatory beliefs to resolve motivational conflict between the desirability and goal. This is because the strategy allows individuals to implement their tempting behavior without conflict or guilt. When individuals implement tempting behavior, they will feel more relieved. With this strategy, individuals do not need to change their desirability or beliefs (Rabiau et al. 2006). In addition, the implicit cognition concept proposes that although individuals have knowledge and understanding about the adverse effects of tempting behavior, such as drinking alcohol, using drugs, having unsafe sex, skipping exercise, or eating food rich in starch and fat, they still implement the behavior, which is not in line with their knowledge or understanding (Wiers et al. 2010). One interesting explanation is the implicit cognition concept identifies that the phenomenon is influenced by the subset of association in memory, which is spontaneously activated under different circumstances. This linkage is learned through experience and leads to behavior that cannot be understood by introspection, self-reflection, or causal attribution (Stacy and Wiers, 2010). It can be said that individuals' implementation of behavior that can have

an adverse impact on health, despite knowing the consequences of the behavior, may result from their experience, perception, or memory at the unconscious level.

(3) Compensatory belief model in the case when samples' BMI is higher than normal BMI ranges

The analysis of the causal relationships among variables in the expanded compensatory health belief model among samples whose BMI was higher than normal BMI ranges (BMI > 22.99) identified that the degree of desirability (DD) had no influence on activating compensatory health beliefs or external self-concordance; external self-concordance had no influence on activating compensatory health beliefs or compensatory behavior intention; actual behavioral control (ABC) had no influence on compensatory health beliefs; and compensatory behavior self-efficacy had no influence on compensatory health beliefs. This finding identified that the weight control behavior of individuals with an excessive BMI or with overweight or obesity cannot be explained using the compensatory health belief model expanded from that by Rabiau et al. (2006). This may result from the fact that the samples had great desire for controlling weight (60.1 percent were controlling weight), which resulted in motivation for control weight stemming from their true appreciation of the benefit of weight control. The analysis revealed that almost half of samples with an excessive BMI (40.6 percent) had identified self-concordance (recognizing the true benefits of weight control). Thus, the samples selected to respond to motivational conflict by resisting desire (46.6 percent) rather than using compensatory beliefs (36.8 percent). It can be said that overweight or obese samples had little compensatory thinking. This is a good thing since many studies found that activating compensatory health beliefs is a key factor in individuals' failure to achieve their goal (Nguyen et al. 2006; Moson et al. 2008; Rabiau et al. 2009; Kronick, 2010; Kronick et al. 2011; Radtke, 2011; Miquelon, 2012).

(4) Compensatory belief model in the case when samples perceive that they are underweight

The analysis of data of samples who perceived that they were underweight indicated that the expanded model was not suitable for explaining weight control behavior among samples who perceived they were underweight. It was identified that the degree of desirability had no influence on activating compensatory health beliefs

or external self-concordance; external self-concordance had no influence on activating compensatory health beliefs or compensatory behavior intention; compensatory health beliefs had no influence on compensatory behavior intention; and actual behavioral control had no influence on identified self-concordance. This finding can be explained based on the same reason for the group of samples whose BMI was lower than the normal values.

(5) Compensatory belief model in the case when samples perceive that they have a normal weight

The analysis of data on samples who perceived that they had a normal weight identified that the causal relationships among almost all variables were similar to those of the compensatory health belief model expanded from the original model by Rabiau et al. (2006). It was only external self-concordance that had no influence on compensatory behavior intention. This manifested that the expanded compensatory health belief model can be used for explaining the data almost perfectly in the case when individuals perceive that they have a normal weight. This finding can be explained based on the same reason for the group of samples whose BMI value was normal.

(6) Compensatory belief model in the case when samples perceive that they are overweight

The analysis of data from samples who perceived that they were overweight indicated that the expanded model was not suitable for explaining weight control behavior among samples perceiving that they were overweight. It was identified that the degree of desirability had no influence on activating compensatory health beliefs; external self-concordance had no influence on activating compensatory health beliefs or compensatory behavior intention; and compensatory behavior self-efficacy had no influence on compensatory health beliefs. Based on the finding, although individuals' BMI is not higher than the normal BMI range, if they perceive that they are overweight, they will have motivation for weight control. In addition, it can be predicted that they will be able to be on a diet or exercise better than those who do not perceive that they are overweight despite the fact that their weight is higher than the standard weight range (Desmond et al. 1986; Khor, 2009, Bhurtun and Jeewan, 2013). Thus, when individuals perceive that they are overweight or obese,

they will have a tendency to have more motivation for weight control than those perceiving that they have a normal weight or are underweight. This will allow them to set their goal to control their weight with intrinsic motivation, because they realize the true value and benefits of weight control, which will lead to the response to motivational conflict by resisting desire rather than activating compensatory health beliefs.

7) Compensatory belief model in the case when samples are controlling weight

The analysis of data from samples that were controlling weight identified that the degree of desirability had no influence on activating compensatory health beliefs; external self-concordance had no influence on activating compensatory health beliefs or compensatory behavior intention; compensatory behavior self-efficacy had no influence on compensatory health beliefs; and actual behavioral control had no influence on identified self-concordance. This indicated that the expanded model failed to explain weight control behavior of samples that were controlling weight. This might be because of the fact that the samples had the goal to control weight, so they might have more motivation for weight control than those who were not controlling weight. The analysis revealed that nearly half of the samples (47.6 percent) responded to motivational conflict by resisting desire, which indicated that they had low thinking about compensation.

(8) Compensatory belief mode in the case when samples are not controlling weight

The analysis of data from samples that were not controlling weight to identify the causal relationships among most variables in the expanded compensatory health belief model manifested that external self-concordance had no influence on compensatory behavior intention; compensatory behavior self-efficacy had no influence on compensatory health beliefs; and actual behavioral control had no influence on identified self-concordance. This might result from the fact that the samples were not in the weight control period, so they did not have sufficient motivation for weight control. Thus, it was difficult to predict how they would respond to motivational conflict.

In summary, based on the data analysis, when individuals have motivational conflict as a result of the disagreement between the desirability and goal to control weight, they will respond to conflict using one of the three different strategies: resisting desire, adapting risk perception/outcome expectancy, and activating compensatory health beliefs. The factors that influence the strategies consist of desirability, weight control self-efficacy, and goal self-concordance. When individuals' degree of desirability is high, they will be able to resist desire to a lesser extent, adjust risk perception/outcome expectancy, and activate more compensatory health beliefs. If individuals have high weight control self-efficacy, they will be able to resist desire well. On the contrary, adapting risk perception/outcome expectancy to resolve motivational conflict will be used to a lesser extent. At the same time, weight control self-efficacy affects goal self-concordance. That is, if individuals have high weight control self-efficacy, they will set their goal with intrinsic motivation, which result in them having high goal self-concordance. The motivation for setting goals also affects the response to motivational conflict. That is, when individuals set the goal to control their weight with intrinsic motivation (truly realizing the value and benefits of weight control), they will tend to resolve motivational conflict by resisting desire. If individuals set a goal with extrinsic motivation, for example, to get reward or avoid punishment, they will tend to respond to their motivational conflict by using compensatory beliefs. When individuals activate compensatory health beliefs to resolve their motivational conflict, this will result in them having compensatory behavior intention. The degree of individuals' compensatory behavior intention, it results from their compensatory behavior self-efficacy and actual compensatory behavior. Compensatory behavior self-efficacy will increase if they have high weight control self-efficacy and actual compensatory behavioral control. In addition, individuals' actual compensatory behavioral control affects their motivation for setting a goal. That is, if individuals have actual compensatory behavioral control, they will have more motivation for setting a goal. However, the compensatory health belief model developed is more suitable for explaining weight control behavior among those who have a normal BMI and perceive that they are normal weight than explaining weight control behavior among individuals who have a BMI value that is lower or

higher than the standard BMI range and perceive that they are overweight or underweight.

5.2 Recommendations

The research implementation and the research results led to the recommendations for application of the research results and recommendations for future research:

5.2.1 Recommendations for application of the research results

(1) The findings from this study revealed that activating compensatory health beliefs has influence on compensatory behavior intention. If individuals have actual compensatory behavior, they will have more compensatory beliefs and more compensatory behavior intention. Their intention to implement the behavior will affect their compensatory behavior. In addition, the expanded compensatory health belief model with adjusted causal relationships of some variables in the model can be used to explain weight control behavior among individuals who have a normal BMI value and perceive that they have a normal weight. It is possible that activating compensatory health beliefs is a factor that results in the individuals being not overweight or obese if they implement compensatory behavior. Thus, the concept of compensatory health beliefs should be applied to counseling or assistance for individuals who want to control their weight to result in them realizing the process of compensatory health beliefs, which will affect their compensatory behavior intention in the future. Actual compensatory behavior should be promoted to enhance self-efficacy, which can be conducted by encouraging individuals to change their compensatory behavior intention to become behavior, through helping them to plan specific, practical guidelines, monitoring, and providing feedback on a regular basis.

(2) The study found that the health goal self-concordance in weight control and weight control self-efficacy affect motivational conflict resolution strategies, especially when individuals have identified self-concordance – individuals want to control their weight because they truly realize the benefits and value of weight control and perceive that they are highly able to control their weight, which will result

in them tending to resist desire that can adversely affect their weight control. Thus, there should be training programs aiming to create motivation, self-efficacy, and setting goals for students to develop their self-efficacy and reinforce how to establish goals and appropriately build intrinsic motivation in the future.

(3) The study suggested that most students desire to do low-energy consuming activities and eat food rich in starch and fat, which have a direct effect on their weight. Dealing with these factors needs various and comprehensive measures involving many levels, consisting of individuals, communities, educational institutions, and policies, which are the government sector's direct responsibility. Practical guidelines that should be considered consist of – 1) Educational institutions should provide activities or programs that promote correct energy-use and consumption behavior for students and personnel; 2) Educational institution administrators should formulate a policy to control the sales of goods that may result in health problems of their students and personnel; 3) Facilities that encourage more physical energy use, e.g. walkways or bicycle lanes should be designed and constructed; and 4) There should be a policy towards using stairs instead of elevators. The government sector may adopt legal measures to regulate advertising or public relations or taxation of food products that may adversely affect individuals' health in the long run and formulate health development plans on consumption and energy use as an urgent agenda item to create alertness to, and awareness of, the importance of this issue.

5.2.2 Recommendations for further research

(1) As the study found that the compensatory health belief model can be satisfactorily used for explaining weight control behavior among people who have a normal BMI and perceive that their weight is normal, this identifies that students in general tend to activate compensatory health beliefs to resolve their motivational conflict rather than those who have a BMI being higher than the BMI range or perceive that they are overweight. On one side, this suggests that activating compensatory health beliefs is a factor that prevents individuals from being overweight. However, because this study aimed to test the hypotheses and expand the original model by Rabiau et al. (2006) without monitoring the samples' behavioral

process, their compensatory behavior was not witnessed. Thus, there should be monitoring on students activating compensatory health beliefs to identify if they implement compensatory behavior and which factor influences them.

(2) Because the response to motivational conflict that may jeopardize achieving the goal to control weight consists of adapting risk perception/outcome expectancy and activating compensatory health beliefs, there should be a comparative study between adapting risk perception/outcome expectancy and activating compensatory health beliefs in terms of weight control. This aims to identify with strategy is more effective in weight control, to encourage individuals to appropriately respond to motivational conflict in the future.

(3) As all the samples in the study were undergraduate students at a government university located in a northern province, some characteristics of whom may be different from those of other sample groups. It did not involve data from students in other regions or private educational institutions or other educational institutions. Thus, to obtain more details about activating compensatory health beliefs, students from both government and private educational institutions in other regions should be studied to contribute to the understanding about students' weight control behavior in the future.

(4) As this study was a quantitative research study, in which data was collected using questionnaires characterized by scales and closed-ended questions, which do not involve all social dimensions, to achieve more profound details about social and cultural contexts, there should be research on compensatory health beliefs conducted by means of qualitative research methods.

(5) The scope of the study of activating compensatory health beliefs should be extended to other health behaviors, such as smoking, drinking alcohol, stopping drug use, and complying with medical personnel's advice, in order to help individuals to achieve their goal more efficiently.

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APPENDICES

APPENDIX A
THE INSTRUMENTS IN THIS STUDY

<u>ตอนที่ 1</u> ข้อมูลเกี่ยวกับตัวฉัน

คำชี้แจง: กรุณาทำเครื่องหมาย √ ลงใน □ และเติมข้อมูลของท่านลงในช่องว่างให้สมบูรณ์

1.1 เพศ □ ชาย □ หญิง

1.2 อายุ ..... ปี

1.3 น้ำหนัก ..... กิโลกรัม

1.4 ส่วนสูง ..... เซนติเมตร

1.5 โรคประจำตัว □ ไม่มี □ มี โปรดระบุ .....

1.6 สำนักวิชา .....

1.7 ชั้นปีที่ □ ชั้นปีที่ 1 □ ชั้นปีที่ 2
□ ชั้นปีที่ 3 □ ชั้นปีที่ 4

1.8 สถานที่พักของท่าน คือ
□ บ้านของตนเอง □ หอพักในมหาวิทยาลัย
□ หอพักนอกมหาวิทยาลัย □ อื่นๆ โปรดระบุ.....

1.9 ท่านได้รับเงินจากผู้ปกครอง เดือนละ ..... บาท

1.10 ท่านได้รับเงินจากแหล่งอื่นๆ เดือนละ ..... บาท โปรดระบุแหล่งรายได้.....

1.11 ท่านมีความคิดเห็นอย่างไรเกี่ยวกับน้ำหนักตัวของท่าน

□	□	□	□	□
น้ำหนักตัวน้อยเกินไปอย่างมาก	น้ำหนักตัวน้อยเกินไปเล็กน้อย	น้ำหนักตัวอยู่ในระดับพอดี	น้ำหนักตัวมากเกินไปเล็กน้อย	น้ำหนักตัวมากเกินไปอย่างมาก

1.12 ช่วงนี้ท่าน**<u>อยู่ในระหว่าง</u>**การควบคุมน้ำหนักหรือไม่

□ ใช่ □ ไม่ใช่

1.13 ถ้าไม่ได้อยู่ในระหว่างการควบคุมน้ำหนัก **<u>ก่อนหน้านี้</u>**ท่านเคยควบคุมน้ำหนักหรือไม่

□ เคย □ ไม่เคย

1.14 ท่านเคยควบคุมน้ำหนักหรือกำลังอยู่ในระหว่างการควบคุมน้ำหนัก ท่านใช้วิธีการใดบ้างในการควบคุมน้ำหนัก (ตอบได้มากกว่า 1 ข้อ)

☐ คุมอาหารที่มีแป้ง น้ำตาล หรือไขมันสูง ☐ ออกกำลังกาย

☐ งดอาหารบางมื้อ ☐ ใช้ผลิตภัณฑ์เสริมอาหาร

☐ ใช้ยาลดความอ้วน ☐ ใช้อุปกรณ์ช่วยดูด/สลายไขมัน

☐ ล้วงคอ ☐ อื่นๆ โปรดระบุ .....

1.15 ท่านมีความคิดที่จะควบคุมน้ำหนักในอนาคตหรือไม่

☐ คิดจะควบคุมน้ำหนักในอนาคต ☐ ไม่คิดจะควบคุมน้ำหนักในอนาคต

ขอให้ท่านตอบคำถามของแบบสอบถามในส่วนต่อไปนี้ทุกข้อ ไม่ว่าท่านจะอยู่ในระหว่างการควบคุมน้ำหนัก เคยควบคุมน้ำหนัก หรือไม่เคยควบคุมน้ำหนักเลยก็ตาม

<u>ตอนที่ 2</u> ฉันปรารถนาหรือต้องการ (สิ่งล่อใจ) เหล่านี้

คำชี้แจง: โปรดอ่านข้อความด้านล่างนี้ทีละข้อความ หลังจากนั้นให้ท่านประเมิน**<u>ความปรารถนาหรือความต้องการของท่านที่จะทำสิ่งต่างๆ</u>**ทีละข้อความ ด้วยการให้คะแนนระดับความปรารถนาของท่านจาก 0-10 คะแนน โดย 0 หมายถึง ท่านไม่ปรารถนาหรือไม่ต้องการสิ่งนั้นเลย และ 10 หมายถึง ท่านต้องการหรือปรารถนาสิ่งนั้นอย่างมากที่สุด ส่วนคะแนนอื่นๆ จาก 1-9 คะแนน หมายถึง ระดับความปรารถนาหรือความต้องการของท่านในระดับที่ต่อเนื่องกันจากน้อยไปหามาก

"ท่านปรารถนาหรือต้องการที่จะทำสิ่งต่อไปนี้มากเพียงใด"

1. กินขนมเค้กรสชาติที่ชอบ

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

2. กินพิซซ่า

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

3. กินเครั้ป

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

4. กินข้าวขาหมู

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

5. กินข้าวมันไก่

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

6. กินไอศกรีม

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

7. กินข้าวเหนียวมะม่วง

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

8. กินข้าวเหนียวทุเรียน

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

9. ดื่มน้ำอัดลม

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

10. ดื่มเครื่องดื่มที่ใส่วิปปิ้งครีม เช่น ช็อกโกแลต ชา กาแฟสด เป็นต้น

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

11. ดื่มเครื่องดื่มประเภทสมูทตี้

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

12. ดื่มชานมไข่มุก

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

13. ดื่มเบียร์

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

14. กินบุฟเฟต์หมูกระทะ

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

15. เล่นเกมคอมพิวเตอร์

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

16. อยู่เฉยๆ ไม่ต้องทำกิจกรรมใดๆ

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

17. นั่งรถเมื่อต้องเดินไกลๆ

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

18. จอดรถให้ใกล้ที่หมายที่สุดเพื่อจะได้ไม่ต้องเดินไกล

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

19. ใช้ลิฟต์เมื่อต้องขึ้นอาคารสูงมากกว่า 2 ชั้น

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

20. ดูโทรทัศน์หรือฟังเพลงอยู่ที่บ้านในช่วงวันหยุด

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

21. อ่านหนังสืออยู่ที่บ้าน

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

22. คุยไลน์กับเพื่อน

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

23. เล่นอินเตอร์เน็ต

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

24. สังสรรค์กับเพื่อนตอนมื้อเย็น

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

25. กินขนมขบเคี้ยวระหว่างมื้ออาหาร

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

26. ทำกิจกรรมที่ไม่ต้องออกแรง

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

27. นอนดึกๆ ตื่นสายๆ

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

28. นอนตอนกลางวัน

ไม่ปรารถนาเลย 0 1 2 3 4 5 6 7 8 9 10 ปรารถนาอย่างมากที่สุด

<u>ตอนที่ 3</u> ฉันมั่นใจว่าฉันสามารถ

คำชี้แจง: โปรดอ่านข้อความด้านล่างทีละข้อความ หลังจากนั้นให้ท่านพิจารณาว่าท่านมี**<u>ระดับความมั่นใจว่าจะทำพฤติกรรมในแต่ละข้อความ</u>**ต่อไปนี้มากน้อยเพียงใด ด้วยการวงกลมในระดับคะแนนที่ตรงกับระดับความมั่นใจของท่านจาก 0-10 คะแนน โดย 0 หมายถึง ท่านไม่มั่นใจเลย และ 10 หมายถึง ท่านมั่นใจมากที่สุด ส่วนคะแนนอื่นๆ จาก 1-9 คะแนน หมายถึง ระดับความมั่นใจของตัวท่านที่จะกระทำพฤติกรรมนั้นๆ ในระดับที่ต่อเนื่องกันจากน้อยไปหามาก

1. ฉันมั่นใจว่าสามารถงดเว้นการรับประทานอาหารที่มีแป้งและไขมันสูงได้

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

2. ฉันมั่นใจว่าสามารถออกกำลังกายให้ได้อย่างน้อยวันละ 30 นาที

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

3. ฉันมั่นใจว่าสามารถงดรับประทานอาหารหวานๆ แม้ของหวานนั้นเป็นชนิดที่ฉันชอบก็ตาม

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

4. ฉันมั่นใจว่าสามารถควบคุมตนเองให้ออกกำลังกายอย่างน้อยสัปดาห์ละ 3 ครั้ง

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

5. ฉันมั่นใจว่าสามารถงดเว้นการรับประทานอาหารหลัง 21.00 นาฬิกา

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

6. ฉันมั่นใจว่าสามารถงดเว้นการรับประทานอาหารระหว่างมื้อได้

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

7. ฉันมั่นใจว่าสามารถควบคุมตนเองให้ออกกำลังกายอย่างสม่ำเสมอและต่อเนื่องในระยะเวลา 3 เดือน

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

8. ฉันมั่นใจว่าสามารถควบคุมตนเองไม่ให้รับประทานอาหารประเภทแป้งและน้ำตาลในปริมาณมากได้

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

9. ฉันมั่นใจว่าสามารถออกกำลังกายเพิ่มขึ้นหลังจากรับประทานอาหารในปริมาณมากในวันนั้น

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

10. ฉันมั่นใจว่าสามารถงดรับประทานอาหารที่มีแป้งและไขมันสูงในมื้อถัดไป หากก่อนหน้านั้นได้รับประทานอาหารที่มีแป้งและไขมันสูง

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

11. ฉันมั่นใจว่าหลังจากรับประทานอาหารมื้อค่ำในปริมาณมาก ฉันสามารถออกกำลังกายให้ได้อย่างน้อย 30 นาทีในวันถัดไป

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

12. ฉันมั่นใจว่าหลังจากรับประทานอาหารในปริมาณมาก ฉันสามารถงดอาหารในมื้อถัดไปได้

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

13. ฉันมั่นใจว่าสามารถออกกำลังกายเพิ่มหลังจากรับประทานอาหารที่มีแป้งและไขมันสูงได้

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

14. ฉันมั่นใจว่าสามารถงดรับประทานอาหารมื้อถัดไป หลังจากรับประทานอาหารที่มีไขมันสูง

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

15. ฉันมั่นใจว่าสามารถควบคุมตนเองให้รับประทานอาหารในปริมาณน้อยลง หลังจากรับประทานอาหารในปริมาณมากในมื้อก่อนหน้า

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

16. ฉันมั่นใจว่าสามารถออกกำลังกายเพิ่มขึ้นในวันถัดไป หากฉันไม่ได้ออกกำลังกายในวันนั้น

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

17. ฉันมั่นใจว่าสามารถงดรับประทานอาหารที่มีแป้งและไขมันสูงในวันถัดไป หากไม่ได้ออกกำลังกายในวันก่อนหน้านั้น

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

18. ฉันมั่นใจว่าสามารถควบคุมตนเองให้รับประทานอาหารที่มีแป้งและไขมันสูงในปริมาณน้อย หากไม่ได้ออกกำลังกายในวันนั้น

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

19. ฉันมั่นใจว่าสามารถควบคุมตนเองให้ทำกิจกรรมที่ต้องออกแรงหรือมีการเคลื่อนไหวของร่างกายเพิ่มขึ้น หากไม่ได้ออกกำลังกายในวันนั้น

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

20. ฉันมั่นใจว่าสามารถควบคุมตนเองให้หยุดทำกิจกรรมที่มีการออกแรงหรือมีการเคลื่อนไหวของร่างกายน้อย หากไม่ได้ออกกำลังกายในวันนั้น

ไม่มั่นใจเลย 0 1 2 3 4 5 6 7 8 9 10 มั่นใจอย่างมากที่สุด

<u>ตอนที่ 4</u> ฉันควบคุมน้ำหนักเพราะ

การควบคุมน้ำหนัก หมายถึง พฤติกรรมที่แสดงออกถึงความพยายามของบุคคลที่จะทำให้น้ำหนักตัวลดลงหรือคงที่ โดยแบ่งออกเป็น 2 วิธี คือ การควบคุมน้ำหนักด้วยการควบคุมการรับประทานอาหาร และการควบคุมน้ำหนักด้วยการทำกิจกรรมทางกายภาพ

คำชี้แจง: โปรดอ่านข้อความด้านล่างทีละข้อความ หลังจากนั้นให้ท่านประเมินระดับ**<u>ความเห็นด้วยกับข้อความ</u>**นั้นทีละข้อความ โดยวงกลมตัวเลขที่ตรงกับระดับความเห็นของท่านด้วยคะแนนจาก 0-10 คะแนน โดย 0 หมายถึง ท่านไม่เห็นด้วยกับข้อความเลย และ 10 หมายถึง ท่านเห็นด้วยกับข้อความมากที่สุด ส่วนคะแนนอื่นๆ จาก 1-9 คะแนน หมายถึง ระดับความเห็นด้วยของตัวท่านในระดับที่ต่อเนื่องกันจากน้อยไปหามาก

"ฉันต้องการควบคุมน้ำหนักเพราะ.... " หรือ ***"ถ้าฉันจะควบคุมน้ำหนัก ฉันจะควบคุมน้ำหนักเพราะ....."***

1. เพราะฉันต้องการให้คนใกล้ชิดชื่นชมในตัวฉัน

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

2. เพราะฉันจะรู้สึกผิดกับตัวเองหากไม่ควบคุมน้ำหนัก

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

3. เพราะฉันไม่อยากให้คนรอบข้างตำหนิเรื่องน้ำหนักตัวของฉัน

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

4. เพราะการควบคุมน้ำหนักทำให้ฉันได้ฝึกการควบคุมตนเองเพิ่มขึ้น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

5. เพราะถ้าฉันสามารถควบคุมน้ำหนักได้สำเร็จ ฉันจะภูมิใจในตัวเองมากขึ้น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

6. เพราะฉันต้องการมีรูปร่างดีเหมือนกับคนอื่น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

7. เพราะการควบคุมน้ำหนักช่วยทำให้ฉันมีความมั่นใจในตัวเองมากขึ้น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

8. เพราะเพื่อนของฉันแนะนำว่าฉันควรลดน้ำหนัก

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

9. เพราะการควบคุมน้ำหนักช่วยทำให้สุขภาพของฉันดีขึ้น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

10. เพราะการควบคุมน้ำหนักเป็นเรื่องท้าทาย

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

11. เพราะฉันคงรู้สึกไม่ดีกับตัวเองหากไม่ควบคุมน้ำหนัก

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

12. เพราะถ้าฉันสามารถควบคุมน้ำหนักได้สำเร็จ ฉันจะรู้สึกว่าตนเองมีคุณค่ามากขึ้น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

13. เพราะการควบคุมน้ำหนักเป็นการพิสูจน์ความมีวินัยของฉัน

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

14. เพราะฉันไม่อยากให้คนอื่นมองฉันไม่ดี

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

15. เพราะการควบคุมน้ำหนักทำให้ชีวิตของฉันมีเป้าหมายที่ชัดเจนมากขึ้น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

<u>ตอนที่ 5</u> ฉันทำตามหรือไม่ทำตามสิ่งล่อใจ เพราะ

คำชี้แจง: โปรดอ่านสถานการณ์ด้านล่าง หลังจากนั้นให้ท่านประเมินว่าท่านจะเลือกตอบสนองต่อสถานการณ์ตามข้อใด โดยทำเครื่องหมาย √ ใน □ หน้าข้อความที่สอดคล้องกับการตอบสนองของท่านมากที่สุด (ท่านสามารถเลือกตอบได้เพียงข้อเดียว)

"หากท่านกำลังอยู่ในระหว่างการควบคุมน้ำหนัก และท่านต้องเผชิญกับสิ่งล่อใจซึ่งเป็นอาหารที่ท่านชอบหรือเป็นกิจกรรมที่ท่านโปรดปราน (เช่น การอยู่นิ่งๆไม่ต้องทำอะไรเลย เป็นต้น) แต่อาหารหรือกิจกรรมเหล่านั้นอาจส่งผลให้น้ำหนักตัวของท่านเพิ่มขึ้น หรือขัดขวางการบรรลุเป้าหมายในการควบคุมน้ำหนักของท่าน ท่านจะ....."

1. □ ไม่ทำตามสิ่งล่อใจ เพราะเชื่อว่าเมื่อตั้งใจจะทำสิ่งใดควรทำให้สำเร็จ

2. □ ทำตามสิ่งล่อใจ เพราะเชื่อว่าการรับประทานอาหารหรือทำกิจกรรมที่ชอบ ไม่น่าจะส่งผลต่อการควบคุมน้ำหนักมากนัก

3. □ ทำตามสิ่งล่อใจ เพราะเชื่อว่าสามารถชดเชยผลเสียจากการทำตามสิ่งล่อใจด้วยการทำพฤติกรรมอื่นๆ เช่น ออกกำลังกายเพิ่มขึ้น งดรับประทานอาหารบางมื้อ หรือรับประทานในปริมาณอาหารน้อยลง เป็นต้น

4. □ ทำตามสิ่งล่อใจด้วยเหตุผลอื่น โปรดระบุ……..

.....

.....

<u>ตอนที่ 6</u> ฉันเห็นด้วยหรือฉันเชื่อ

คำชี้แจง: ขอให้ท่านอ่านข้อความด้านล่างนี้ทีละข้อความ หลังจากนั้นให้ท่านประเมินระดับ**<u>ความเห็นด้วยหรือความเชื่อของท่าน</u>**ต่อข้อความเหล่านี้ โดยวงกลมตัวเลขที่ตรงกับระดับความเชื่อของท่านด้วยคะแนนจาก 0-10 คะแนน โดย 0 หมายถึง ท่านไม่เชื่อหรือไม่เห็นด้วยข้อความเลย และ 10 หมายถึง ท่านเชื่อหรือท่านเห็นด้วยกับข้อความมากที่สุด ส่วนคะแนนอื่นๆ จาก 1-9 คะแนน หมายถึง ระดับความเชื่อหรือเห็นของตัวท่านในระดับที่ต่อเนื่องกันจากน้อยไปหามาก

1. ฉันเชื่อว่าผู้ที่กำลังควบคุมน้ำหนักสามารถรับประทานอาหารในปริมาณมากได้ หากลดปริมาณการรับประทานอาหารในมื้อถัดไป

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

2. ฉันเชื่อว่าผู้ที่กำลังควบคุมน้ำหนักสามารถรับประทานอาหารที่มีแป้งหรือไขมันสูงได้ หากมีการออกกำลังกายเพิ่มขึ้น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

3. ฉันเชื่อว่าผู้ที่กำลังควบคุมน้ำหนักสามารถรับประทานอาหารที่มีแป้งหรือไขมันสูงได้ หากรับประทานเฉพาะผักหรือผลไม้ในมื้อเย็น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

4. ฉันเชื่อว่าหากผู้ที่กำลังควบคุมน้ำหนักไม่ได้ออกกำลังกายในวันใด ก็สามารถชดเชยได้ด้วยการออกกำลังกายเพิ่มขึ้นในวันถัดไป

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

5. ฉันเชื่อว่าผู้ที่กำลังควบคุมน้ำหนักสามารถรับประทานอาหารที่มีแป้งหรือไขมันสูงได้ หากงดรับประทานอาหารในมื้อถัดไป

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

6. ฉันเชื่อว่าหากผู้ที่กำลังควบคุมน้ำหนักไม่ได้ออกกำลังกายในวันใด ก็สามารถชดเชยได้ด้วยการรับประทานอาหารที่มีแป้งและไขมันต่ำในวันนั้น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

7. ฉันเชื่อว่าหากผู้ที่กำลังควบคุมน้ำหนักไม่ได้ออกกำลังกายในวันใด ก็สามารถชดเชยได้ด้วยการงดรับประทานอาหารมื้อเย็นในวันนั้น

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

8. ฉันเชื่อว่าผู้ที่กำลังควบคุมน้ำหนักไม่จำเป็นต้องออกกำลังกายทุกวัน หากในวันนั้นไม่ได้รับประทานอาหารที่มีแป้งหรือไขมันสูง

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

9. ฉันเชื่อว่าผู้ที่กำลังควบคุมน้ำหนักสามารถรับประทานอาหารที่มีแป้งหรือไขมันสูงได้ หากออกกำลังกายอย่างน้อยวันละ 30 นาที ทุกวัน

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

10. ฉันเชื่อว่าหากวันใดผู้ที่กำลังควบคุมน้ำหนักทำกิจกรรมที่มีการใช้พลังงานหรือมีการเคลื่อนไหวของร่างกายน้อย ก็สามารถชดเชยด้วยการออกกำลังกายหรือทำกิจกรรมที่มีการเคลื่อนไหวร่างกายเพิ่มขึ้นในวันถัดไป

ไม่เห็นด้วยเลย 0 1 2 3 4 5 6 7 8 9 10 เห็นด้วยมากที่สุด

<u>ตอนที่ 7</u> ฉันตั้งใจ

คำชี้แจง: โปรดอ่านข้อความด้านล่างทีละข้อความ หลังจากนั้นให้ท่านประเมินว่าภายใต้สถานการณ์ในแต่ละข้อความ **<u>ท่านตั้งใจทำพฤติกรรม</u>**นั้นๆ มากน้อยเพียงใด โดยวงกลมตัวเลขที่สอดคล้องกับระดับความตั้งใจของท่านด้วยคะแนนจาก 0-10 คะแนน โดย 0 หมายถึง ท่านไม่ตั้งใจทำพฤติกรรมตามข้อความนั้นเลย และ 10 หมายถึง ท่านตั้งใจทำพฤติกรรมตามข้อความนั้นมากที่สุด ส่วนคะแนนอื่นๆ จาก 1-9 คะแนน หมายถึง ระดับความตั้งใจของตัวท่านในระดับที่ต่อเนื่องกันจากน้อยไปหามาก

1. ฉันตั้งใจที่จะงดอาหารในมื้อถัดไปหลังจากรับได้ประทานอาหารที่มีแป้งหรือไขมันสูงในมื้อก่อนหน้า

ไม่ตั้งใจเลย 0 1 2 3 4 5 6 7 8 9 10 ตั้งใจมากที่สุด

2. ฉันตั้งใจที่จะออกกำลังกายเพิ่มขึ้นหลังจากรับประทานอาหารที่มีแป้งหรือไขมันสูง

ไม่ตั้งใจเลย 0 1 2 3 4 5 6 7 8 9 10 ตั้งใจมากที่สุด

3. ฉันตั้งใจจะลดปริมาณอาหารในมื้อถัดไป หลังจากได้รับประทานอาหารในปริมาณมากในมื้อก่อนหน้า

ไม่ตั้งใจเลย 0 1 2 3 4 5 6 7 8 9 10 ตั้งใจมากที่สุด

4. ฉันตั้งใจจะรับประทานเฉพาะผักหรือผลไม้ในมื้อเย็น หลังจากรับประทานอาหารที่มีแป้งหรือไขมันสูง

ไม่ตั้งใจเลย 0 1 2 3 4 5 6 7 8 9 10 ตั้งใจมากที่สุด

5. ฉันตั้งใจว่าหากไม่ได้ออกกำลังกายในวันใด ฉันจะออกกำลังกายเพิ่มขึ้นในวันถัดไป

ไม่ตั้งใจเลย 0 1 2 3 4 5 6 7 8 9 10 ตั้งใจมากที่สุด

6. ฉันตั้งใจว่าหลังจากรับประทานอาหารที่มีแป้งหรือไขมันสูง ฉันจะลดปริมาณอาหารในมื้อถัดไป

ไม่สอดคล้องเลย 0 1 2 3 4 5 6 7 8 9 10 สอดคล้องมากที่สุด

7. ฉันตั้งใจว่าจะออกกำลังกายเพิ่มขึ้นในวันถัดไป หลังจากรับประทานอาหารมื้อค่ำในปริมาณมาก

ไม่ตั้งใจเลย 0 1 2 3 4 5 6 7 8 9 10 ตั้งใจมากที่สุด

8. ฉันตั้งใจว่าหากวันใดฉันไม่ได้ออกกำลังกาย ฉันจะไม่รับประทานอาหารที่มีแป้งหรือไขมันสูง

ไม่ตั้งใจเลย 0 1 2 3 4 5 6 7 8 9 10 ตั้งใจมากที่สุด

9. ฉันตั้งใจว่าจะงดรับประทานอาหารในมื้อถัดไปหลังจากรับประทานอาหารปริมาณมากในมื้อก่อนหน้า

ไม่ตั้งใจเลย 0 1 2 3 4 5 6 7 8 9 10 ตั้งใจมากที่สุด

10. ฉันตั้งใจว่าจะไม่รับประทานอาหารมื้อค่ำ ถ้าวันนั้นฉันไม่ได้ออกกำลังกาย

ไม่ตั้งใจเลย 0 1 2 3 4 5 6 7 8 9 10 ตั้งใจมากที่สุด

<u>ตอนที่ 7</u> ฉันเคยทำ

คำชี้แจง: โปรดอ่านข้อความด้านล่างทีละข้อความ หลังจากนั้นให้ท่านประเมินว่าท่านเคยแสดงพฤติกรรมในแต่ละข้อความบ่อยครั้งเพียงใด โดยวงกลมตัวเลขที่ตรงกับพฤติกรรมของท่านด้วยคะแนนจาก 0-10 คะแนน โดย 0 หมายถึง ท่านไม่เคยทำพฤติกรรมนั้นเลย และ 10 หมายถึง ท่านเคยทำพฤติกรรมนั้นบ่อยมากที่สุด ส่วนคะแนนอื่นๆ จาก 1-9 คะแนน หมายถึง ระดับความสอดคล้องกับตัวท่านในระดับที่ต่อเนื่องกันจากน้อยไปหามาก

1. ฉันเคยงดรับประทานอาหารในมื้อถัดไป หลังจากรับประทานอาหารที่มีแป้งหรือไขมันสูง

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

2. ฉันเคยออกกำลังกายเพิ่มขึ้นหลังจากรับประทานอาหารที่มีแป้งหรือไขมันสูง

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

3. ฉันเคยงดรับประทานอาหารในมื้อถัดไป หลังจากรับประทานอาหารในปริมาณมาก

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

4. ฉันเคยรับประทานเฉพาะผักหรือผลไม้ในมื้อเย็น หลังจากรับประทานอาหารที่มีแป้งหรือไขมันสูงในมื้อก่อนหน้า

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

5. ฉันเคยออกกำลังกายเพิ่มขึ้นในวันถัดไป หลังจากที่ไม่ได้ออกกำลังกายในวันก่อนหน้านั้น

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

6. ฉันเคยลดปริมาณการรับประทานอาหารในมื้อถัดไป หลังจากรับประทานอาหารที่มีแป้งหรือไขมันสูงในมื้อก่อนหน้า

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

7. ฉันเคยออกกำลังกายเพิ่มขึ้น หลังจากรับประทานอาหารในปริมาณมาก

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

8. ฉันเคยงดรับประทานอาหารที่มีแป้งหรือไขมันสูง หากวันใดไม่ได้ออกกำลังกาย

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

9. ฉันเคยลดปริมาณอาหาร หลังจากรับประทานอาหารในปริมาณมากในมื้อก่อนหน้า

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

10. ฉันเคยงดรับประทานอาหารมื้อค่ำ ถ้าไม่ได้ออกกำลังกายในวันเดียวกัน

ไม่เคยทำเลย 0 1 2 3 4 5 6 7 8 9 10 เคยทำบ่อยมากที่สุด

APPENDIX B
THE PARTICIPATION INFORMATION SHEET

คำชี้แจง
ในเอกสารนี้อาจมีข้อความที่ท่านอ่านแล้วยังไม่เข้าใจ โปรดสอบถามหัวหน้าโครงการวิจัย หรือผู้แทนให้ช่วยอธิบายจนกว่าจะเข้าใจดี ท่านจะได้รับเอกสารนี้ 1 ฉบับ นำกลับไปอ่านที่บ้านเพื่อปรึกษาหารือกับญาติพี่น้อง เพื่อนสนิทของท่าน หรือผู้อื่นที่ท่านต้องการปรึกษา เพื่อช่วยในการตัดสินใจเข้าร่วมการวิจัย

ชื่อโครงการ	ความเชื่อเชิงชดเชยในการควบคุมน้ำหนักของนักศึกษาระดับปริญญาตรี
ชื่อผู้วิจัย	สิทธิชัย ทองวร
สถานที่ทำงาน	สำนักวิชาศิลปศาสตร์ มหาวิทยาลัยแม่ฟ้าหลวง จังหวัดเชียงราย
หมายเลขโทรศัพท์	0909-833-101
สถานที่วิจัย	มหาวิทยาลัยแม่ฟ้าหลวง 333 ม. 1 ต. ท่าสุด อ.เมือง จ. เชียงราย 57100
ผู้ให้ทุน	-

ข้อมูลโครงการวิจัยโดยย่อ

โครงการวิจัยนี้ทำขึ้นเพื่อทดสอบสมมติฐานต่างๆ ที่เสนอไว้ในแบบจำลองความเชื่อทางสุขภาพเชิงชดเชย ของ Rabiau และคณะ (2006) และเพื่อขยายแบบจำลองความเชื่อเชิงชดเชยดังกล่าวเพิ่มเติม

ประโยชน์ที่คาดว่าจะได้รับจากการวิจัยนี้ คือ ช่วยในการขยายองค์ความรู้ที่ใช้ในการอธิบายและทำนายปรากฏการณ์ที่เกี่ยวข้องกับพฤติกรรมสุขภาพ โดยเฉพาะอย่างยิ่งพฤติกรรมการควบคุมน้ำหนักให้กว้างขวางมากยิ่งขึ้น รวมทั้งใช้เป็นแนวทางในการพัฒนากลวิธีให้ความช่วยเหลือบุคคลที่ต้องการควบคุมน้ำหนักให้สามารถแสดงพฤติกรรมการควบคุมน้ำหนักได้อย่างต่อเนื่อง นอกจากนี้ยังคาดหวังว่าข้อมูลที่ได้จะเป็นประโยชน์ในการนำไปประยุกต์กับแผนการพัฒนาพฤติกรรมทางสุขภาพประเภทอื่นๆ เช่น การปฏิบัติตามคำแนะนำของบุคลากรทางการแพทย์

พฤติกรรมการออกกำลังกาย พฤติกรรมการใช้ติดสารเสพติดหรือแอลกอฮอล์ หรือพฤติกรรมการติดเกม ในลำดับต่อไป

ท่านได้รับเชิญให้เข้าร่วมการวิจัยนี้	เพราะท่านเป็นนักศึกษาระดับปริญญาตรีใน ม. แม่ฟ้าหลวง
จำนวนผู้เข้าร่วมการวิจัยทั้งสิ้น	788 คน
ระยะเวลาที่จะทำวิจัยทั้งสิ้น	5 เดือน (เดือนธันวาคม 2557- เดือนเมษายน 2558)

หากท่านตัดสินใจเข้าร่วมการวิจัยแล้ว จะมีขั้นตอนการวิจัยดังต่อไปนี้

ผู้วิจัยจะขอให้ท่านตอบแบบสอบถามในประเด็นเกี่ยวกับ "การใช้ความเชื่อเชิงชดเชยทางสุขภาพ" โดยใช้เวลาในการตอบแบบสอบถามประมาณ 30 นาที ซึ่งคำถามแบ่งออกเป็น 7 ส่วน ดังนี้

ส่วนที่ 1 แบบสอบถาม "ข้อมูลส่วนตัวของฉัน" จำนวน 16 ข้อ
ส่วนที่ 2 แบบสอบถาม "ฉันปรารถนาหรือต้องการ (สิ่งล่อใจ) เหล่านี้" จำนวน 28 ข้อ
ส่วนที่ 3 แบบสอบถาม "ฉันมั่นใจว่าฉันสามารถ" จำนวน 15 ข้อ
ส่วนที่ 4 แบบสอบถาม "ฉันควบคุมน้ำหนักเพราะ" จำนวน 15 ข้อ
ส่วนที่ 5 แบบสอบถาม "ฉันทำตามหรือไม่ทำตามสิ่งล่อใจเพราะ" จำนวน 20 ข้อ
ส่วนที่ 6 แบบสอบถาม "ฉันเห็นด้วยหรือฉันเชื่อ" จำนวน 10 ข้อ
ส่วนที่ 7 แบบสอบถาม "ฉันตั้งใจ" จำนวน 10 ข้อ
ส่วนที่ 8 แบบสอบถาม "ฉันเคยทำ" จำนวน 10 ข้อ

ข้อมูลเกี่ยวกับการปกป้องสิทธิผู้เข้าร่วมการวิจัย

ข้อมูลที่ได้จากการตอบแบบสอบถาม ผู้วิจัยจะใช้รหัสแทนชื่อและข้อมูลส่วนตัวของท่านในการบันทึกข้อมูล และจะดำเนินการทำลายข้อมูลตลอดจนข้อมูลอื่นๆ ที่เกี่ยวข้องกับท่านภายหลังเสร็จสิ้นการวิจัย 1 ปี โดยใช้เครื่องตัดกระดาษเพื่อนำกระดาษเข้าสู่กระบวนการนำกลับมาใช้ใหม่

ความเสี่ยงที่อาจจะเกิดขึ้นเมื่อเข้าร่วมการวิจัย ท่านอาจรู้สึกอึดอัด หรืออาจรู้สึกไม่สบายใจอยู่บ้างกับบางคำถาม ท่านมีสิทธิ์ที่จะไม่ตอบคำถามเหล่านั้นได้ รวมถึงท่านมีสิทธิ์ถอนตัวออกจากโครงการนี้เมื่อใดก็ได้โดยไม่ต้องแจ้งให้ทราบล่วงหน้าและการไม่เข้าร่วมวิจัยหรือถอนตัวออกจากโครงการวิจัยนี้จะไม่มีผลกระทบใดๆ ต่อท่านแต่อย่างใด

ข้อมูลส่วนตัวของท่านจะถูกเก็บรักษาไว้ ไม่เปิดเผยต่อสาธารณะเป็นรายบุคคล และไม่มีการแสดงชื่อหรือที่อยู่ของท่านแต่อย่างใด แต่จะรายงานผลการวิจัยเป็นข้อมูลส่วนรวม ผู้ที่มีสิทธิ์เข้าถึงข้อมูลของท่านจะมีเฉพาะผู้ที่เกี่ยวข้องกับการวิจัยนี้ คือ นักวิจัย หรืออาจมีคณะบุคคลบางกลุ่มเข้ามาตรวจสอบได้ความถูกต้อง เช่น ผู้ให้ทุนวิจัย สถาบัน หรือองค์กรของรัฐที่มีหน้าที่ตรวจสอบ คณะกรรมการจริยธรรมฯ เป็นต้น

การวิจัยครั้งนี้ท่านจะไม่ได้รับค่าตอบแทนและไม่เสียค่าใช้จ่ายใดๆ ทั้งสิ้น

หากมีข้อมูลเพิ่มเติมทั้งด้านประโยชน์และโทษที่เกี่ยวข้องกับการวิจัยนี้ ผู้วิจัยจะแจ้งให้ทราบโดยรวดเร็วไม่ปิดบัง

หากท่านมีข้อสงสัยที่จะสอบถามเกี่ยวกับการวิจัย ท่านสามารถติดต่อไปยัง นายสิทธิชัย ทองวร หมายเลขโทรศัพท์ 0909-833-101 ได้ตลอดเวลา

โครงการวิจัยนี้ได้รับการพิจารณารับรองจากคณะกรรมการจริยธรรมการวิจัยในคนสาขาสังคมศาสตร์ เลขที่ MU-SSIRB 2014/346.0212 ซึ่งมีสำนักงานอยู่ที่คณะสังคมศาสตร์และมนุษยศาสตร์ มหาวิทยาลัยมหิดล ถนนพุทธมณฑล สาย 4 ตำบลศาลายา อำเภอพุทธมณฑล จังหวัดนครปฐม 73170 หมายเลขโทรศัพท์ 024419180 โทรสาร 024419181 หากท่านได้รับการปฏิบัติไม่ตรงตามที่ระบุไว้ ท่านสามารถติดต่อกับประธานคณะกรรมการจริยธรรมฯ หรือผู้แทน ได้ตามสถานที่และหมายเลขโทรศัพท์ข้างต้น

ข้าพเจ้าได้อ่านรายละเอียดในเอกสารชี้แจงผู้เข้าร่วมการวิจัยนี้ ครบถ้วนแล้ว

ลงชื่อ.....ผู้เข้าร่วมวิจัย

(.....)

วันที่.....

BIOGRAPHY

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