HEALTH CONSCIOUSNESS AND THE THEORY OF PLANNED BEHAVIOR: THE ROLE OF HEALTH CONSCIOUSNESS WITH THE ON-CAMPUS USE OF REUSABLE WATER BOTTLE AMONG CHULALONGKORN FRESHMEN

Mr. Aruch Patumtaewapibal

A Thesis Submitted in Partial Fulfilment of Requirements

for the degree of Master of Arts in Psychology

Common Course

Faculty of Psychology

Chulalongkorn University

Academic Year 2018

บทบาทของสติสุขภาพภายใต้กรอบแนวคิดทฤษฎีพฤติกรรมตามแผนที่มีต่อพฤติกรรมการใช้กระบอกน้ำที่มหาวิทยาลัยของนิสิตปี 1 จุฬาลงกรณ์มหาวิทยาลัย

นายอรุช ปทุมเทวาภิบาล

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
สาขาวิชาจิตวิทยา ไม่สังกัดภาควิชา/เทียบเท่า
คณะจิตวิทยา จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2561

Thesis Tile	HEALTH CONSCIOUSNESS AND THE THEORY OF PLANNED BEHAVIOR: THE ROLE OF HEALTH CONSCIOUSNESS WITH THE ON-CAMPUS USE OF REUSABLE WATER BOTTLE AMONG CHULALONGKORN FRESHMEN
By	Mr. Aruch Patumtaewapibal
Field of Study	Psychology
Thesis Advisor	Assistant Professor Watcharaporn Boonyasiriwat

---

Accepted by the Faculty of Psychology, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master of Arts

..... Dean of the Faculty of Psychology

(Assistant Professor Panrapee Suttiwan, Ph.D.)

THESIS COMMITTEE

..... Chairman

(Lecturer Prapimpa Jarunratanakul, Ph.D.)

..... Thesis Advisor

(Assistant Professor Watcharaporn Boonyasiriwat, Ph.D.)

..... Examiner

(Lecturer Yokfah Isaranon, Ph.D.)

..... External Examiner

(Assistant Professor Sittipong Wattananonsakul, Ph.D.)

อรุช ปทุมเทวาภิบาล: บทบาทของสติสุขภาพภายใต้กรอบแนวคิดทฤษฎีพฤติกรรมตามแผนที่มีต่อพฤติกรรมการใช้กระบอกน้ำที่มหาวิทยาลัยของนิสิตปี 1 จุฬาลงกรณ์มหาวิทยาลัย. (HEALTH CONSCIOUSNESS AND THE THEORY OF PLANNED BEHAVIOR: THE ROLE OF HEALTH CONSCIOUSNESS WITH THE ON-CAMPUS USE OF REUSABLE WATER BOTTLE AMONG CHULALONGKORN FRESHMEN)
อ.ที่ปรึกษาหลัก: ผศ. ดร. วัชราภรณ์ บุญญศิริวัฒน์

แม้จุฬาลงกรณ์มหาวิทยาลัยได้รณรงค์การใช้กระบอกน้ำในมหาวิทยาลัยของนิสิตจุฬาลงกรณ์เพื่อลดปัญหาขยะที่มีต่อสิ่งแวดล้อม แต่ยังมีนิสิตจ้านวนน้อยที่ใช้กระบอกน้ำเป็นประจำ งานวิจัยนี้ใช้ทฤษฎีพฤติกรรมตามแผนและตัวแปรความเป็นห่วงสุขภาพเพื่อทดสอบตัวแปรทำนายพฤติกรรมการใช้กระบอกน้ำในมหาวิทยาลัยของนิสิต จากผลการสำรวจของนิสิตจุฬาลงกรณ์จำนวน 120 คน พบว่าทฤษฎีพฤติกรรมตามแผนสามารถทำนายการใช้กระบอกน้ำในมหาวิทยาลัยของนิสิตได้ โดยเจตคติต่อพฤติกรรม การคล้อยตามกลุ่มอ้างอิง และการรับรู้การควบคุมพฤติกรรมทำนายเจตนาและพฤติกรรมได้อย่างมีนัยสำคัญ ความเป็นห่วงสุขภาพเป็นปัจจัยพื้นหลังที่ทำนายเจตคติต่อพฤติกรรม การคล้อยตามกลุ่มอ้างอิง และการรับรู้การควบคุมพฤติกรรม ข้อค้นพบของงานวิจัยนี้ สามารถนำไปวางแผนสร้างการแทรกแซงเพื่อรณรงค์การใช้กระบอกน้ำในบริเวณมหาวิทยาลัยของนักศึกษามหาวิทยาลัยได้

สาขาวิชา จิตวิทยา ลายมือชื่อนิสิต .....
ปีการศึกษา 2561 ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

5977638438: MAJOR PSYCHOLOGY

KEYWORDS: REUSABLE WATER BOTTLE, HEALTH CONSCIOUSNESS, REUSABLE BOTTLE, THE THEORY OF PLANNED BEHAVIOR, ATTITUDE, ATTITUDE TOWARD THE BEHAVIOR, PERCEIVED NORMS, PERCEIVED BEHAVIORAL CONTROL, INTENTION, BEHAVIOR

Aruch Patumtaewapibal : HEALTH CONSCIOUSNESS AND THE THEORY OF PLANNED BEHAVIOR: THE ROLE OF HEALTH CONSCIOUSNESS WITH THE ON-CAMPUS USE OF REUSABLE WATER BOTTLE AMONG CHULALONGKORN FRESHMEN

Advisor: Asst. Prof. Watcharaporn Boonyasiriwat, Ph.D.

Use of reusable water container on Chulalongkorn University campus, though is pro-environmental, is currently limited among the students. The present study investigated antecedents of such behavior, using the theory of planned behavior (TPB) with health consciousness as an addition to the model. One-hundred and twenty Chulalongkorn freshmen filled out a TPB-based questionnaire with a health consciousness scale. Data analyses using LISREL reveal an excellent fit for the TPB model. Specifically, attitude, perceived norms, and perceived behavioral control significantly and positively predicted intention and the behavior. Health consciousness indirectly influence intention and behavior via attitude, perceived norms, and perceived behavioral control. Examinations of the effects of these predictors have important implications for designing effective behavior-change interventions to promote the use of reusable water container on campus among college students.

Field of Study: Psychology Student's Signature .....

Academic Year 2018 Advisor's Signature .....

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

Chapter I

Introduction

Background and importance

Many prestigious universities around the world have implemented zero waste programs, to curb universities' waste. Among various types of waste that universities generate daily, plastic waste receives the most priority, due to its harmful effect on the environment (Bläsing & Amelung, 2018; Horton, Walton, Spurgeon, Lahive, & Svendsen, 2017; Thompson, Moore, vom Saal, & Swan, 2009). Banning the plastic bottled in a university setting seems to be an intuitive solution, but evidence demonstrated that such action did not reduce the number of plastic bottled entering the university waste stream (Berman & Johnson, 2015), and led to less water consumption, as beverage choice is being limited (Mikhailovich & Fitzgerald, 2014). The current and most preferred solution to university's plastic waste has become the on-campus use of reusable bottles.

Many universities have attempted to make the on-campus use of reusable bottle become a rational behavior a behavior with optimal level of benefits. They have installed water refill stations campus-wide, given away free reusable bottles to newly enrolled freshmen, and discounted beverage price to students who purchase a beverage with their own reusable bottles. These practices allow students to drink free water, and pay less for any beverage purchase. In theory, all of these practices should encourage college students to use the reusable bottles, but they do not. Some universities found that only 10% students reported using the reusable bottles daily (Environmental Research Institute. Chulalongkorn University, 2017).

In *Conservation Psychology*, Clayton and Myers (2015) placed an emphasis on the role of internal factors that influence pro-environmental behavior. They suggested that beside external factors, internal factors such as attitude toward the behavior, self-efficacy, societal norms, and behavioral intention are important factors determining the performance of behaviors. Based on Clayton and Myers (2015)'s notion, it is crucial to address psychological factors that would induce college students to use the reusable bottle.

In search of psychological antecedents of the on-campus use of reusable bottle, limited numbers of studies were found (Bhesyanavin & Pichalai, 2015; Patumtaewapibal, Jakkapark, & Simarangsarit, 2017). These two studies investigated college students' intention to use the reusable bottle on campus, under the theory of planned behavior. The model assumes that individuals' attitude, subjective norm, and perceived behavioral control determine intention to perform the behavior. Their findings however shed little lights. First, the two studies found mixed results on intention's predictors. Bhesyanavin and Pichalai (2015) found that attitude toward behavior and subjective norm predict intention to use the reusable bottles on campus, while Patumtaewapibal et al. (2017) found subjective norm and perceived behavioral control. Hence, it is unsettled which variables (attitude, subjective norm, or perceived behavioral control) are responsible for intention to use the reusable bottle on campus. Second, the two studies only examined antecedents of intention, leading to an unknown relationship between intention and behavior. Even if we can motivate students to use the reusable bottles on campus, we cannot be certain that the motivated students would carry out the behavior.

Finally, the two studies were based on the theory of planned behavior, which rests on an assumption of sufficiency (Fishbein & Ajzen, 2011). That is, only three variables (attitude, subjective norm, and perceived behavioral control) predict

intention to perform the behavior. This notion has been attacked by many researchers that three variables cannot fully explain intention. Adding variables that related to the focal behavior increases an overall prediction of the model (Conner & Armitage, 1998). For the case of the on-campus use of reusable bottle among college students, findings from the two studies showed that the three variables did not fully explain intention. Beside methodological error, it is likely that other variables may contribute to the intention to perform the behavior. This raises an interesting question, what would be the additional factor that determine college students' intention to use the reusable bottle on campus?

Fishbein and Ajzen (2011) have provided a guideline for researchers who want to add additional variables into the theory of planned behavior to investigate the behavior: (1) additional construct is not overlapping the existing variables conceptually and operationally; (2) the additional construct has to be antecedent of either intention to perform the behavior or the performance of the behavior; and (3) it has to be widely studies in social science.

Based on Fishbein and Ajzen (2011)'s guideline, health consciousness one orientation to overall health (Hong, 2009) comply to majority of the guideline. First, health consciousness is widely studied construct in social science. Over three millions results on health consciousness come up in Google scholar search. Second, definition of health consciousness does not overlapping with any of the theory of planned behavior variables. Each theory of planned behavior independent variables say nothing about how individuals take care of themselves. Third, health consciousness is a promising construct to be antecedent of intention to use the reusable bottles. Health consciousness has been shown to be a predictor of intention to perform various kind of health behavior (Hong, 2011; Kaynak & Eksi, 2011; Mai & Hoffmann, 2012; Melody & Shang-Hui, 2013). Because the use of reusable

bottle has often been associated with health concern (Choate, Davis, & Verrecchia, 2018), it stands to reason that reusable bottle behavior is a health behavior; therefore, health consciousness is likely to be antecedent of intention to use the reusable bottles on campus.

The present study aims to expand the knowledge about the use of reusable bottles on campus among college students by investigating the role of health consciousness under the framework of theory of planned behavior.

Literature Review

This section reviews the theory of planned behavior and health consciousness regarding the use of reusable bottles on campus.

1. The theory of planned behavior

The theory of planned behavior is a behavioral model that provides psychological explanation of the behavior. The model was developed by Ajzen (1991). In contrast to the notion that human behavior is complex, Ajzen (1991) assumed that once people form beliefs about the behavior—whether they are accurate or inaccurate, biased or unbiased, deliberative or intuitive—attitude toward the behavior, subjective norm, perceived behavioral control, and intention follow automatically and inevitably. These four constructs in turn give rise to the performance of the behavior, as depicted in figure 1. The theory of planned behavior rests on a sufficiency assumption. That is, consideration of extra antecedent of intention—beside attitude toward the behavior, subjective norm, and perceived behavioral control—would not improve prediction of intention (Fishbein & Ajzen, 2011).

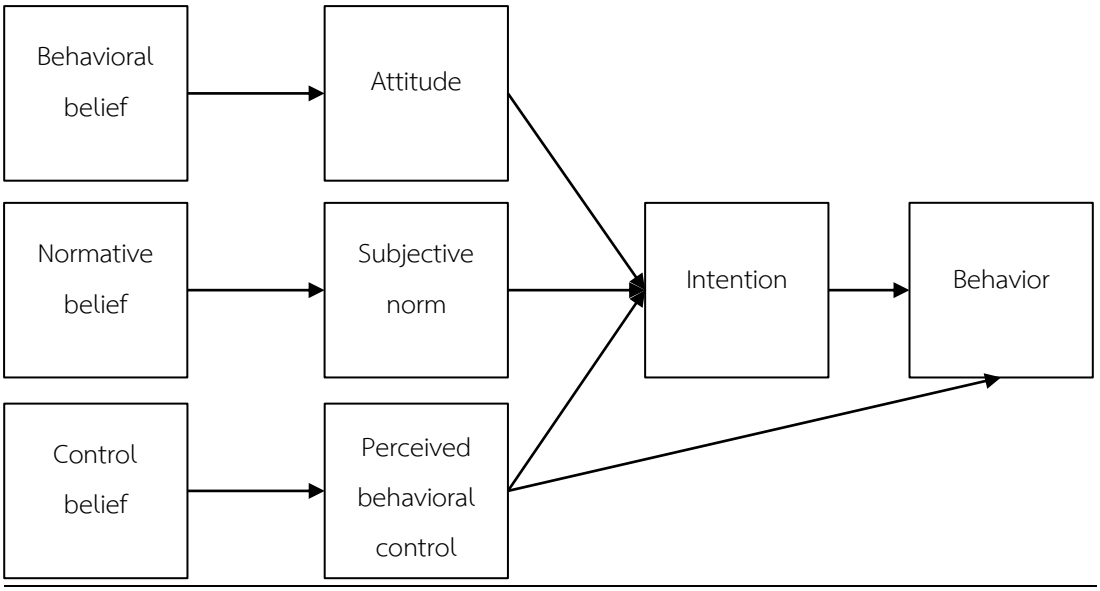

Figure 1 The theory of planned behavior model.

In addition, the theory of planned behavior has provided a strict rules and procedures on how to use the model to investigator behavior in questions. In the followings, the author discusses each variable in turn on how it is defined, and measured.

1.1 Behavior

First is the behavior. The theory of planned behavior requires that an investigator has to define an interested behavior in terms of what is the action, what is the target of the action, where is the context in which the action takes place, and when is the time that the action occurs. This rule is commonly known as the TACT rule. The abbreviation stands for target, action, context and time, respectively. An example of behavior defined by TACT rule are going hunt in the next 12 months (Hrubes, Ajzen, & Daigle, 2001) or the use of reusable bottles on campus (Patumtaewapibal et al., 2017). Another rule is the compatibility rule. That is, once the behavior is defined in terms of TACT, variables in the theory of planned behavior

model (e.g. intention, attitude, subjective norm) must be measured in respect with the same behavior.

Next is to choose how investigators are going to measure the behavior. Fishbein and Ajzen (2011) suggested two ways to measure the behavior: (1) direct observation by the investigators; or (2) self-report from the participants themselves. Both ways have their pros and cons. Direct observation may be the simplest way to measure the behavior of the participants, and tends to yield accurate results (Armitage & Conner, 2001). However, it may not be realistic as investigators have to track participants 24/7. The simpler route of self-report may be preferable. The research may simply ask the participants how many times they have done the behavior. To assess a category of behavior, researchers must provide respondents a clear definition of a category in question. For instance, the use of reusable bottles includes refill, drink, bring, or carry the bottles.

Although self-report is convenient, many researchers have questioned the validity of self-reports (Jaccard, McDonald, Wan, Dittus, & Quinlan, 2002; Schwarz, Groves, & Schuman, 1998; Tourangeau & Yan, 2007). People may not be able to accurately recall their past behavior, or, usually due to self-presentation concerns, they may choose not to report it accurately. For example, people tend to over-report medication adherence (Wagner & Rabkin, 2000) but under-report drug use (Lapham, C'de Baca, Chang, Hunt, & Berger, 2002). For this case of social desirable or undesirable behavior, Fishbein and Ajzen (2011) suggested tips to reduce participants' social desirability. Investigators should provide participants with a verification of confidentiality and scientific purpose. Sometime behavior is difficult to remember, investigator can ask participants to keep a daily or weekly diary.

Fishbein and Ajzen (2011) suggested three possible ways on what aspects of the behavior should be measured. They are dichotomies, frequencies and

magnitude. Investigators could ask the magnitude and the frequency of the behavior. For example, how much money did you donate to the temple yesterday or how often do you donate to the temple during the past two weeks. These questions can come in a form of numerical estimate that correspond to the actual number of time a donation was made, or a verbal scale ranging from never to many times. Alternatively, a researcher could ask participants about the magnitude of the behavior, for example, did you donate the money to the temple? The magnitude behavior often adopted by many researchers as it gives a better understanding of why some people perform a given behavior, while others do not.

1.2 Intention

Fishbein and Ajzen (2011) defined intention as an indication of a person's readiness to perform a behavior. It can come in various form as following: I will engage in the behavior X, or I intend to perform the behavior X, where X can be any human behavior. The theory of planned behavior requires that intention to perform behavior X has to be the same behavior as defined in the previous stage. For example, if the behavior in question is defined as the use of reusable bottles on campus, intention must be stated as intention to use the reusable bottles on campus. Intention has been confirmed that it can predict behavior in many studies such as to donate blood (Giles & Cairns, 1995), to go hunting (Hrubes et al., 2001), and to use marijuana (Conner & McMillan, 1999).

Intention is usually measured via self-report Likert scale (Likert, 1932) a questionnaire format that asks respondents to respond to a series of statements about a topic, in terms of the extent to which they agree with them either on a scale of 5, 7 or 9 points. For the measure of intention, the question item would read, how strongly they intend to perform the behavior? The answer scale ranges from

extremely likely to extremely unlikely. Giles and Cairns (1995), for example, asked participants to rate their intention to give blood at the university on Monday as following:

I intend to give blood at the university of Monday.

Extremely likely: 1 l 2 l 3 l 4 l 5 l 6 l 7 :Extremely unlikely

Or it can be a bipolar rating scale, too.

Extremely likely: -3 l -2 l -1 l 0 l +1 l +2 l +3 :Extremely unlikely

Ogaji (2018) pointed out that when intention to perform health behavior is measured, unipolar scale tended to receive a significant lower response rate, in comparison to bipolar scale. In addition, bipolar scale received a significant higher score than unipolar scale. Both types indicates low floor effect and ceiling effect.

In addition to extremely likely-unlikely, investigators may opt for other adjectives like probable-improbable or agree-disagree. There is no specific rule on selecting the adjective word. But there are rule on how many items that measure intention. At least three items that access the target intention should be included in the questionnaire to check reliability of the items. The general rule is that the higher participants rate the intention, the more likely they will perform the behavior.

The downside of measuring intention via rating scale is the validity in predicting the behavior. The estimate tends to be surplus the reality. Armitage and Conner (2001) gave two possible cause of why the rating is higher than the reality: (1) temporal stability of intention, and (2) volitional control.

Temporal stability: Even when an intention is fully compatible with the behavior criterion, its predictive validity will decline if the intention changes after it was assessed and prior to performance of the behavior. The time interval between

measurement of intention and assessment of behavior is taken as a proxy for temporal stability. It is assumed that with the passage of time, an increasing number of events may cause intention to change. A meta-analysis has confirmed this idea (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Sheeran & Orbell, 1998). It was found that the correlation between effect size and amount of time in weeks between assessment of intention and behavior was -.59 in the Sheeran and Orbell (1998) analysis. The difference, however, was not statistically significant.

Volitional control: Even assuming a measure of intention that is stable and compatible with the behavior, performance of the behavior may be thwarted by factors beyond a person's control. People cannot act on their intentions if they lack the skills or resources required to perform the behavior, or if external factors prevent them from doing so. This lack of volitional control can be causally implicated because it can prevent performance of the behavior. For example, people may intend to move a piece of furniture but could not do so because they underestimated its weight and are physically incapable of performing the task.

As discussed previously, three theory of planned behavior constructs attitude toward the behavior, subjective norm, and perceived behavioral control influence the intention. The general rule is that the more favorable the attitude toward the behavior, and perceived norms, and the greater the perceived behavioral control, the stronger should be the person's intention to perform the behavior in question. In reality, these three factors will not always contribute equally to the formation of intention. They are expected to be vary from one person to another, from one group of individuals to another, and from one behavior to another. In some circumstances, a person's intention may be determined largely by the attitude toward the behavior, and normative considerations may play little to none. Table 1 shows the difference of predictive power of each theory of planned behavior variables onto individuals'

intention to perform various kinds of behavior. From the table 1, we can see that difference intention to perform behavior vary in their beta. For example, perceived behavior control physical activity has the highest weight determining intention to perform physical activities. When the intention to perform the behavior change to drinking and driving, weight of subjective norms become the greatest.

Table 1

Prediction of intentions from attitude toward the behavior, subjective norm, and perceived behavioral control.

Intention	ATT		SN		PBC	
	r	*β*	*r*	*β*	*r*	*β*
Physical activity (Latimer & Martin Ginis, 2005)	0.58	0.29	0.48	0.27	0.66	0.47
Drinking and driving (Armitage, Norman, & Conner, 2002)	0.71	0.34	0.71	0.41	0.64	0.23
Completing the school year (Davis, Ajzen, Saunders, & Williams, 2002)	0.47	0.22	0.47	0.28	0.62	0.44
Applying for a promotion (Giles & Larmour, 2000)	0.66	0.15	0.6	0.16	0.87	0.7
Using ecstasy (Orbell, Blair, Sherlock, & Conner, 2001)	0.75	0.44	0.69	0.24	0.58	0.34
Consuming soft drinks (Kassem & Lee, 2004)	0.72	0.52	0.42	0.19	0.54	0.28
Using condoms (Villarruel, Jemmott, Jemmott, & Ronis, 2004)	0.63	0.26	0.67	0.36	0.59	0.34
Breast cancer screening (Drossaert, Boer, & Seydel, 2003)	0.6	0.42	0.2	0.09	0.49	0.29
Blood donation (Giles & Cairns, 1995)	0.55	0.25	0.22	0.11	0.73	0.61

Intention	ATT		SN		PBC	
	r	β	*r*	β	*r*	β
Recycling of waste paper (Cheung, Chan, & Wong, 1999)	0.66	0.43	0.52	0.27	0.57	0.21
Quit smoking (Godin, Valois, Lepage, & Desharnais, 1992)	0.31	0.22	0.12*	0.17*	0.52	0.55
Healthy diet (Hagger, Chatzisarantis, & Harris, 2006)	0.7	0.55	0.5	0.21	0.42	0.22

Note. The table adopted from Fishbein and Ajzen (2011), *r* = correlation coefficient, β = standardized regression coefficient, ATT = attitude toward the behavior, SN = subjective norm, PBC = perceived behavioral control, * Not significant, all other coefficients are significant at $p < .05$

Intention to perform the behavior can be expressed in algebraic form as followed:

$I = A_B(w_1) + SN\ (w_2) + PBC\ (w_3)$

Where I refers to intention;

A_B represents the attitude toward the behavior;

SN represents the subjective norms;

PBC represents perceived behavioral control; and

w_1, w_2, and w_3 represents the weights for each factor.

Weight (or the regression coefficients, β) can be obtained through examination of the standardized partial regression coefficients from a multiple regression analysis. In general, a predictor's regression coefficient reflects importance as a determinant of intention. For example, Hagger et al. (2006) found that attitude has higher regression coefficient than perceived norms and perceived behavioral control (Table 1). It is thus reasonable to argue that attitudinal considerations outweigh normative and control considerations as causal factors influencing

intentions. Vice versa, a low regression coefficient is an indicator that the predictor is not important determinant of intention. However, in some circumstance, low regression coefficient may occur not because the factor is not important, but because there is little or no variance in the predictor variables.

1.3 Perceived behavioral control

Perceived behavioral control refers to the extent to which people believe that they are capable of performing a given behavior, that they have control over its performance (Fishbein & Ajzen, 2011). Perceived behavioral control contains two components: ability to perform the behavior (perceived capacity), and control over performing the behavior, (perceived autonomy).

The theory of planned behavior assigns two roles to perceived behavioral control. First is the moderator of the intention-behavior relation. Perceived behavioral control is assumed to reflect the actual control over a behavior. The effect of intention on behavior is stronger when perceived behavioral control is high other than low. The second role of the perceived behavioral control is the antecedent of intention. It is assumed that the greater the perceived behavioral control, the stronger should be the intention to perform the behavior.

Like intention, the measure of perceived behavioral control can be asked directly using the Likert scale. A variety of direct questions can be used to assess respondents' perception of control. Items should tap in both abilities to perform the behavior and control over performing the behavior components of the perceived behavioral control. For example,

If I really want to I could stop smoking in the next 6 months.

(Perceived capacity)

Extremely likely: 1 l 2 l 3 l 4 l 5 l 6 l 7 :Extremely unlikely

I have complete control over my stopping smoking in the next 6 months

(Perceived autonomy)

Strongly agree: 1 l 2 l 3 l 4 l 5 l 6 l 7 :Strongly disagree

The perceived behavioral control is assumed to originate from control beliefs, which consists of beliefs that the control factors will appear, and beliefs about the power of that control factors to either facilitate or impede the performance of the behavior. This assumption is based on the value-expectancy theory (Feather, 1959, 1982). Readily accessible beliefs regarding these control factors are assumed to determine the overall level of perceived behavioral control. The more of the required resources and opportunities individuals think they possess, and the fewer obstacles or impediments they anticipate, the greater should be their perceived behavioral control over their performance of the behavior. Equation below shows the relation between control beliefs and perceived behavioral control in symbolic form.

$PBC = f [\Sigma C_k P_k]$

where PBC = Perceived behavioral control,

C_k = The belief that control factor k will be present,

P_k = The power of factor k to facilitate or impede performance of the behavior,

Q = Number of control factors.

1.4 Subjective norm

Subjective norm is an individual's perception of significant others toward the performance of a behavior (Ajzen, 1991). However, evidence has suggested that subjective norm is not the only form of social influence (Cialdini, 2001; Kallgren, Reno, & Cialdini, 2000; Reno, Cialdini, & Kallgren, 1993). Descriptive norms, a perceptions that significant others are or are not performing the behavior, is another social force. Fishbein and Ajzen (2011) thus renames the construct subjective norm to perceived norm, and redefine the construct to capture both societal force, as the person's general perception of whether important others desire the performance or nonperformance of the behavior. Similar to other the theory of planned behavior constructs, we use the Likert scale to assess people perceived norms. Question items to reflect both construct are as followed:

Injunctive norm

Most people who are important to me think . . . . exercise regularly.

I should : 1 l 2 l 3 l 4 l 5 l 6 l 7 : I should not

The people in my life whose opinions I value would .... of my regular exercise.

Approve : 1 l 2 l 3 l 4 l 5 l 6 l 7 : Disapprove

Descriptive norm

Most people who are important to me . . . exercise regularly

Do : 1 l 2 l 3 l 4 l 5 l 6 l 7 : Do not

How many of the people who you respect and admire exercise regularly

Very few : 1 l 2 l 3 l 4 l 5 l 6 l 7 : All of them

Most people like me exercise regularly

Always : 1 l 2 l 3 l 4 l 5 l 6 l 7 : Never

Similar to perceived behavioral control, perceived norms are assumed to originate from normative beliefs. The normative beliefs consist of (1) beliefs about expectations of specific important others; and (2) beliefs about the individual's motivation to comply with each of those referents. An algebraic expression is

$PN = f [\sum n_i m_i]$

Where PN = Perceived norms

n_i = One ascribes to particular salient others

m_j = One's motivation to comply with those others

1.5 Attitude toward the behavior

The theory of planned behavior sees attitude toward the behavior as an evaluation of cognitive and affective aspects of psychological object. Cognitive aspects of attitude involve such dimension as *wise-foolish* and *harmful-beneficial*, whereas affective aspects are assumed to be reflected in such dimensions as *pleasant-unpleasant* and *boring-interesting*.

The theory of planned behavior adopted the semantic differential scale (Osgood, Suci, & Tannenbaum, 1957) to measure these two aspect of attitude toward the behavior. Responses are usually scored from -3 on the negative side of the scale to +3 on the positive side. For example,

The behavior X is . . .

Boring : -3 l -2 l -1 l 0 l +1 l +2 l +3 : Interesting

Unpleasant : -3 l -2 l -1 l 0 l +1 l +2 l +3 : Pleasant

The sum or mean across all scales is taken as a measure of the person's attitude. The higher the score, the more favorable the respondent's attitude toward the attitude object. Cronbach's coefficient alpha which can range from a low of 0 to a high of 1, is usually used to measure the degree to which the items on an attitude scale are internally consistent. A coefficient of .75 or higher is generally taken as evidence of satisfactory internal consistency.

From factor analytical studies, Osgood et al. (1957)'s semantic measure turns out to have three dimensions: evaluation (*good-bad*), potency (*Large-small*), and activity (*active-passive*). Because attitude toward the behavior is defined as evaluative dispositions, adjective pairs in the semantic scale have to represent only the evaluation dimension. Fishbein and Ajzen (2011) suggested that the theory of planned behavior formative research should be conducted a pilot study to validate the scale prior to the main study.

Similar to perceived behavioral control and subjective norm, The theory of planned behavior assumes that attitude is formed automatically and inevitably as behavioral beliefs are formed about the object. Behavioral beliefs consist of (1) beliefs about the consequences of the performance of the behavior; and (2) beliefs about the evaluation of that consequences. Symbolically, the relationship between attitude and beliefs can be expressed as following:

$A_B = f [\sum b_i e_i]$

where: A_B = Attitude toward and object,

b_i = The strength of the belief that the object has attribute i,

e_i = The evaluation of attribute i,

N = Number of individual's beliefs about consequences.

2. The critique of the theory of planned behavior

Although The theory of planned behavior has induced a substantial body of literature applying it to a variety of behavioral domain, the theory received critics on two domains: (1) sufficiency, and (2) methods issue.

2.1 Sufficiency assumption

As mentioned earlier, the theory of planned behavior assumes that the three variables attitude toward behavior, subjective norm, and perceived behavioral control are enough to explain intention to perform the behavior in question. That is, consideration of additional predictor would not increase an overall prediction of intention. Despite this sufficiency claim, many researchers have corroborated that adding a relevant variables, once obeyed the level of measurement rule, could increase overall prediction of the model. The following discusses some of the most frequently studied variables being added into the theory of planned behavior: past behavior, self-identity, and anticipated affect.

Past behavior: It is well documented that past exercise behavior has been link with tendency to exercise in the future (Ouellette & Wood, 1998). Also, the definition of past behavior does not overlap with any of the existing the theory of planned behavior variables. Thus, Norman and Smith (1995) decided to add the past behavior construct as the fourth factor in addition to the three standard the theory of planned behavior variables. The findings reveal that without past exercise, intentions and perceived behavioral control measured at time 1 accounted for 27% of the variance in exercise behavior as measured at time 2. Adding pasting behavior to time 1, prediction equation raised the proportion of explained variance to 47%. A significant increase in overall prediction of exercise behavior.

Self-identity: Relying on role theory (Turner, 1991; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), a number of researchers have proposed that people's self-concepts can influence their intentions and actions (Armitage & Conner, 1999; Sparks & Shepherd, 1992). They argued that people who identify with a certain role are expected to perform, and are more likely to perform, behaviors consistent with that role than individuals whose self-concepts do not identify them with the role in question. In a meta-analysis of 24 data set from studies concerning the prediction of intention (Rise, Sheeran, & Skalle, 2006), inclusion of self-identity raised explained variance by 13 percentage points. Based on the theory's three basic antecedents of intention, the multiple correlation for the prediction of intentions was .58, and this correlation increased to .68 with the addition of self-identity on the second step of a hierarchical regression analysis.

Anticipated affect: Anticipated affect has been constantly reported a relationship with intention to engage in exercise behavior (Richard, de Vries, & van der Pligt, 1998). Also, according to Fishbein and Ajzen (2011) guideline, the definition of anticipated affect does not overlap with any of the existing the theory of planned behavior variables. Abraham and Sheeran (2003) were them include anticipated affect in their theory of planned behavior analysis of the exercise behavior. They assessed intention to exercise at least six times in the next two weeks as well as attitudes, injunctive norms, and perceived behavioral control with respect to this behavior. They found that the intention to exercise has a multiple correlation of .64 with attitudes, perceived norms, and perceived behavioral control. When anticipated affect was added to the prediction equations, multiple correlations increase significantly to .71. In terms of explained variance (r^2), these improvements in prediction represent 10% increase in the case of intention to perform the behavior.

From this perspective, empirical evidence suggests that additional intention predictors increase overall prediction of the model. Thus, it is likely that sufficient assumption may no longer be true.

Due to this, Fishbein and Ajzen (2011) have provided a general guideline for any researchers who are interested in increasing the predictive power of the performance of the focal behavior. First, the proposed addition should obey the rule of compatibility, just like the other variables do. Second, the new variable has to be a cause of intention or behavior. Third, the proposed variable should conceptually differ to the existing variables. Fourth, the proposed factor must be applicable to a wide range of behaviors. Finally, the fourth variables should improve prediction of intention and behavior. Among a vast number of proposed variables, descriptive norm stands out, passes all the Fishbein and Ajzen (2011)'s guideline.

2.2 Method issues

The theory of planned behavior rule on how to measure each construct presents a social desirability problem in which the proportion of people who intend to engage in socially desirable behaviors is greater than the proportion of people who actually do and that the proportion of people who intend to perform socially undesirable behavior is smaller than the proportion. This effect has been shown in various of studies (Greenwald, Carnot, Beach, & Young, 1987; Sherman, 1980). Greenwald et al. (1987), for example, found that participants who expressed intentions to register and votes in the 1984 U.S. presidential election were more likely to participate in the election than participants who did not express their intention to register and vote. Thus, it seems clear that asking people to estimate their future behavior impacts on their subsequent behavior.

Sufficiency assumption and methods issues are the two concerns regarding the theory of planned behavior model. The former questions the sufficiency of the three original theory of planned behavior intention predictor, while the latter concern about the validity of the theory of planned behavior questionnaire. In the next section, the author reviews the theory of planned behavior study on the use of reusable bottles on campus among college students.

3. The theory of planned behavior research about reusable bottles on campus

The theory of planned behavior has been successfully used to understand and predict various kinds of behavior (Albarracín et al., 2001; Armitage & Conner, 2001; Godin & Kok, 1996; Hagger, Chatzisarantis, & Biddle, 2002; Sheeran & Taylor, 1999; Sheppard, Hartwick, & Warshaw, 1988; van den Putte, Hoogstraten, & Meertens, 1993). However, very limited the theory of planned behavior studies examine the use of reusable bottles among college students in a university setting. The author found two unpublished studies: Bhesyanavin and Pichalai (2015) and Patumtaewapibal et al. (2017). The two studies agreed on the salient beliefs of college students on the use of reusable bottles on campus. Behavioral beliefs were reduction of beverage expense, reduction of plastic bottle waste, and cleanliness of the water; normative beliefs were friends, family member, and professors; control beliefs were being water stations, inconvenience, and contaminated water.

When it comes to relative weight of each intention predictor, the two studies disagree. Bhesyanavin and Pichalai (2015) found that attitude toward the behavior and subjective norm significantly predicted intention, while Patumtaewapibal et al. (2017) found a significant effect on perceived behavioral control, and subjective norm. Furthermore, the two differ, although slightly, in terms of the three predictors and intention to perform the behavior. (Table 2).

Table 2

A comparison between the two studies of intention to use the reusable bottles on campus among Chulalongkorn students

	ATT		SN		PBC	
	r	*β*	*r*	*β*	*r*	*β*
Bhesyanavin and Pichalai (2015)	.48**	.26**	.58**	.46**	.38**	.12
Patumtaewapibal et al. (2017)	.65**	.45	.56**	26*	.76**	.64**

Note. ATT = attitude toward the behavior, SN = subjective norm, PBC = perceived behavioral control ** $p < .01$ * $p < .05$ two-tailed.

Because the two studies only investigated antecedents of intention to use the reusable bottles on campus among college students, the intention-behavior and perceived behavioral control-behavior links are unknown. To date no study has yet to examine such relationships particular on the use of reusable bottles on campus among Thai college students.

4. Other related-reuse behavior

There is a very limited study that investigates the on-campus use of reusable bottles among college students, needless to say, under the theory of planned behavior as a theoretical framework. Nonetheless, if we consider the use of reusable bottles as one kind of reuse behavior, Ertz, Huang, Jo, Karakas, and Sarigöllü (2017) can provide some relevant findings.

Ertz et al. (2017) examined the reuse behavior of Asian and western lay people, using the theory of planned behavior as a theoretical framework. In their study, context and individuals' motivation were added into the original theory of

planned behavior model. To develop the theory of planned behavior questionnaire 180 students in a Canadian and a Chinese university were accessed their attitude toward the behavior, subjective norm, and perceived behavioral control, plus context and motivation toward the use of reusable container in general. In the actual data collection phase, Ertz et al. (2017) sent an online questionnaire to 549 western and 672 Asian consumers. Via structural equation modeling, it was found that all three original theory of planned behavior constructs have significant impact to the intention to use the reusable containers. Context and motivation turned out to be antecedents of several the theory of planned behavior constructs: context strongly impacts PBC (β_{total} = .66) both Asian and western but context only have large impact to westerners (β = .59) but not to Asian (β = .26). Motivation is significant but has weak impact on attitude and intention. In addition, cultural difference between Asian and western mediated the link between intention and behavior.

We can see that the three theory of planned behavior constructs are able to explain intention to engage in reuse behavior, and intention. In addition, context and motivation gave more information about the origin and process of the performance of the behavior. Context influences people motivation, attitude toward reuse behavior and perceived behavioral control. These three constructs then determine intention to engage in reuse behavior. Motivation explains not only intention to perform the behavior but also attitude toward the reuse behavior. Context shows correlation to subjective norms. And finally, intention is able to translate into the actual performance of reuse behavior.

5. Health consciousness

As discussed previously that the theory of planned behavior variable cannot cover all the variance of intention to use the reusable bottles in a university setting

(Bhesyanavin & Pichalai, 2015; Patumtaewapibal et al., 2017). This means adding an additional and relevant variable into the theory of planned behavior would better explain intention to use and actual use of reusable bottles on campus. Based on the Bhesyanavin and Pichalai (2015) and Patumtaewapibal et al. (2017) Chulalongkorn students reported paradoxical beliefs about the use of reusable bottles on campus. Some students believe that the use of reusable bottle is healthy as they can control over what kind of water to consume. Some on the other hands reported that the use of reusable bottle would be unhealthy to their health as such behavior rely heavily on the refill station, which may not be properly function. This raise an interesting question whether health plays which role in explaining intention to use the reusable bottles.

Health consciousness is a construct related to how individuals concern about their health. There is no consensus in definition of health consciousness (Zhang, Sun, & Khan, 2018). Various authors have defined the terms differently, as shown in the table 3. In the past, many authors defined health consciousness in one specific behavior or aspect. For instance, Furnham and Forey (1994)'s definition of health consciousness focuses only on information seeking about healthy lifestyle; or Iversen and Kraft (2006)'s refers to mere motivation to be concern with health. Kraft and Goodell (1993) refers exercise for 30 minutes.

Hong (2009) compiled all of the health consciousness definition available at the time, and concluded that there are five majors the health consciousness dimensions: (1) engagement in health behavior (Kraft & Goodell, 1993; Slater & Flora, 1991); (2) attention to one's health (Iversen & Kraft, 2006); (3) health information seeking and usage (Furnham & Forey, 1994; Rodgers, Chen, Duffy, & Fleming, 2007); (4) personal responsibility (Basu & Dutta, 2008; Dutta-Bergman, 2004; Dutta & Feng, 2007); (5) health motivation (Dutta-Bergman, 2004; Moorman & Matulich, 1993). Hong

(2009) then re-conceptualize the health consciousness as people's orientation toward overall health to capture the complexity of the health consciousness. Many new health studies often refer to Hong (2009)'s definition of health consciousness (Zhang et al., 2018).

Table 3

Various definitions of health consciousness

Authors	Definitions of health consciousness
Gould (1990)	A psychological or inner status of a person, including health alertness, health self-consciousness, health involvement, and self-monitoring of one's health.
Kraft and Goodell (1993)	A set of personal activities, interests, and opinions related to one's health.
Furnham and Forey (1994)	One's ecological and self-awareness of lifestyles—including health information seeking, food consumption, concern for the natural environment, and perception of prescription drugs.
Kaskutas and Greenfield (1997)	Being composed of concerns for nutrition and health information seeking.
Jayanti and Burns (1998)	The degree to which health concerns are integrated into a person's daily activities.
Meng and Wang (2000)	One's cognition of and comments on their personal physical, psychological and social adaptabilities in their daily lives."
Iversen and Kraft (2006)	A person's tendency to be concerned with his or her health.
Dutta (2007)	Healthy activities such as exercise, no drinking, no gambling.
Li (2008)	A kind of spiritual phenomenon with health as its

Authors	Definitions of health consciousness
	object.
Hong (2009)	One's orientation toward overall health.

6. Effect of health consciousness

Many health consciousness studies opted for broad definition of Hong (2009), which has been found to predict various kinds of intention to engage in health-related behavior. Examples are motivation to anti-consumer (Kaynak & Eksi, 2011), message processing (Hong, 2011), intention to purchase green products (Melody & Shang-Hui, 2013), food choice (Mai & Hoffmann, 2012), calorie intake (Ellison, Lusk, & Davis, 2013), willingness to use functional foods (Chen, 2013), dietary supplements (Royne, Fox, Deitz, & Gibson, 2014), health app usage (Cho, Park, & Lee, 2014), perception of fast food (Hwang & Cranage, 2015), healthy food (Mai & Hoffmann, 2015), organic food (Akhondan, Johnson-Carroll, & Rabolt, 2015), drug use (Lee, King, & Reid, 2015), intention to purchase alcohol (Sinkevičius, 2016), intention to purchase meat (Buaprommee & Polyorat, 2016), consumer behavior toward organic food (Singhal, 2017), disease prevention behavior (Gould, 1988), and nutrition management (Kraft & Goodell, 1993).

The role of health consciousness has often been investigate under the theory of planned behavior. Although the theory of planned behavior suggested all the variables in the model should have the level of measurement, many researchers still chose to retain the Hong (2009)'s broad definition of health consciousness and found significant relationship to attitude, perceived behavioral control, subjective norm, and intention (Furnham & Forey, 1994; Kaynak & Eksi, 2011; Divya & Nakkeeran, 2018; Gould, 1988, 1990; Hong 2011). Nonetheless, there are a body of research that did not found no significant relationship between health consciousness and theory of

planned behavior variables (e.g. Baumann, Czerwinski, Reifegerste, 2017). The effect of health consciousness seems to depend greatly on the types of behavior in question.

7. Measuring health consciousness

Hong (2009) argued that health consciousness should be understood as a psychological state predicting a variety of related variables (e.g., health attitudes and behaviors), rather than actual specific behaviors. Thus, Hong (2009) create a new health consciousness scale to reflect a psychological state, on a seven-point Likert scale. His scale consists of 11 items, covering three dimensions: self-awareness, personal responsibility, and health motivation. Hong (2009)'s questionnaire has a standardized Cronbach's Alpha score of .85, indicating highly reliable internal consistency. The health consciousness items are listed below:

Table 4

The three health consciousness dimensions and items

Dimensions	Items
Self-awareness	1. I'm very self-conscious about my health.
	2. I'm generally attentive to my inner feelings about my health.
	3. I reflect about my health a lot.
	4. I'm concerned about my health all the time.
Personal responsibility	5. I notice how I feel physically as I go through the day.
	6. I take responsibility for the state of my health.
	7. Good health takes active participation on my part.
	8. I only worry about my health when I get sick. (R)
Health motivation	9. Living life without disease and illness is very important to me.
	10. My health depends on how well I take care of myself.
	11. Living life in the best possible health is very important to me.

Note: (R) = Reversed score.

Summary and hypothesis development.

The theory of planned behavior is a widely accepted model that successfully explain human behavior (Albarracín et al., 2001; Armitage & Conner, 2001). According to Ajzen (1991), the model assumes that behavior is determined by perceived behavioral control and intention. Intention in turn is influenced by attitude toward the behavior, subjective norm, and perceived behavioral control. These three constructs are then originated from behavioral, normative, and control beliefs.

The theory of planned behavior requires that the behavior in question has to be defined in TACT rule, target, action context and time (Ajzen, 1991). Thus, the present study defines the behavior as the on-campus use of reusable bottles in the next 5 schooling day. In addition, when measuring the behavior, Fishbein and Ajzen

(2011) have provided three acceptable options: frequency, magnitude, and dichotomy. The present study opts for the frequency to gain insight on how many days college students would use the reusable bottles, in respect to their degree of intention to perform the behavior.

Since the first development of the theory of planned behavior, the definition of subjective norms has been challenge by many scholars. Originally, subjective norm is defined as the approval of significant other to perform the behavior in question. Recent evidence has suggested that there is an additional social force, namely descriptive norm the behavior of significant others (Cialdini, 2001; Kallgren et al., 2000) It has been shown that the behavior of others can influence individuals behavior. Due to this revelation, Fishbein and Ajzen (2011) renamed the subjective norm to perceived norm as well as redefine its definition to cover bother types of social influence. Thus, the present study would use the new theory of planned behavior model as a theoretical framework.

The theory of planned behavior rests on the assumption of sufficiency (Fishbein & Ajzen, 2011). That is, intention and behavior are only explained by nothing else but attitude toward the behavior, subjective norm, and perceived behavioral control. However, evidence has accumulated, showing that the overall prediction of intention and behavior can be increased by adding additional variables (Armitage & Conner, 1999; Norman & Smith, 1995; Richard et al., 1998). For the case of reusable bottles, previous studies has shown that attitude toward the behavior, subjective norm, and perceived behavioral control did not fully explain intention variance (Bhesyanavin & Pichalai, 2015; Patumtaewapibal et al., 2017). This evidence is congruence to the critics of sufficiency assumption.

When looking at antecedents that could predict intention to use the reusable bottles, health consciousness one orientation to overall health (Hong, 2009) seems

viable due to several reasons. First health consciousness is a widely known construct in social science. Second, the construct definition does not overlapping with any of the theory of planned behavior variables. Finally, because college students often associated the behavior with health concern (Bhesyanavin & Pichalai, 2015; Patumtaewapibal et al., 2017), health consciousness could be viewed as health behavior. When we think of the use of reusable bottles in this way, health consciousness become a promising antecedent of intention because it has been shown that health consciousness is a predictor of various health behavior (Hong, 2011; Kaynak & Eksi, 2011; Melody & Shang-Hui, 2013).

Thus, the present study would add health consciousness as the fourth predictor of intention to use the behavior. The author then hypothesized that the extended theory of planned behavior with health consciousness would better predict intention to use the reusable bottles, and the actual performance of the behavior than the original theory of planned behavior. And because health consciousness has been shown to predict intention to perform health behavior, the author then hypothesized that in the extended theory of planned behavior model, health consciousness would significantly predict intention to use the reusable bottles.

Past research on the use of reusable bottles disagree on prediction weight of attitude toward the behavior, subjective norms, and perceived behavioral control. Bhesyanavin and Pichalai (2015) found that attitude toward behavior and subjective norm predict intention to use the reusable bottles on campus, while Patumtaewapibal et al. (2017) found subjective norm and perceived behavioral control. Although the weight of each intention predictor varies, such results suggest that the attitude toward the behavior, subjective norm, and perceived behavioral control were able to explain the intention to perform the behavior. From this

perspective, the author formulated a subsequent hypotheses as following: in the extended theory of planned behavior attitude toward the behavior, perceived norm, and perceived behavioral control significantly predict intention to use the reusable bottles.

In addition, because the two reusable bottles studies stopped their investigation at intention to use the reusable bottles (Bhesyanavin & Pichalai, 2015; Patumtaewapibal et al., 2017), the relationships of intention-behavior and perceived behavioral control-behavior links are unknown. It is uncertain whether or not intention and perceived behavioral control could translate into an actual performance of the behavior according to what the theory of planned behavior claim. Thus, the present study would examine such relationships. Based on Ertz et al. (2017)'s study, The author hypothesized that intention and perceived behavioral control would significantly predict the use of reusable bottles on campus.

Finally, the author decided to leave out the belief measurement because the previous studies on intention to use the reusable bottles on campus explicitly shown that students salient beliefs behavioral, normative, and control beliefs stay relatively same over a the past three year (Bhesyanavin & Pichalai, 2015; Patumtaewapibal et al., 2017).

Hypothesis

There are seven hypotheses in the present study. Table 5 below describes each hypothesis in turn.

Table 5

A table summarizing hypotheses formulated in the present study

Hypothesis	Descriptions
H1	Addition of health consciousness into the theory of planned

Hypothesis	Descriptions
	behavior would better the prediction of intention and behavior.
H2	Health consciousness positively influence intention.
H3	Attitude toward the behavior positively influence intention.
H4	Perceived norm positively influence intention.
H5	Perceived behavioral control positively influence intention.
H6	Intention positively influence behavior.
H7	Perceived behavioral control positively influence behavior.

Objectives of the study

The present study's objectives were to (1) identify the relationships of among the theory of planned behavior with health consciousness, and (2) compare the predictive validity of intention to use and the actual use of the reusable bottles on campus between the extended theory of planned behavior with health consciousness and the original theory of planned behavior.

Conceptual model

The conceptual model in the present study is depicted in Figure 2. The author calls this model, the extended theory of planned behavior with health consciousness. Behavior is determined by perceived behavioral control and intention. Intention in turn is influenced by health consciousness, attitude toward the behavior, perceived norm, and perceived behavioral control. All relationships are positive.

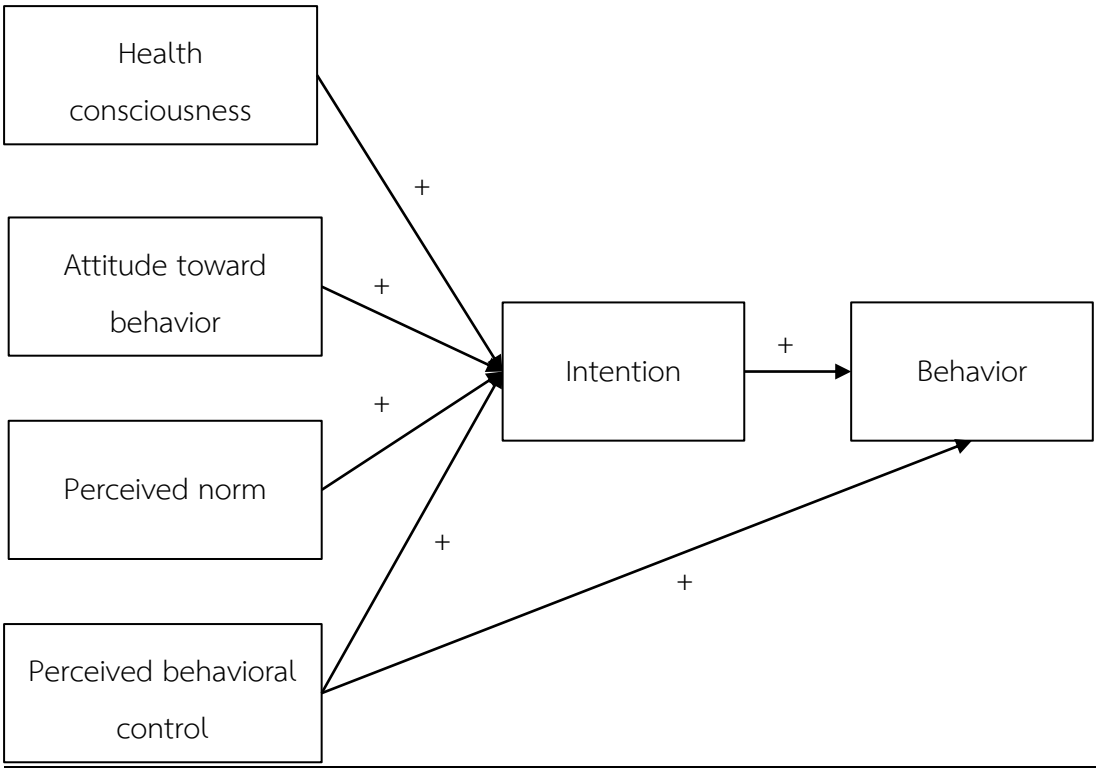

Figure 2 The conceptual model of the present study: the extended theory of planned behavior with health consciousness model.

Scope of the study

The study conducted at Chulalongkorn University, Bangkok Thailand, because Chulalongkorn University has already equipped with water stations campus wide. Also Chulalongkorn University provides free reusable bottles and financial incentive to students. But the majority of students do not use the reusable bottles regularly (Environmental Research Institute. Chulalongkorn University, 2017). Thus, Chulalongkorn University was a suitable place to find out what would be internal factors, required to make students use the reusable bottles on campus.

The sample of the study included only Chulalongkorn freshmen who enrolled in 2018/2019 academic year. These groups of students have the greatest length of stay in a university, compared to other-year students. In addition, people

who enter new situation are more likely to accept new information (Verplanken & Wood, 2006). Thus, if we knew what make them use the reusable bottles, we could give the critical information to them to generate a behavioral change.

Variables

Exogenous variables are health consciousness, attitude toward the behavior, perceived norms, and perceived behavioral control. Endogenous variables intention and behavior.

Conceptual and operational definitions

The use of reusable bottles refers to a respondents' action of bringing reusable bottles to use inside Chulalongkorn University area within the next five school days after their rating of intention. Its operational definition is days in which respondents answer from zero to five days.

Intention refers to readiness to perform the behavior. Its operational definition is a score respondents rating their intention to use the reusable bottles inside Chulalongkorn University area within the next five school days on a 7-pointed Likert scale. (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither disagree or agree, 5 = slightly agree, 6 = agree, 7 = strongly agree) The question items are adopted from Patumtaewapibal et al. (2017).

Attitude toward the behavior refers to an evaluation of cognitive and affective aspects of psychological object. Its operational definition is a score respondents rating 6 items of their attitude toward the use of reusable bottles inside Chulalongkorn University area within the next five school days on a semantic differential 7-pointed Likert scale. (1 = strongly disagree, 2 = disagree, 3 = slightly

disagree, 4 = neither disagree or agree, 5 = slightly agree, 6 = agree, 7 = strongly agree) The question items are adopted from Patumtaewapibal et al. (2017).

Perceived norm refers to the person's general perception of whether important others desire the performance or nonperformance of the behavior. Its operational definition of perceived norm is a score respondents rating 6 items of their perceived norm on a 7-pointed Likert scale. (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither disagree or agree, 5 = slightly agree, 6 = agree, 7 = strongly agree) The question items are adopted from Patumtaewapibal et al. (2017).

Perceived behavioral control refers to the extent to which people believe that they are capable of performing a given behavior, that they have control over its performance. Its operational definition is a score respondents rating their perceived behavioral control on a 7-pointed Likert scale. (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither disagree or agree, 5 = slightly agree, 6 = agree, 7 = strongly agree) The question items are adopted from Patumtaewapibal et al. (2017).

Health consciousness refers to one's orientation toward overall health. Its operational definition is a score respondents rating their health consciousness on a 7-pointed Likert scale. (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither disagree or agree, 5 = slightly agree, 6 = agree, 7 = strongly agree) The question items are adopted from Hong (2009).

Benefits

The present study offered several theoretical benefits. First, it settled down the dispute between Bhesyanavin and Pichalai (2015) and Patumtaewapibal et al. (2017), over the weight of the three theory of planned behavior intention predictors. Second, unlike the two previous studies, the present study furthered an investigation to the actual use of the reusable bottles on campus among college freshmen,

enabling to make a conclusion about the intention-behavior, and perceived behavioral control-behavior links. Third, the study confirmed external validity of the theory of planned behavior on this particular behavior, the use of reusable bottles on campus among Chulalongkorn freshmen. Finally, because the present study explored a new way to increase overall predictive power of the theory of planned behavior, the findings of this study, for the first time, informed to other researchers whether the health consciousness has the potential to be the fourth theory of planned behavior predictor of intention to use the reusable bottles on campus among college students or not.

For the practical sense, the present study acted as a guideline for anyone who interests in promotion of the use of reusable bottles on campus among college freshmen in a university to design effective intervention. If it turns out that health consciousness significantly predicts students' intention to use the reusable bottles on campus, interventions may focus on how to get students to take care of their health. Although the setting in the present study locates at Chulalongkorn University and the target group focus solely on freshmen, the author believes that the findings can more or less generalize to all level students and to other universities in Bangkok, to help promoting the use of reusable bottles among Thai college students.

Chapter II

Methods

This study was a correlational research, aiming to (1) identify the role of health consciousness on the on-campus use of reusable bottles among Chulalongkorn freshmen, under the framework of the theory of planned behavior, and (2) compare the predictive validity between the standard theory of planned behavior and extended theory of planned behavior with health consciousness.

Population and sample

The population was Chulalongkorn freshmen 2018/2019 academic year, Thailand. Chulalongkorn freshmen could be any nationality, age range, gender identity, sexual orientation, and native language. The author used the ratio of five sample size to one free parameter (Hair, Black, Babin, & Anderson, 2010). The conceptual model includes 24 free parameters. Thus, the sample size was 120. In case of no-response issue, the author increased sample size to 150. Respondents must be (1) Chulalongkorn freshmen, indicated by student identification, (2) able to read and comprehend Thai language, and (3) willing to participate in the study. Respondents who did not complete up to 80 percent of the total items were excluded from the study. Respondents, who completed the questionnaire over 80 percent but not 100 percent, would be reported as missing values.

Materials

This study used a hard copy questionnaire, consisting of two scales: Patumtaewapibal et al. (2017)'s the theory of planned behavior on the on-campus use of reusable bottles, and Hong (2009)'s health consciousness scales. The

following section describes how the two scales were prepared before being used to test the stated hypotheses.

1. The theory of planned behavior scale

The theory of planned behavior questionnaire measured attitude toward the behavior, perceived norm, perceived behavioral control, intention, and behavior.

Behavior. One item assessed the use of reusable bottles. Because behavior had been operationally defined as the use of reusable bottles on campus of the past five schooling days, thus the item asked: how many days did the respondents used the reusable bottles after they had rated their intention. Six answer choices were provided from zero to five days.

Intention. Three items assessed intention to use the reusable bottles on campus. The question asked, for example, I intent to use the reusable bottles on campus. Each item was a 7-pointed Likert scale. (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither disagree or agree, 5 = slightly agree, 6 = agree, 7 = strongly agree). The three items were performed a Cronbach's alpha, corrected item total correlation, and discriminant *t*-test to check their reliability and validity. 60 Chulalongkorn freshmen were conveniently selected and complete the questionnaire. The three items showed Cronbach's alpha at .95, considered a robust Cronbach's alpha value (Taber, 2018), and corrected item total correlation over r critical at 2.10 (*df* = 59, α = .05). The discriminant *t*-test results revealed that each construct was able to distinguish high (75^{th} percentile) - low (25^{th} percentile) group at a significance level. (Table 6).

Table 6

Intention results from Cronbach's alpha test, Corrected Item Total Correlation, and Discriminant t-test

Items	Directions	Discriminant *t*-test				*t*	*p*	CITC *n*=60	Results
		High group		Low group					
		M	*SD*	*M*	*SD*				
1	+	7.00	0.00	3.73	0.79	15.83	> .001	.90	✓
2	+	7.00	0.00	3.66	0.61	20.91	> .001	.92	✓
3	+	7.00	0.00	3.60	0.98	13.36	> .001	.91	✓
α = .95									

Note: One-tailed test, CITC = corrected item total correlation, *M* = mean, *SD* = standard deviation.

Next, the three items were then performed a correlational analysis and a confirmatory factor analysis to confirm that each item belong to the construct it meant to measure. The new 100 Chulalongkorn freshmen were conveniently recruited to participate in this scale development phase. Results from the correlational analysis showed that each item of each construct statistically significantly correlated with one another. Results from the confirmatory factor analysis showed that factor loading of each item was statistically significant. The measurement model for the four constructs indicated good fit. (Table 7).

Table 7

Confirmatory Factor Analysis of Attitude Toward the Behavior Constructs

Observed variables	Factor matrix Factor loading (SE)	*t*	r^2
Intention 1	.91 (.07)	11.38	.80
Intention 2	.91 (.07)	11.71	.83
Intention 3	.96 (.07)	12.79	.92
χ^2 = .06, *df* = 1, *p* = .80, GFI = 1.00, AGFI = .99, RMSEA = .00			

Note. All factor loadings are significant at $p < .001$, *SE* = standard error, *t* = t statistics, β = beta, *SE* = standard error, r^2 = coefficient of determination, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and χ^2 = chi-square.

Attitude toward the behavior. Six items assessed attitude toward the behavior to use the reusable bottles on campus. On a bipolar 7-pointed scale, the question asked, for example, using the reusable water bottle on campus is good or bad (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither disagree or agree, 5 = slightly agree, 6 = agree, 7 = strongly agree). The six items were performed a Cronbach's alpha, corrected item total correlation, and discriminant *t*-test to check their reliability and validity. 60 Chulalongkorn freshmen were conveniently selected and complete the questionnaire. The six items showed Cronbach's alpha at .80, considered a robust Cronbach's alpha value (Taber, 2018), and corrected item total correlation over r critical at 2.10 (*df* = 59, α = ,05). The discriminant *t*-test results revealed that each construct was able to distinguish high (75^{th} percentile) - low (25^{th} percentile) group at a significance level. (Table 8).

Table 8

Attitude toward the behavior results from Cronbach's alpha test, Corrected Item Total Correlation, and Discriminant t-test.

Items	Directions	Discriminant *t*-test				*t*	*p*	CITC *n*=60	Results
		High group		Low group					
		M	*SD*	*M*	*SD*				
1	+	6.50	0.61	4.28	0.64	10.90	> .001	.66	✓
2	+	6.72	0.46	4.71	0.90	8.92	> .001	.60	✓
3	+	7.00	0.00	6.04	1.20	3.62	> .001	.44	✓
4	+	6.50	0.61	4.52	1.12	6.64	> .001	.55	✓
5	+	6.88	0.32	5.00	1.44	5.80	> .001	.59	✓
6	+	6.16	0.92	4.28	0.95	6.22	> .001	.55	✓
α = .80									

Note: One-tailed test, CITC = corrected item total correlation, *M* = mean, *SD* = standard deviation.

Next, the three items were then performed a correlational analysis and a confirmatory factor analysis to confirm that each item belong to the construct it meant to measure. The new 100 Chulalongkorn freshmen were conveniently recruited to participate in this scale development phase. Results from the correlational analysis showed that each item of each construct statistically significantly correlated with one another. Results from the confirmatory factor analysis showed that factor loading of each item was statistically significant. The measurement model for the four constructs indicated good fit. (Table 9).

Table 9

Confirmatory Factor Analysis of Attitude Toward the Behavior Constructs

Observed variables	Factor matrix	*t*	r^2
	Factor loading (SE)		
Attitude toward the behavior 1	.92 (.07)	12.14	.86
Attitude toward the behavior 2	.94 (.07)	12,47	.88
Attitude toward the behavior 3	.86 (.08)	10.74	.74
Attitude toward the behavior 4	.90 (.07)	11.70	.82
Attitude toward the behavior 5	.92 (.07)	12.13	.86
Attitude toward the behavior 6	.77 (.08)	9.14	.61
X^2 = 2.97, *df* = 6, *p* = .81, GFI = .99, AGFI = .96 , RMSEA = .00			

Note. All factor loadings are significant at $p < .001$, *SE* = standard error, *t* = t statistics, β = beta, *SE* = standard error, r^2 = coefficient of determination, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and X^2 = chi-square.

Perceived norm. Six items assessed perceived norm to use the reusable bottles on campus. On a 7-pointed Likert scale, the question asked, for example, people who are important to me think I should/ should not use the reusable water bottle on campus. (1 = strongly disagree to use, 2 = disagree to use, 3 = slightly disagree to use, 4 = neither disagree or agree to use, 5 = slightly agree not to use, 6 = agree not to use, 7 = strongly agree not to use). The six items were performed a Cronbach's alpha, corrected item total correlation, and discriminant t-test to check their reliability and validity. 60 Chulalongkorn freshmen were conveniently selected and complete the questionnaire. The three items showed Cronbach's alpha at .79, considered a robust Cronbach's alpha value (Taber, 2018), and corrected item total correlation over r critical at 2.10 (*df* = 59, α = ,05). The discriminant t-test results revealed that each construct was able to distinguish high (75^{th} percentile) - low (25^{th} percentile) group at a significance level. (Table 10).

Table 10

Perceived norm results from Cronbach's alpha test, Corrected Item Total Correlation, and Discriminant t-test

Items	Directions	Discriminant *t*-test				*t*	*p*	CITC *n*=60	Results
		High group		Low group					
		M	*SD*	*M*	*SD*				
1	+	6.72	4.81	4.81	1.10	6.41	> .001	.55	✓
2	+	6.83	4.62	4.62	1.14	7.34	> .001	.57	✓
3	+	6.27	4.31	4.31	1.44	4.71	> .001	.51	✓
4	+	6.50	3.87	3.87	1.02	9.16	> .001	.61	✓
5	+	5.94	3.31	3.31	1.19	7.61	> .001	.52	✓
6	+	6.83	4.31	4.31	1.35	7.20	> .001	.55	✓
α = .79									

Note: One-tailed test, CITC = corrected item total correlation, *M* = mean, *SD* = standard deviation.

Next, the three items were then performed a correlational analysis and a confirmatory factor analysis to confirm that each item belong to the construct it meant to measure. The new 100 Chulalongkorn freshmen were conveniently recruited to participate in this scale development phase. Results from the correlational analysis showed that each item of each construct statistically significantly correlated with one another. Results from the confirmatory factor analysis showed that factor loading of each item was statistically significant. The measurement model for the four constructs indicated good fit. (Table 11).

Table 11

Confirmatory Factor Analysis of Perceived norm Constructs

Observed variables	Factor matrix Factor loading (SE)	*t*	r^2
Perceived norm 1	.72 (.09)	8.10	.53
Perceived norm 2	.90 (.08)	11.13	.81
Perceived norm 3	.82 (.08)	9.60	.67
Perceived norm 4	.78 (.08)	9.05	.62
Perceived norm 5	.62 (.09)	6.59	.39
Perceived norm 6	.63 (.09)	6.76	.40
X^2 = 4.98, *df* = 6, *p* = .56, GFI = .98, AGFI = .94, RMSEA = .00			

Note. All factor loadings are significant at $p < .001$, *SE* = standard error, *t* = t statistics, β = beta, *SE* = standard error, r^2 = coefficient of determination, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and X^2 = chi-square.

Perceived behavioral control. Six items assessed perceived behavioral control to use the reusable bottles on campus. On a 7-pointed Likert scale, the question asked, for example, I am confident that I can use the reusable water bottle on campus (1 = strongly disagree, 2 = disagree, 3 = slightly disagree, 4 = neither disagree or agree, 5 = slightly agree, 6 = agree, 7 = strongly agree). The six items were performed a Cronbach's alpha, corrected item total correlation, and discriminant *t*-test to check their reliability and validity. 60 Chulalongkorn freshmen were conveniently selected and complete the questionnaire. The three items showed Cronbach's alpha at .83, considered a robust Cronbach's alpha value (Taber, 2018), and corrected item total correlation over r critical at 2.10 (*df* = 59, α = ,05). The discriminant *t*-test results revealed that each construct was able to distinguish high (75 percentile) - low (25 percentile) group at a significance level. (Table 12).

Table 12

Perceived behavioral control results from Cronbach's alpha test, Corrected Item Total Correlation, and Discriminant t-test

Items	Directions	Discriminant *t*-test				*t*	*p*	CITC *n*=60	Results
		High group		Low group					
		M	*SD*	*M*	*SD*				
1	+	7.00	0.00	4.66	1.29	7.00	> .001	.58	✓
2	+	7.00	0.00	5.13	1.12	6.42	> .001	.76	✓
3	+	7.00	0.00	4.53	1.12	8.48	> .001	.77	✓
4	+	7.00	0.00	5.93	1.03	4.00	> .001	.56	✓
5	+	7.00	0.00	5.93	1.09	3.75	> .001	.55	✓
6	+	7.00	0.00	4.66	1.71	5.25	> .001	.54	✓
α = .83									

Note: One-tailed test, CITC = corrected item total correlation, *M* = mean, *SD* = standard deviation.

Next, the three items were then performed a correlational analysis and a confirmatory factor analysis to confirm that each item belong to the construct it meant to measure. The new 100 Chulalongkorn freshmen were conveniently recruited to participate in this scale development phase. Results from the correlational analysis showed that each item of each construct statistically significantly correlated with one another. Results from the confirmatory factor analysis showed that factor loading of each item was statistically significant. The measurement model for the four constructs indicated good fit. (Table 13).

Table 13

Confirmatory Factor Analysis of Perceived norm Constructs

Observed variables	Factor matrix Factor loading (SE)	*t*	r^2
Perceived behavioral control 1	.86 (.08)	10.78	.74
Perceived behavioral control 2	.86 (.08)	10.89	.75
Perceived behavioral control 3	.95 (.07)	12.82	.91
Perceived behavioral control 4	.91 (.07)	11.81	.83
Perceived behavioral control 5	.92 (.07)	11.94	.84
Perceived behavioral control 6	.92 (.07)	11.99	.85
X^2 = 6.02, *df* = 6, *p* = .47, GFI = .98, AGFI = .93, RMSEA = .00			

Note. All factor loadings are significant at $p < .001$, *SE* = standard error, *t* = t statistics, β = beta, *SE* = standard error, r^2 = coefficient of determination, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and X^2 = chi-square.

In conclusion, the results from Cronbach's alpha test, corrected item total correlation, discriminant *t*-test, correlation analysis and confirmatory factor analysis indicated that the twenty-one item theory of planned behavior questionnaire about the use of reusable bottles on campus among Chulalongkorn freshmen has validity and reliability.

2. Health consciousness scale

A Hong (2009)'s eleven-items health consciousness scale was translated into Thai by two translators. The discrepancy between the two translators was discussed and adjusted to derive at a Thai version. Next, the Thai version of health consciousness scale was back-translated by another two translators. The discrepancy of the translation was discussed among the two before reaching the English version of the scale. At the final stage of translation process, the back-translation version and the original version were compared in terms of interpretation and language use of

each item. Using Sperber (2004)'s Likert 7-point rating scale (see the scale in appendix A), the author asked 30 English native speakers to rate the eleven-items health consciousness in terms of similarity in meaning and form. According to Sperber (2004), any items that score below five need a wording adjustment. Item number one, two, and seven met this criterion, so their language were modified with a help from Assistant Professor Watcharaporn Boonyasiriwat.

After the translation process, health consciousness scale was undergone a Cronbach's alpha and corrected item total correlation test to check its reliability. Sixty Chulalongkorn freshmen were conveniently selected to complete this eleven question items. Results show that Cronbach's alpha was .88, which was a good reliability (Taber, 2018). However, item seven had corrected item total correlation .11, below critical Pearson's *r* one-tail with 39 degree of freedom. Item seven was then eliminated from the questionnaire before redoing the Cronbach's alpha and corrected item total correlation. The reanalysis showed that Cronbach's alpha became .91 and all ten items elicited significant corrected item total correlation. Next the collected data from the same 60 Chulalongkorn freshmen was used to analyze a discriminant *t*-test. Results revealed that each item was able to distinguish high (75^{th} percentile) - low (25^{th} percentile) group at a statistically significance level. (Table 14).

Table 14

Health consciousness results from Cronbach's alpha test, Corrected Item Total Correlation, and Discriminant t-test

Items	Directions	Discriminant *t*-test				*t*	*p*	CITC *n*=60	Results
		High group		Low group					
		M	*SD*	*M*	*SD*				
1	+	6.62	0.50	4.65	1.26	6.37	> .001	.70	✓
2	+	6.93	0.25	4.70	0.97	9.83	> .001	.77	✓
3	+	6.87	0.34	4.65	1.18	8.01	> .001	.75	✓
4	+	6.75	0.44	4.60	0.88	8.85	> .001	.80	✓
5	+	6.43	0.81	4.20	1.10	6.75	> .001	.73	✓
6	+	6.87	0.34	4.85	1.03	8.17	> .001	.69	✓
7	+	6.75	0.44	5.15	1.34	4.97	> .001	.45	✓
8	+	6.93	0.25	5.75	1.61	3.23	> .001	.68	✓
9	+	6.87	0.50	5.60	1.39	3.80	> .001	.52	✓
10	+	7.00	0.00	5.45	1.76	3.93	> .001	.66	✓
α = .91									

Note: One-tailed test, CITC = corrected item total correlation, *M* = mean, *SD* = standard deviation.

Similar to the theory of planned behavior questionnaire, the 10 items health consciousness then underwent a correlational analysis and a confirmatory factor analysis to confirm that each item belonged to the construct it meant to measure. 100 Chulalongkorn freshmen were conveniently selected to complete the scale. Results from the correlational analysis showed that each item of each construct statistically significantly correlated with one another. Results from the confirmatory factor analysis showed that factor loading of each item was statistically significant.

The measurement model the health consciousness indicated fit. Table 15 summarized the factor loading and model fit indices for the four constructs.

Table 15

A Confirmatory Factor Analysis Results of 10-item Health Consciousness Questionnaire From 100 Conveniently Selected Chulalongkorn Freshmen

Observed variables	Factor matrix	*t*	r^2
	Factor loading (SE)		
Health consciousness 1	.88 (.07)	11.23	.78
Health consciousness 2	.90 (.07)	11.59	.811
Health consciousness 3	.97 (.07)	13.28	.94
Health consciousness 4	.94 (.07)	12.68	.89
Health consciousness 5	.91 (.07)	11.76	.83
Health consciousness 6	.92 (.07)	12.08	.85
Health consciousness 7	.76 (.08)	8.91	.57
Health consciousness 8	.84 (.08)	10.35	.70
Health consciousness 9	.83 (.08)	10.22	.69
Health consciousness 10	.72 (.08)	8.39	.53
X^2 = 23.66, *df* = 24, *p* = .48, GFI = .95, AGFI = .89, RMSEA = .00			

Note. All factor loadings are significant at $p < .001$, *SE* = standard error, *t* = t statistics, β = beta, *SE* = standard error, r^2 = coefficient of determination, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and X^2 = chi-square.

In conclusion, the results from Cronbach's alpha test, corrected item total correlation, discriminant *t*-test, correlation analysis and confirmatory factor analysis indicated that the 10 item health consciousness questionnaire has validity and reliability.

These two validated scales the theory of planned behavior and health consciousness were combined to form a questionnaire that being used in the present study. In addition, the author added two more demographic questions, asking first

participants to identify their gender identity and students identification number. The latter was to make sure that respondents were freshmen according to the stated inclusion criteria. The author had a major concern overloading respondents with multiple question items. For that reason, the questionnaire did not equip with items that detected social desirability of respondents. The questionnaire being used in this study can be found in appendix A.

Data collection

The author made an appointment with several Chulalongkorn lecturers, asking for permission to collect data from their students. Once granted, the author showed up fifteen minute before the classes ended to inform students about the study. Convenient sampling technique was used. That is, students, who were willing to participate, were given a hard copy of a 31-item questionnaire to complete. Thus, the respondents in the present study all selected themselves into the sample. A week later, the author came back to the same classes to collect data about students' behavior.

Data analysis

The obtained data were cleaned, by eliminating data that fell into a stated exclusion criterion. Next, the obtained data were analyzed with descriptive statistics to check all of the multivariate assumption. And then structural equation model technique was performed to test the study hypotheses with Statistics Package for Social Science for Window and Linear Structural Relations 9.2 Student version, respectively.

Chapter III

Results

This study was a correlational research, aiming to (1) identify the role of health consciousness onto the use of reusable bottles on campus among Chulalongkorn freshmen, under the framework of the theory of planned behavior, and (2) compare the predictive validity between the standard theory of planned behavior and extended theory of planned behavior with health consciousness. The conceptual model included six variables, health consciousness, attitude toward the behavior, perceived norms, perceived behavioral control, intention, and behavior, all of which were assumed to be observed variables, measured by 7-pointed Likert scale. The author presented results in six sections: (1) abbreviations and symbols (2) respondents characteristic, (3) preliminary analysis, (4) Linear Structural Relations, (5) hypothesis testing, and (6) additional analysis.

Abbreviations and definitions

Statistics abbreviations: *N* = Sample size

Max = Maximum value

Min = Minimum value

M = Mean

SD = Standard deviation

TE = Total effect

DE = Direct effect

IE = Indirect effect

χ^2 = Chi-square

df = Degree of freedom

p = P-value

β = Standardized beta

SE = Standard error

t = T statistics

GFI = Goodness of fit index

AGFI = Adjusted goodness of fit index

CFI = Comparative fit index

RMSEA = Root mean square error of approximation

Variable abbreviation: HC = Health consciousness

ATT = Attitude toward the behavior

PN = Perceived norm

PBC = Perceived behavioral control

INT = Intention

BEH = Behavior

Characteristics of respondents

The data collection was done during October 2018. About 50,000 Chulalongkorn freshmen were eligible to participate in the study. The author approached three different classes: Science labs, a chemistry class, and a computer application class. From three classes, 224 students completed the questionnaire vol.1. However, the number of students who took the questionnaire vol. 2 dropped

to 120. For those who completed both questionnaire, 86 were science major students in a Thai program, 54 were science major students in an international program, and 30 were psychology students in a Thai program. 49 were male. 71 were female. All respondents were first year students. (Students identification codes 61X-XXXX-XX). The figure 3 depicted the flow of respondents in a survey study.

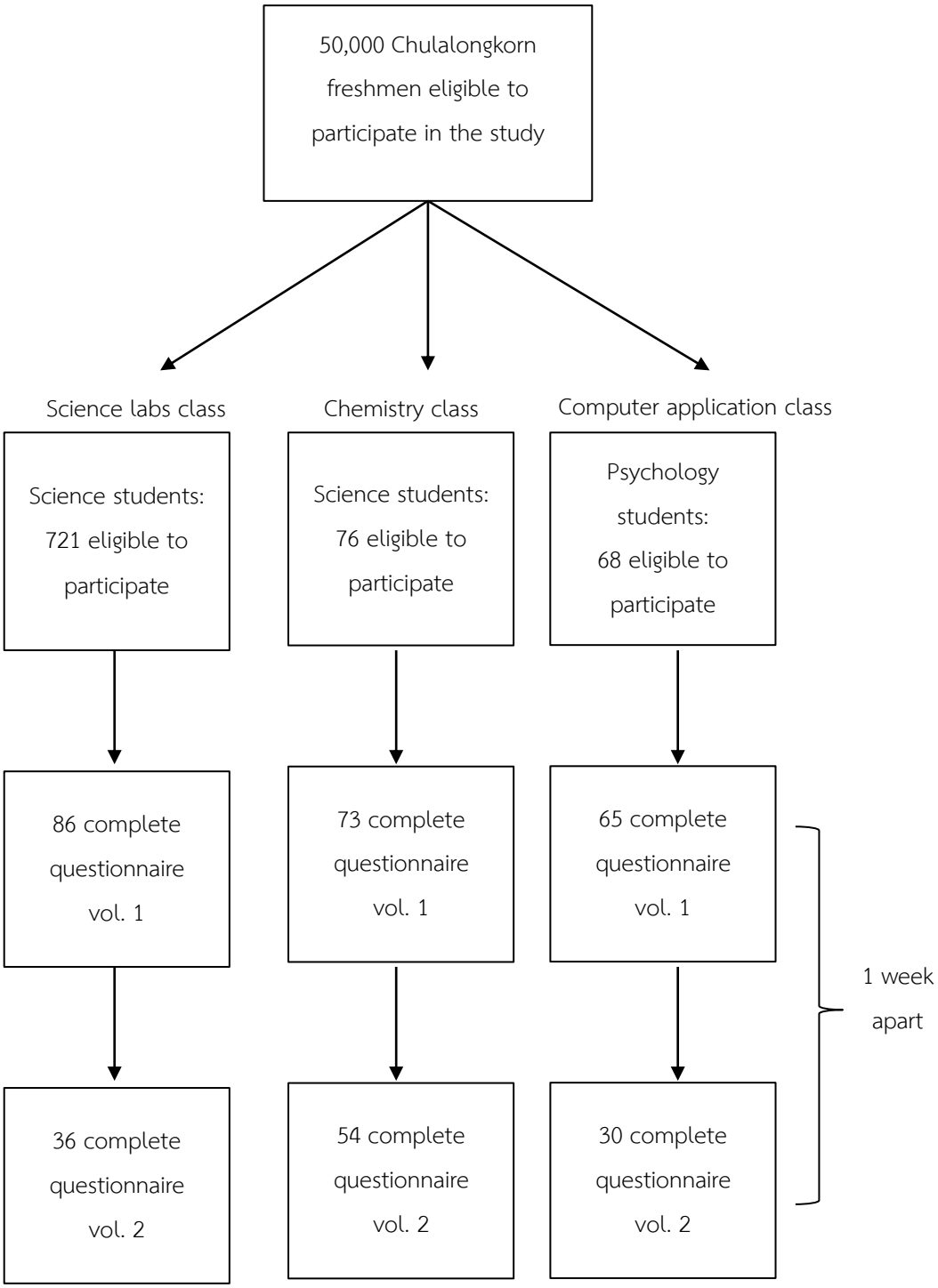

Figure 3 Response rate throughout the recruitment processes.

Preliminary analysis

Response rate equated 53.57 percent. No missing data were found. Before analyzing the collected data, the author checked the assumption regarding the structural equation modeling. Structural equation modeling required collected data to have a normal distribution, no multicollinearity issue, and an identification of the model. The obtained data were then analyzed with four statistical methods: (1) descriptive statistics, (2) multicollinearity test, and (3) identification of the model.

Descriptive statistics. Results of descriptive statistics indicated that the data distribution of each six variables health consciousness, attitude toward the behavior, perceived norms, perceived behavioral control, intention, and behavior pointed to the same direction that the data distributions were not normally distributed. Skewness ranged from -0.96 to 0.17. Shapiro-Wilk test also indicated statistically significant results to all variables. Kurtosis was above and below 1. Specifically, health consciousness, perceived behavioral control and intention were positive, while attitude toward the behavior, perceived norm, and behavior were negative. Table 16 summarized the descriptive statistics of the six variables. From this three descriptive statistics, the author concluded that all six variables in this study were not normally distributed. These distributions showed that most students in the sample had positive perceptions in terms of all the six measured variables and behavior toward the use of reusable bottles on campus above the average. Health consciousness, perceived behavioral control and intention had narrower dispersion of data than the attitude toward the behavior, perceived norm, and behavior had.

Table 16

Descriptive Statistics of the Six Variables Measured in the Present Study

	M	*SE*	*SD*	Min	Max	SKEW	KUR	SWT
HC	5.78	.09	1.00	2.50	7.00	-0.97	0.86	< .001
ATT	5.95	.10	1.08	2.33	7.00	-0.90	-0.04	< .001
PN	5.47	.09	.99	2.50	7.00	-0.47	-0.14	0.008
PBC	6.21	.09	1.01	2.33	7.00	-1.59	2.03	< .001
INT	5.65	.14	1.51	1.00	7.00	-1.13	0.70	< .001
BEH	2.20	.18	2.00	0.00	5.00	0.17	-1.52	< .001

Note. HC = health consciousness, ATT = attitude toward the behavior, PN = perceived norm, PBC = perceived behavioral control, INT = intention, BEH = behavior. *M* = mean, *SE* = standard error, SKEW = skewness, KUR = kurtosis, and SWT = Shapiro-Wilk test.

Multicollinearity test. All tolerance values and VIFs of intention's antecedents, namely health consciousness, attitude toward behavior, perceived norms, and perceived behavioral control were greater than .1 and lower than 10, respectively. Correlation analysis results indicated a moderate, statistically significant relationships among these six variables. (Table 17). Specifically, the correlation of the four intention's antecedents (health consciousness, attitude toward the behavior, perceived norm, and perceived behavioral control) ranged between .49 to .60. However, the conditions index was 22.96, which indicated an overlapping of independents variance explaining intention. Judging from the results of correlation test and multicollinearity indices, the author concluded that the four intention's antecedents did not have the problem of multicollinearity.

Table 17

Correlation Matrix of the Six Variables in the Present Study (N = 120)

	HC	ATT	PN	PBC	INT	BEH
HC	1.00					
ATT	.50**	1.00				
PN	.49**	.69**	1.00			
PBC	.57**	.60**	.60**	1.00		
INT	.47**	.65**	.61**	.61**	1.00	
BEH	.25*	.40**	.35**	.39**	.59**	1.00
M	5.78	5.95	5.47	6.21	5.65	2.20
SD	1.00	1.08	.99	1.01	1.51	2.00

Note: ** $p < .01$, * $p < .05$ two-tailed. HC = health consciousness, ATT = attitude toward the behavior, PN = perceived norm, PBC = perceived behavioral control, INT = intention, BEH = behavior.

Identification of the model. Identification of the model indicated whether the conceptual model was able to produce estimate parameter. To be able to estimate the free parameter, the conceptual model should pass the necessary condition. The necessary condition required that free parameters in the conceptual model has to be less than (1/2)(NI)(NI+1), where NI = numbers of observed variables in the conceptual model. Because the present study compared models between the original theory of planned behavior and the extended theory of planned behavior, thus each model was calculated for number of free parameters to see if the model qualified for the necessary condition. The theory of planned model had 13 free parameters and 5 observed variables. And the extended theory of planned behavior with health consciousness had 18 free parameters and six observed variables. For both models, the computation of necessary condition indicated the identification of the model.

In conclusion, the preliminary analysis showed that the collected data had no problem with the multicollinearity, and the conceptual models was able to estimate free parameters. However, the collected data were not normally distributed, which violated the assumption of the structural equation modeling. Due to the non-normal distribution, the author chose a maximum likelihood technique to estimate free parameter. Such technique was showed to be robust to the violation of assumption of normality (Hair et al., 2010).

Linear Structural Relations outputs

Because the hypothesis of the present study involved the comparison between the Fishbein and Ajzen (2011) theory of planned behavior and the extend theory of planned behavior with health consciousness as the fourth antecedent of intention. Recalling that preliminary analysis indicated that collected data were not normally distributed, which violate structural equation modeling. The author then chose a maximum likelihood technique as a remedy to non-normal distribution to estimate free parameter. Such technique was showed to be robust to the violation of assumption of normality (Hair et al., 2010). This section provided a summary of the model fit and relationship among variables of (1) the theory of planned behavior, (2) the extended theory of planned behavior with health consciousness.

The theory of planned behavior. Correlation matrix of the five variables attitude toward the behavior, perceived norm, perceived behavioral control, intention, and behavior was used to estimate free parameters. The results showed that the observed covariance and estimated covariance from the conceptual models were relatively similar. And all the model fit indices indicate a model fit. Thus the author rejected the alternative hypothesis ($s \neq \Sigma$), and accepted null hypothesis ($s = \Sigma$). When looking at the dependence relationships among variables in the proposed

model, we could see that behavior was statistically significantly influenced by intention. Intention in turn, was statistically significantly predicted by attitude toward the behavior, perceived norm, and perceived behavioral control. However, the only the perceived behavioral control and behavior link shown a non-significant relationship. Table 18 summarized the effect, model indices and covariance matrix of the variables in the theory of planned behavior model.

Table 18

Path Analysis Results of the Theory of Planned Behavior Model

		INT			BEH		
		TE	**IE**	**DE**	**TE**	**IE**	**DE**
ATT	*β*	.332***	-	.332***	.185**	.185**	-
	SE	(.094)	-	(.094)	(.061)	(.061)	-
	t	3.515	-	3.515	3.019	3.019	-
PN	*β*	.213*	-	.213*	.159**	.159**	-
	SE	(.095)	-	(.095)	(.055)	(.055)	-
	t	2.244	-	2.244	2.920	2.920	-
PBC	*β*	.285***	-	.285***	.213**	.159**	.054
	SE	(.085)	-	(.085)	(.094)	(.055)	(.039)
	t	3.363	-	3.363	2.264	2.920	1.38
INT	*β*				.558***	-	.558***
	SE				(.095)	-	(.095)

t	5.892	-	5.892
Statistics: χ^2 = .480, *p* = .788, *df* = 2, GFI = .988 , RMSEA = .000, AGFI = .988			
r^2	INT = .523	BEH = .351	

Covariance matrix	ATT	PN	PBC	INT	BEH
ATT	1.145				
PN	0.740	0.9788			
PBC	0.649	0.606	1.019		
INT	1.051	0.921	0.934	2.268	
BEH	0.868	0.688	0.7963	1.773	3.964
M	5.957	5.475	6.219	5.650	2.208
SD	1.070	.989	1.009	1.516	2.001

Note. ** $p < .01$, * $p < .05$ two-tailed. ATT = attitude toward the behavior, PN = perceived norm, PBC = perceived behavioral control, INT = intention, BEH = behavior, TD = total effect, DE = direct effect, IE = indirect effect, *t* = t statistics, β = beta, *SE* = standard error, r^2 = coefficient of determination, *df* = degree of freedom, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and χ^2 = chi-square.

The extended theory of planned behavior with health consciousness. The second model added health consciousness as the fourth antecedent of intention. Correlation matrix of the six variables health consciousness, attitude toward the behavior, perceived norm, perceived behavioral control, intention, and behavior was used to estimate free parameters. The results showed that the observed covariance and estimated covariance from the conceptual models were relatively similar. And all the model fit indices indicate a model fit. Thus the author rejected the alternative hypothesis ($s \neq \Sigma$), and accepted null hypothesis ($s = \Sigma$). When looking at the dependence relationships among variables in the proposed model, we could see that health consciousness did not statistically significantly predicted intention. Other

relationships in the extended model were similar to the original theory of planned behavior. Behavior was statistically significantly influenced by intention. Intention in turn, was statistically significantly predicted by attitude toward the behavior, perceived norm, and perceived behavioral control. However, the only the perceived behavioral control and behavior link shown a non-significant relationship. The table 19 summarized the effect, model indices and covariance matrix of the variables in the model.

Table 19

Path Analysis Results of the Extended Theory of Planned Behavior With Health Consciousness Model

		INT			BEH		
		TE	**IE**	**DE**	**TE**	**IE**	**DE**
HC	β	.067	-	.067	.038	.038	-
	SE	(.080)	-	(.080)	(.045)	(.045)	-
	t	.842		.842	.833	.833	-
ATT	β	.318***	-	.318***	.177**	.177**	-
	SE	(.096)	-	(.096)	(.061)	(.061)	-
	t	3.315	-	3.315	2.886	2.886	-
PN	β	.202*	-	.202*	.113*	.113*	-
	SE	(.096)	-	(.096)	(.057)	(.057)	-
	t	2.107	-	2.107	1.983	1.983	-
PBC	β	.264**	-	.264**	.201*	.148**	.053
	SE	(.089)	-	(.089)	(.096)	(.056)	(.040)
	t	2.981	-	2.981	2.093	2.658	1.325
INT	β				.558***	-	.558***
	SE				(.095)	-	(.095)

t	5.867	-	5.867
Statistics: χ^2 = .800 , *p* = .849, *df* = 3 GFI = .998, RMSEA = .000, AGFI = .984			
r^2	INT = .526	BEH = .351	

Covariance matrix	HC	ATT	PN	PBC	INT	BEH
HC	.401					
ATT	.560	1.145				
PN	.517	.722	.978			
PBC	.478	.667	.615	1.019		
INT	.633	1.053	.917	.945	2.272	
BEH	.517	.847	.742	.804	1.778	3.968
M	5.780	5.957	5.475	6.219	5.650	2.208
SD	1.000	1.070	.989	1.009	1.516	2.001

Note. ** $p < .01$, * $p < .05$ two-tailed. ATT = attitude toward the behavior, PN = perceived norm, PBC = perceived behavioral control, INT = intention, BEH = behavior, TD = total effect, DE = direct effect, IE = indirect effect, *t* = t statistics, β = beta, *SE* = standard error, r^2 = coefficient of determination, *df* = degree of freedom, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and χ^2 = chi-square.

Together put, the figure 4 depicted the theory of planned behavior model side by side with the extended theory of planned behavior with health consciousness model. We could see that from the same data set, the models fit with the collected data. However, when adding health consciousness into the model, the relationship of the attitude toward the behavior, perceived norm, and perceived behavioral control changed slightly. For example, the effect of perceived behavioral control on intention in the theory of planned behavior model was .285 with a

statistical significance at .001. When the health consciousness was inserted into the model, such relationship became .264 with a statistical significant at .01.

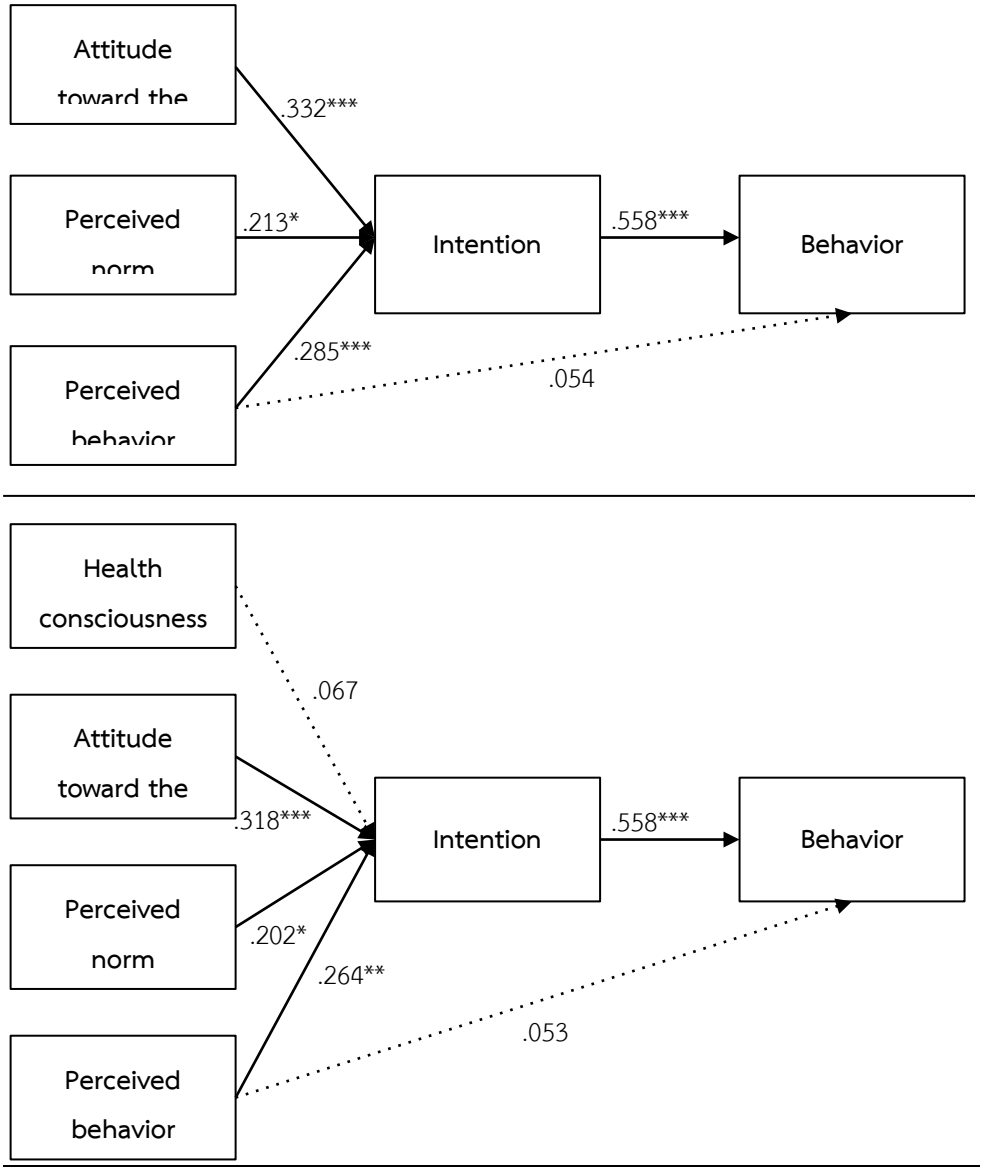

Figure 4 A standardized beta comparison between the theory of planned behavior model (top) and the extended theory of planned behavior with health consciousness model (bottom). Dash line represents significant paths. Dot line represents nonsignificant paths. * $p < .05$, ** $p < .01$, *** $p < .001$.

Using these results from the structural equation modeling, the author investigated each stated hypotheses in turn in the following section.

Hypothesis testing

Hypothesis 1: Addition of health consciousness into the theory of planned behavior would better the prediction of intention and behavior.

The first hypothesis stated that addition health consciousness into the theory of planned behavior would better the prediction of intention and behavior. From the Linear Structural Relations analysis, results did not support the hypothesis. Coefficient of determination of behavior and intention from both models were relatively similar. The theory of planned model showed that 35.1 percent of behavior and 52.3 percent of intention are explained by the independent variables, respectively. On the other hand, the extended theory of planned behavior with health consciousness model showed that 35.1 percent of behavior and 52.6 percent of intention are explained by the independent variables, respectively. There was only a decimal difference between the two models. When comparing the two models in terms of Chi-square, the author found no significant difference between the two model at .05 significance level. (Table 20). In addition, the original theory of planed behavior and the one with health consciousness yield Akaike information criterion (AIC) of 26.47 and 36.798, respectively. The less the AIC, the better the model (Hair et al., 2010). Thus, the standard theory of planned behavior is better in explaining the behavior than the theory of planned behavior with health consciousness. In conclusion, the results show that the extended theory of planned behavior with health consciousness was not better than the original theory of planned behavior in explaining intention and behavior.

Table 20

Model Comparison Between the Theory of Planned Behavior Model and the Theory of Planned Behavior With Health Consciousness Model

	X^2	*df*	*p*	GFI	CFI	RMSEA	BEH r^2	INT r^2
The theory of planned behavior	.480	2	.788	.998	1.000	.000	.351	.523
The extended theory of planned behavior with health consciousness	.800	3	.849	.998	1.000	.000	.351	.526
X^2_{diff} = .323, df_{diff} = 1								

Note. r^2 = coefficient of determination, *df* = degree of freedom, *p* = p-value, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and X^2 = chi-square.

Hypothesis 2: Health consciousness positively influences intention.

The results did not support hypothesis 2 that health consciousness positively influences intention. Direct effect of health consciousness on intention was .067 with no statistical significance. The author concluded that health consciousness did not influence intention to use the reusable bottle on campus among Chulalongkorn freshmen.

Hypothesis 3: Attitude toward the behavior positively influences intention.

The results supported hypothesis 3 that attitude toward the behavior positively influences intention. In the extended theory of planned behavior with health consciousness, direct effect of attitude toward the behavior on intention was .318 with statistical significance ($p < .001$). In the original theory of planned behavior, direct effect of attitude toward the behavior on intention was .332 with statistical significance ($p < .001$). The author concluded that attitude toward the behavior

positively influences intention to use the reusable bottle on campus among Chulalongkorn freshmen.

Hypothesis 4: Perceived norm positively influences intention.

The results supported hypothesis 4 that perceived norm positively influences intention. In the extended theory of planned behavior with health consciousness, direct effect of perceived norm on intention was .202 with statistical significance ($p < .05$). In the original theory of planned behavior, direct effect of perceived norm on intention was .213 with statistical significance ($p < .05$). The author concluded that perceived norm positively influences intention to use the reusable bottle on campus among Chulalongkorn freshmen.

Hypothesis 5: Perceived behavioral control positively influences intention

The results supported hypothesis 5 that perceived behavioral control positively influences intention. In the extended theory of planned behavior with health consciousness, direct effect of perceived behavioral control on intention was .264 with statistical significance ($p < .01$). In the original theory of planned behavior, direct effect of perceived behavioral control on intention was .285 with statistical significance ($p < .01$). The author concluded that perceived behavioral control positively influence intention to use the reusable bottle on campus among Chulalongkorn freshmen.

Hypothesis 6: Intention positively influences behavior

The results supported hypothesis 6 that intention positively influences behavior. In the extended theory of planned behavior with health consciousness, direct effect of intention on behavior was .558 with statistical significance ($p < .001$). In the original theory of planned behavior, direct effect of intention on behavior was .558 with statistical significance ($p < .001$). The author concluded that intention positively influences the use the reusable bottle on campus among Chulalongkorn freshmen.

Hypothesis 7: Perceived behavioral control positively influences behavior

The results support hypothesis 7 that perceived behavioral control positively influences behavior. Although perceived behavioral control did not have a significant direct effect on behavior, the indirect and total effects were statistically significant .148, and .201, respectively. Thus, the author concluded that perceived behavioral control positively influence the use the reusable bottle on campus among Chulalongkorn freshmen.

In conclusion, the extended theory of planned behavior with health consciousness did not differ from the standard theory of planned behavior in terms of its ability to explain intention and behavior of using reusable water bottle on campus. Looking at the relationships between each variable in the extended theory of planned behavior with health consciousness, we could see that behavior is mostly explained by intention. And via Intention, behavior is also explained by attitude toward the behavior, perceived norm, perceived behavior. Subsequently, intention is explained by attitude toward the behavior, perceived norm, and perceived behavioral control. Health consciousness is the only predictor that does not have a significant effect on intention and behavior.

Additional analysis

Because the results from the present study showed that health consciousness highly correlated with attitude toward the behavior, perceived norms, and perceived behavioral control (*r* =.508, .497, and .537, respectively), the author did a further literature review on their relationships. It was found that health consciousness is an antecedent of attitude toward many health behavior (health care, Gould, 1988; organic food, Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007; anti-consumer, Kaynak & Eksi, 2011), and perceived behavior control over various health behavior (Hong, 2011). In addition, the author found that health consciousness tended to have high correlation with perceived norms (Abdourrahmane & Sukhabot, 2014). Based on these findings, the author constructed a new conceptual model where health consciousness was relocated to be an antecedent of attitude toward the behavior, perceived norms, and perceived behavioral control. Attitude toward the behavior, perceived norm, and perceived behavioral control determine intention. And intention and perceived behavioral control join force to influence behavior. (Figure 5). The author names this model, the new health consciousness model. The exogenous variable was health consciousness. The endogenous variables were attitude toward the behavior, perceived norm, perceived behavioral control, and intention. The endogenous was health consciousness.

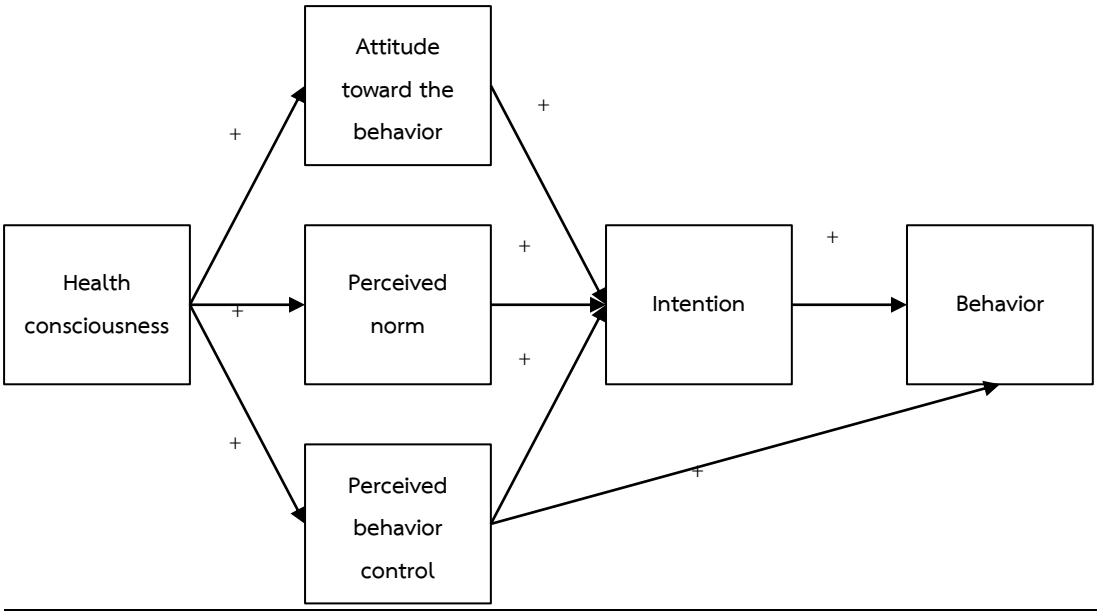

Figure 5 The new health consciousness model where health consciousness is an antecedent of attitude toward the behavior, perceived norms, and perceived behavioral control.

Because the present study interested in explaining the intention and behavior of the use of reusable bottles on campus, the author hypothesized that this new health consciousness model would better explain intention and behavior than the original theory of planned behavior. Since literature review suggests a causation between health consciousness and the theory of planned behavior variables, the author hypothesized that health consciousness would positively influence attitude toward the behavior, perceived norms, and perceived behavioral control.

To test these four hypotheses, the author used and analyzed the same data set as from the main study linear structural relations program student version. The model included 17 free parameters. From the identification of the model calculation, the model passed the necessary condition. Thus the 17 free parameters were able to estimated. Maximum likelihood technique was applied to estimate free parameter.

Linear structural relations revealed first an unfitted model. The error relationships were then adjusted: attitude toward the behavior and perceived norm, perceived norm and perceived behavioral control, and attitude toward the behavior and perceived behavioral control. After the model modification, the linear structural relation outputs showed a model fit. That is, the new health consciousness model was congruence with the collected data (s = Σ). Table 21 showed a covariance matrix of the model. Table 22 summarized the total, direct, and indirect effect.

Table 21

Covariance matrix of the new health consciousness model

	HC	ATT	PN	PBC	INT	BEH
HC	.401					
ATT	.560	1.145				
PN	.517	.722	.978			
PBC	.478	.667	.615	1.019		
INT	.633	1.053	.917	.945	2.272	
BEH	.517	.847	.742	.804	1.778	3.968
M	5.780	5.957	5.475	6.219	5.650	2.208
SD	1.000	1.070	.989	1.009	1.516	2.001

Note. ATT = attitude toward the behavior, PN = perceived norm, PBC = perceived behavioral control, INT = intention, BEH = behavior

From Table 22, we can see that behavior is largely determined by intention. Via intention, behavior is also explained by attitude toward the behavior, perceived norm, and perceived behavioral control. Via intention, attitude, perceived norm, and perceived behavioral control, behavior is explained by health consciousness. Subsequently, Intention is explained by attitude toward the behavior, perceived norms, and perceived behavioral control. Via these three variables, intention is

explained by health consciousness. Finally, attitude toward the behavior, perceived norm, and perceived behavioral control are explained by health consciousness.

Table 22

The total, direct, and indirect effect of the new health consciousness model

	ATT			NORM			PBC			INT			BEH		
	TE	IE	DE	TE	IE	DE	TE	IE	DE	TE	IE	DE	TE	IE	DE
HC	.826***	-	.826***	.825***	-	.825***	.746***	-	.746***	.662***	.662***	-	.410***	.410***	-
	(.202)	-	(.202)	(.186)	-	(.186)	(.183)	-	(.183)	(.250)	(.250)	-	(.270)	(.270)	-
	6.902	-	6.902	6.898	-	6.898	6.487	-	6.487	6.298	6.298	-	4.753	4.753	-
ATT										.330***	-	.339***	.185**	.185**	-
										(.130)	-	(.130)	(.112)	(.112)	-
										3.579	-	3.579	3.062	3.062	-
NORM										.213*	-	.213*	.119*	.119*	-
										(.140)	-	(.140)	(.111)	(.111)	-
										2.311	-	2.311	2.153	2.153	-
PBC										.284***	-	.284***	.212**	.159**	.053
										(.128)	-	(.128)	(.185)	(.108)	(.077)
										3.329	-	3.329	2.262	2.90	1.38
INT													.559***	-	.559***
													(.124)	-	(.094)
													5.916	-	5.943
Statistics: χ^2 = 4.494, p = .821, df = 6, RMR = 0.027; GFI = .987; AGFI = .956, RMSEA = .000															
r^2	.683			.681			.557			.524			.352		

Note. ** $p < .01$, * $p < .05$ two-tailed. ATT = attitude toward the behavior, PN = perceived norm, PBC = perceived behavioral control, INT = intention, BEH = behavior, TD = total effect, DE = direct effect, IE = indirect effect, t = t statistics, β = beta, SE = standard error, r^2 = coefficient of determination, df = degree of freedom, p = p-value, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and χ^2 = chi-square.

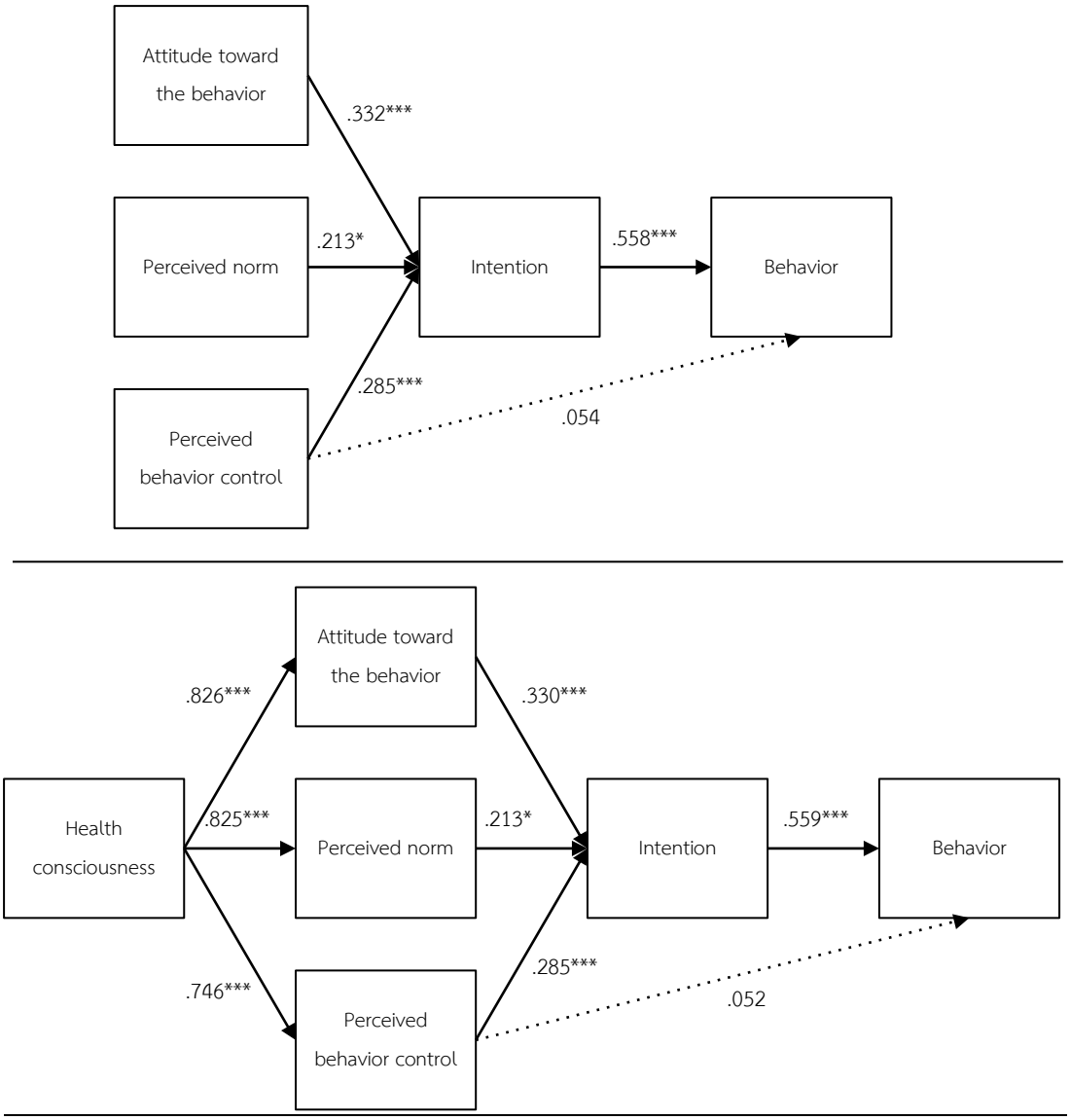

Figure 6 A standardized beta comparison between the theory of planned behavior model (top) and the new health consciousness model (bottom). Dash line represents significant paths. Dot line represents nonsignificant paths.

* $p < .05$, ** $p < .01$, *** $p < .001$.

When comparing with the original theory of planned behavior, we could see that the new health consciousness model elicits similar relationships among theory of planned behavior variables. Figure 6 depicted the theory of planned behavior model and the new health consciousness model for the purpose of visual comparison. Using

these results from the structural equation modeling, the author investigated each stated hypotheses in turn in the following section.

Additional hypothesis 8: The new health consciousness model better explains intention and behavior than the original theory of planned behavior.

From linear structural relations analysis, results did not support the hypothesis that the new health consciousness model better explained intention and behavior than the theory of planned behavior. Although Chi-square difference between the two model was 4.012, a statistical significant difference and AIC score of the standard theory of planned behavior (AIC = 26.476) was lower than the new health consciousness model (AIC = 35.521), the Coefficient of determination of intention and behavior, in comparison to the theory of planned behavior, were relatively same, as shown in table 3. The author concluded that the new health consciousness model was no better than the original theory of planned behavior in explaining intention and behavior.

Table 23

Model comparison between the theory of planned behavior and the new health consciousness model

	X^2	*df*	*p*	GFI	CFI	RMSEA	BEH r^2	INT r^2
The theory of planned behavior	.480	2	.788	.998	1.000	.000	.351	.523
The new health consciousness model	4.492	6	.610	.987	1.000	.000	.352	.524
X^2_{diff} = 4.012, df_{diff} = 4								

Note. r^2 = coefficient of determination, *df* = degree of freedom, *p* = p-value, GFI = goodness of fit index, RMSEA = root mean square error of approximation, AGFI = adjusted goodness of fit index, and X^2 = chi-square

Additional hypothesis 9: Health consciousness positively influences attitude toward the behavior.

The results supported hypothesis 9 that in the new health consciousness model, health consciousness positively influences attitude toward the behavior. The direct effect of the health consciousness to attitude toward the behavior was .826 with statistical significance. ($p < .001$). The author concluded that health consciousness positively influence attitude toward the behavior.

Additional hypothesis 10: Health consciousness positively influences perceived norm

The results supported hypothesis 10 that in the new health consciousness model, health consciousness positively influences perceived norm. The direct effect of the health consciousness to perceived norm was .825 with statistical significance. ($p < .001$). The author concluded that health consciousness positively influences perceived norm.

Additional hypothesis 11: Health consciousness positively influences perceived behavioral control

The results supported hypothesis 11 that in the new health consciousness model, health consciousness positively influences perceived behavioral control. The direct effect of the health consciousness to perceived behavioral control was .746 with statistical significance. ($p < .001$). The author concluded that health consciousness positively influences perceived behavioral control.

Hypothesis 2 revisit: Health consciousness positively influences intention.

The new health consciousness model showed a significant relationship between health consciousness and intention to use the reusable water bottle on campus. Health consciousness elicited an indirect effect on intention (.662), via attitude toward the behavior, perceived norm, and perceived behavioral control. These findings, however, contradicted to what the extended theory of planned behavior with health consciousness had found.

In conclusion, the new health consciousness model was no difference from the theory of planned behavior in ability to explain intention to use and the actual use of reusable bottles among Chulalongkorn freshmen: the proportions of explained variance of behavior and intention were same, and the relationship among the attitude toward the behavior, perceived norm, perceived behavioral control, intention and behavior were almost identical. However, the new health consciousness model provided an evidence of a direct effect from health consciousness to attitude toward the behavior, perceived norm, and perceived behavioral control with statistical significance. Also, health consciousness also showed an indirect effect on intention to use the reusable water bottle on campus.

The present study analyzed the three models (1) the theory of planned behavior, (2) the extended theory of planned behavior with health consciousness, and (3) the new health consciousness model. When comparing the two latter models with the original theory of planned behavior, we could see that the models did not differ from the theory of planned behavior with a statistically significant level, in terms of ability to explain intention and behavior of the use of reusable water bottle on campus. The three models showed the explained variance of intention and behavior with relatively similar magnitude. The relationships among theory of planned behavior variables showed the similar results in the three models: all links were statistically significant.

The major findings in the present study are an the identification of the role of health consciousness on the use of reusable water bottle. When health consciousness was assigned to be antecedent of intention in the extended theory of planned behavior with health consciousness (model II), it showed no significant effect on intention. But when health consciousness was moved to be antecedents of attitude toward the behavior, perceived norms, and perceived behavioral control in the new health consciousness model (model III), it showed significant effect on intention via attitude, perceived norms, and perceived behavioral control. Table 24 summarizes hypothesis testing results of the present study.

Table 24

A summary of hypotheses

		Support	Did not support
H1	Coefficient of determination of intention and behavior is better explain in the health consciousness model than the theory of planned behavior.		✓
H2	Health consciousness significantly predicts intention.	✓	
H3	Attitude toward the behavior significantly predicts intention.	✓	
H4	Perceived norm significantly predicts	✓	

	intention.		
H5	Perceived behavioral control significantly predicts intention.	✓	
H6	Intention significantly predicts behavior.	✓	
H7	Perceived behavioral control significantly predicts behavior.	✓	
AH8	Coefficient of determination of intention and behavior is better explain in the new health consciousness model than the theory of planned behavior.		✓
AH9	Health consciousness significantly predicts attitude toward the behavior.	✓	
AH10	Health consciousness significantly predicts perceived norm.	✓	
AH11	Health consciousness significantly predicts perceived behavioral control.	✓	

Note. H = hypothesis, and AH = additional hypothesis.

Chapter IV

Discussion

This study aims to (1) investigate the role of health consciousness on the use of reusable bottles on campus among Chulalongkorn freshmen, under the framework of the theory of planned behavior, and (2) compare the models between standard theory of planned behavior and the extended theory of planned behavior with health consciousness.

From Linear Structural Relation analysis, the results show that the theory of planned behavior is the appropriate behavioral model to explain the behavior. The use of reusable water bottle on campus is explained by intention and perceived behavioral control. In turn, intention is explained by attitude toward the behavior, perceived norm, and perceived behavioral control. The results are in line with the theory itself and other theory of planned behavior studies (Albarracín et al., 2001; Armitage & Conner, 2001; Godin & Kok, 1996; Hagger et al., 2002; Sheeran & Taylor, 1999; Sheppard et al., 1988; van den Putte et al., 1993).

Looking at the first order prediction of the behavior, we can see that intention has a strong influence to the use of reusable bottles on campus among CU freshmen. This finding is congruent with Fishbein and Ajzen (2011) who claimed that intention is the most powerful indicator of the performance of the behavior. The unexplained variance of behavior, as discussed in the literature review section, is due to the flaw of the mythology issues of the theory of planned behavior; there is the time difference between the days in which respondents evaluated their intention to perform the behavior and the actual performance of the behavior (Fishbein & Ajzen, 2011). During this time, Prestwich, Sheeran, Webb, and Gollwitzer (2015) explained that people often forget what they intended to do. As a result, the predictive validity

of intention declines if the intention change after it was assessed but prior to performance of the behavior. Future research may conduct a qualitative analysis, investigating the in-depth reasons why intended college students do not carry out their intention.

Perceived behavioral control does not have a direct effect in the use of reusable water bottle. Fishbein and Ajzen (2011) argued that strength of the link between perceived behavioral control and behavior depends on how perceived behavioral control reflect actual control in the situation. For the case of Chulalongkorn freshmen, the results have shown that, on a 7-point Likert scale, respondents score relatively high on perceived behavioral control (M = 6.21, SD = .09). With high degree of perceived behavioral control, the structural equation modeling indicated a nonsignificant relationship to behavior. Such results imply that respondents' perceived behavioral control does not reflect actual control over the use of the reusable water bottle on campus. In other words, respondents underestimate the how hard to use the reusable water bottle. If we scrutinized the use of reusable water bottle on campus, we can see that such behavior includes a series of single behaviors, most of which are largely invisible to respondents at the time of behavioral control assessment. The behavior can include (1) bringing the bottles to the university, (2) carrying the bottles around the university, (3) trying not to lose the bottles during the day, (4) bringing the bottles back home. And then respondents have to repeat those step for five consecutive days.

However, perceived behavioral control have a significant effect on the use of reusable water bottle on campus via intention. The total and indirect effects of perceived behavioral control on behavior via intention are significant. These results are in line with the theory of planned behavior (Fishbein & Ajzen, 2011). The implication is that a favorable perceived behavioral control gives rise to intention to

perform the behavior, which in turn intention translates into the performance of the behavior.

In terms of the three intention's predictors, attitude toward the behavior, perceived norms, and perceived behavioral control significantly predicted intention to use the reusable bottles on campus. But, the three predictors' weights differed. Attitude toward the behavior carries the highest weigh in predicting intention, compared with perceived norms and perceived behavioral control. These findings imply that attitude toward the behavior matters more than perceived norm and perceived behavioral control, when it comes to explaining students' intention to use the reusable water bottle on campus. Such findings however contrast with the two previous water bottle studies, Bhesyanavin and Pichalai (2015), and Patumtaewapibal et al. (2017), in which the two did not found all three predictors as significance predictors of intention. The former found that attitude toward the behavior and norms significantly predicted intention, while the latter found norms and perceived behavioral control significantly predicted intention. This may due to the fact that the three studies, although investigating in similar topic and context, defined the behavior slightly difference. The previous two study defined behavior broadly: the use of reusable water bottle on campus, while the present study defined behavior more specifically: the use of reusable water bottle on campus in the next five schooling days. In addition, questionnaires being used differs. That is, the wordings and adjective use to reflect respondents were different. Because of these different in materials use, the predictive weight was different among the three studies. Another possible explanation of incongruence of the findings is the change in context of Chulalongkorn University. In 2015 in which the study of Bhesyanavin and Pichalai (2015) took place, water stations on campus were not as prevalent as recent date. During the time gap, Chulalongkorn University has replaced the old stainless steel

water stations to new clean-looking water station. Because of an increasing number of new water stations, the relationship between the three theory of planned behavior variables with intention has changed.

The addition of health consciousness as an intention predictor into the theory of planned behavior, the results showed, did not improve overall prediction of the model. Other relationships in the theory of planned behavior remain unchanged. Specifically, health consciousness has little to none impact to explain intention and behavior variances. This implies that how Chulalongkorn freshmen take care of them does not motivate them to use or use the reusable bottles on campus. This findings however do not comply with previous research on health consciousness, most of which found a significant coefficient of determination of health consciousness and intention to perform health behavior, even when the question items of health consciousness did not specify the behavior in questions (Hong, 2011; Kaynak & Eksi, 2011; Mai & Hoffmann, 2012; Melody & Shang-Hui, 2013). One possible explanation is the level of measurement of health consciousness and intention did not match. The present study defined health consciousness broadly as an overall one's health orientation, while intention was defined specifically, intention to use the reusable water bottle on campus in the next five schooling days. However, there are evidence suggested that although the level of measurement did not match, health consciousness still predict intention to engage in health behavior (e.g. Hong 2011). This evidence implied that Chulalongkorn freshmen have no longer perceived the use of reusable bottles as health behavior as once found in the Bhesyanavin and Pichalai (2015) and Patumtaewapibal et al. (2017). A future study may need to update students' salient beliefs regarding the use of reusable water bottle on campus.

The author did a further analysis by relocating the position of health consciousness from antecedent of intention to antecedent of attitude toward the behavior, perceived norm, and perceived behavioral control. Still, the overall prediction of intention and behavior remain relatively same, in relation to the original theory of planned behavior. This result confirms that health consciousness has no direct influence on intention to and actual use of reusable bottles on campus among Chulalongkorn freshmen. However, health consciousness showed significant influence to attitude toward the behavior (Furnham & Forey, 1994; Kaynak & Eksi, 2011), perceived norms (Divya & Nakkeeran, 2018), and perceived behavioral control (Gould, 1988, 1990; Hong, 2011). These results are consistent with previous research who found similar relationships. This results implied that individual's health perceptions of Chulalongkorn freshmen influence shape how they see the use of reusable bottles on campus, in terms of attitude, perceived norms, and perceived behavioral control. That is, Chulalongkorn freshmen who has high health consciousness tend to hold a positive attitude toward the, a perception that other would support their, and a belief that they can use of reusable bottles on campus.

The results of this study highlight the importance of health consciousness of Chulalongkorn freshman. Although health consciousness had no direct effect on intention to use the reusable bottles, it instead can facilitate or inhibit how Chulalongkorn freshmen evaluate the behavior, perceive social norm of the behavior, and perceive the difficulty of the behavior. For instance, if Chulalongkorn freshmen are high on health consciousness, they would evaluate the use of reusable bottles in positive ways, think that their friends would accept themselves using the reusable bottles, and see that the use of reusable bottles is easy to perform and under their control. When students perceived the behavior in this ways, they tend to be motivated to use the reusable bottles and eventually use the reusable bottles on

campus. Vice versa, if Chulalongkorn freshmen are low on health consciousness, they would evaluate the behavior negatively, and think that their friends would not approve behavior, and think that the behavior is difficult to perform and out of their control. These perceptions would lead to low intention to use the reusable bottles on campus, which eventually results in low rate of the use of reusable bottles on campus. Thus, in an attempt to change Chulalongkorn freshmen behavior to use the reusable bottles on campus, interventionists may have to pay attention to Chulalongkorn students' health.

The present study had several limitations. First, because the present study obeyed the 5:1 ratio (Hair et al., 2010), the sample size hence was small, which led to a non-normal distribution of the collected data set. Although the author used maximum likelihood to estimate parameter, which is robust to skewness of the distribution, this non-normal distribution would interfere with the findings. Future research may opt for a higher ratio to gain a larger sample size. Second, because the author did not want to overload respondents with too many question items, there was no items to detect social desirability of the respondents. Thus they might answer question that did not represent their reality, resulting in overestimating relationships among variables. Finally, the present study assumed that all the variables were observed variables, when they are in fact they are latent variables. Thus, the results may not reflect the true reality of the relationship among variables.

Chapter V

Conclusion and Suggestion

This study aimed to (1) identify the role of health consciousness on the use of reusable bottles, under the framework of the theory of planned behavior, and (2) compare the models between standard theory of planned behavior and the extended theory of planned behavior with health consciousness. The author hypothesized seven hypotheses as following:

1. The extended theory of planned behavior with health consciousness better explain intention and behavior than the original theory of planned behavior.
2. Health consciousness positively influence intention.
3. Attitude positively influence intention.
4. Perceived norm positively influence intention.
5. Perceived behavioral control positively influence intention.
6. Intention positively influence behavior.
7. Perceived behavioral control positively influence intention.

To test these seven hypotheses, the author conveniently sample 120 Chulalongkorn freshmen to complete a hardcopy of questionnaire that consisted of two validated scales: the theory of planned behavior and health consciousness. The collected data were first cleaned up and preliminarily analyzed, before analyzed with structural equation modeling technique, using linear structural relation program.

To test these seven hypotheses, the author conveniently sampled 120 Chulalongkorn freshmen to complete a hardcopy of questionnaire that consisted of two validated scales: the theory of planned behavior and health consciousness. The

collected data were first cleaned up and preliminarily analyzed, before analyzed with structural equation modeling technique, using linear structural relation program.

Results revealed an excellent model fit of the extended theory of planned behavior with health consciousness. However, when comparing the predictive validity to the standard theory of planned behavior, extended theory of planned behavior with health consciousness was no better at explaining the intention and behavior of the use of reusable water bottle on campus. The relationships among attitude, perceived norm, perceived behavioral control, intention, and behavior were supported by the analysis of collected data. Health consciousness did not significantly influence intention.

The author did a further analysis by relocating the position of health consciousness from intention predictor to antecedent of attitude, perceived norm, and perceived behavioral control. Additional hypotheses were as following:

1. The new health consciousness model better explains intention and behavior than the original theory of planned behavior.
2. Health consciousness positively influence attitude.
3. Health consciousness positively influence perceived norm.
4. Health consciousness positively influence perceived behavioral control.

Results revealed the new health consciousness model did not better explain intention and behavior than the original theory of planned behavior. Chi-square difference did not show a statistical significance. But, the collected data supported the role of health consciousness as an antecedent of attitude, perceived norm, and perceived behavioral control.

The findings from this study highlighted the importance of health consciousness as the origin of the on-campus use of reusable bottles among college students, through the theory of planned behavior variables. This study evidenced that health consciousness did not have a direct impact on intention and behavior. A future research could search other constructs that do so.

REFERENCES

Appendix

Appendix A

Scale development

Table 25

A correlational analysis of the four theory of behavior's constructs with a conveniently selected 100 Chulalongkorn freshmen

	ATT 1	ATT 2	ATT 3	ATT 4	ATT 5	ATT 6
ATT 1	1					
ATT 2	.87	1				
ATT 3	.80	.81	1			
ATT 4	.84	.85	.78	1		
ATT 5	.85	.88	.84	.84	1	
ATT 6	.71	.71	.60	.76	.74	1
	PN 1	PN 2	PN 3	PN 4	PN 5	PN 6
PN 1	1					
PN 2	.66	1				
PN 3	.63	.72	1			
PN 4	.51	.72	.65	1		
PN 5	.45	.55	.53	.68	1	
PN 6	.42	.58	.53	.62	.61	1
	PBC 1	PBC 2	PBC 3	PBC 4	PBC 5	PBC 6
PBC 1	1					
PBC 2	.87	1				
PBC 3	.87	.84	1			
PBC 4	.78	.76	.87	1		
PBC 5	.79	.81	.86	.85	1	
PBC 6	.78	.78	.88	.83	.79	1
	INT 1		INT 2		INT 3	
INT 1	1					
INT 2	.81		1			
INT 3	.86		.87		1	

Note: All correlation coefficients are significant $p < .001$. One-tailed test.

Table 26

The results of translation comparison from conveniently selected 30 English speakers

Item	Original version	Back-translation version	Lang.	Interp.
1	I'm very self-conscious about my health.	I care about my own health very much.	4.63	4.67
2	I'm generally attentive to my inner feelings about my health.	Normally, I pay attention to how I feel about my health.	4.97	5.60
3	I reflect about my health a lot.	I think about my health a lot.	5.23	5.17
4	I'm concerned about my health all the time.	I'm constantly worried about my health	5.73	5.53
5	I notice how I feel physically as I go through the day.	During the day, I notice how I physically feel	5.23	5.17
6	I take responsibility for the state of my health.	I am responsible for my health	5.70	5.57
7	Good health takes active participation on my part.	Good health takes a lot of effect from my part	4.97	4.47
8	I only worry about my health when I get sick.	I am only worried about my health when I'm sick	6.17	6.30
9	Living life without disease and illness is very important to me.	Living without any illness is important for me.	5.43	6.10
10	My health depends on how well I take care of myself.	My health depend on how well I take care of myself.	6.37	6.57
11	Living life in the best possible health is very important to me.	Living the healthiest possible life is important for me.	5.60	5.33

Table 27

A correlational analysis of health consciousness with a conveniently selected 100 Chulalongkorn freshmen

	HC 1	HC 2	HC 3	HC 4	HC 5	HC 6	HC 7	HC 8	HC 9	HC10
HC 1	1									
HC 2	.923**	1								
HC 3	.869**	.881**	1							
HC 4	.874**	.860**	.924**	1						
HC 5	.797**	.809**	.845**	.864**	1					
HC 6	.798**	.834**	.892**	.861**	.853**	1				
HC 7	.651**	.665**	.750**	.698**	.671**	.745**	1			
HC 8	.695**	.733**	.811**	.785**	.774**	.827**	.748**	1		
HC 9	.685**	.732**	.780**	.784**	.743**	.806**	.831**	.831**	1	
HC 10	.575**	.595**	.716**	.664**	.656**	.736**	.849**	.826**	.812**	1

Note: All correlation coefficients are significant $p < .001$. One-tailed test.

Appendix B

The questionnaire

Questionnaire volume 1: แบบสอบถามเกี่ยวกับพฤติกรรมการใช้กระบอกน้ำพกพาภายในบริเวณจุฬาลงกรณ์มหาวิทยาลัย และความเป็นห่วงสุขภาพ ชุดที่ 1

ชื่อผู้วิจัย: อรุช ปทุมเทวาภิบาล

ตำแหน่ง: นิสิตปริญญาโทจุฬาลงกรณ์มหาวิทยาลัย

คณะ: จิตวิทยา

ชื่อโครงการวิจัย: บทบาทของสติสุขภาพภายใต้กรอบแนวคิดทฤษฎีพฤติกรรมตามแผนที่มีต่อพฤติกรรมการใช้กระบอกน้ำที่มหาวิทยาลัยของนิสิตปี 1 จุฬาลงกรณ์มหาวิทยาลัย

คำชี้แจง: แบบสอบถามฉบับนี้มีวัตถุประสงค์ที่จะสำรวจความคิดเห็นของนิสิตระดับปริญญาตรีชั้นปีที่ 1 จุฬาลงกรณ์มหาวิทยาลัย ต่อการใช้กระบอกน้ำภายในบริเวณจุฬาลงกรณ์มหาวิทยาลัยภายในช่วงเวลา 5 วันข้างหน้าที่นิสิตมาเรียน ผลการสำรวจนี้จะเป็นแนวทางในการรณรงค์การใช้กระบอกน้ำของนิสิตจุฬาลงกรณ์มหาวิทยาลัย ข้อมูลทุกอย่างจะถูกเก็บเป็นความลับ แบบสอบถามฉบับนี้มีจำนวนทั้งสิ้น 4 ตอน รวม 34 ข้อ

คำแนะนำในการกรอกแบบสำรวจ: *<u>การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯ ภายใน 5 วันข้างหน้าที่ฉันมาเรียน</u>* หมายถึง การที่นิสิตนำกระบอกน้ำพกพามาใช้ภายในพื้นที่ของจุฬาลงกรณ์มหาวิทยาลัย ในช่วงเวลา 5 วันข้างหน้าที่นิสิตมาเรียนที่จุฬาลงกรณ์มหาวิทยาลัย

คำว่า *“ใช้ ”* ครอบคลุมถึงพฤติกรรมต่างๆที่เกี่ยวกับกระบอกน้ำ เช่น นำกระบอกน้ำมาเติมน้ำจากตู้กดน้ำ ดื่มน้ำจากกระบอกน้ำ หรือนำกระบอกน้ำพกพามาใช้ซื้อน้ำปั่น เพื่อให้ไม่ต้องซื้อขวดหรือแก้วน้ำพลาสติกและแก้วกระดาษ

ตอนที่ 1

คำชี้แจง: โปรดระบุและเขียนเครื่องหมาย ✓ หน้าข้อความที่ตรงกับสภาพความเป็นจริงของนิสิต

รหัสนิสิต: ☐☐☐ ☐☐☐☐☐ ☐☐

เพศ: ( ) หญิง ( ) ชาย ( ) ไม่ระบุ

ตอนที่ 2

คำชี้แจง: โปรดพิจารณาข้อความต่อไปนี้แล้วเลือกคำศัพท์ที่ตรงกับความรู้สึกในด้านซ้ายหรือด้านขวาในแต่ละข้อ เพียงข้อละ 1 คำตอบ แล้วเขียนเครื่องหมาย ✓ ลงในช่องที่ตรงกับความรู้สึกของท่านมากที่สุด

ตัวอย่าง: การใช้กระบอกน้ำพกพาที่จุฬาลงกรณ์มหาวิทยาลัย ภายใน 5 วันข้างหน้า ที่ฉันจะมาเรียนที่จุฬาลงกรณ์มหาวิทยาลัย เป็นสิ่งที่....

ดี |_____|_____|_____|_____|_____|_____|_____| เลว

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

ถ้านิสิตคิดว่าการใช้กระบอกน้ำพกพาที่จุฬาลงกรณ์มหาวิทยาลัย ภายใน 5 วันข้างหน้า ที่ฉันจะมาเรียนที่จุฬาลงกรณ์มหาวิทยาลัย เป็นสิ่งที่ <u>ดีมาก</u> ให้เขียนเครื่องหมาย ✓ ลงในช่องมากที่อยู่ใกล้คำว่าดี

ดี |___✓___|_____|_____|_____|_____|_____|_____| เลว

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

ถ้านิสิตคิดว่าการใช้กระบอกน้ำพกพาที่จุฬาลงกรณ์มหาวิทยาลัย ภายใน 5 วันข้างหน้า ที่ฉันจะมาเรียนที่จุฬาลงกรณ์มหาวิทยาลัย เป็นสิ่งที่ <u>เลวมาก</u> ให้เขียนเครื่องหมาย ✓ ลงในช่องมากที่อยู่ใกล้คำว่าเลว

ดี |_____|_____|_____|_____|_____|_____|___✓___| เลว

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

1. *<u>การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน</u>* เป็นสิ่งที่....

ดูดี |_____|_____|_____|_____|_____|_____|_____| ดูไม่ดี

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

2. *<u>การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน</u>* เป็นสิ่งที่....

เป็นที่ยอมรับ |_____|_____|_____|_____|_____|_____|_____| ไม่เป็นที่ยอมรับ

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

3. *<u>การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน</u>* เป็นสิ่งที่....

ควรสนับสนุน |_____|_____|_____|_____|_____|_____|_____| ไม่ควรสนับสนุน

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

4. *<u>การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน</u>* เป็นสิ่งที่....

น่าภูมิใจ |_____|_____|_____|_____|_____|_____|_____| ไม่น่าภูมิใจ

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

5. *<u>การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน</u>* เป็นสิ่งที่....

น่าพอใจ |_____|_____|_____|_____|_____|_____|_____| ไม่น่าพอใจ

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

6. *<u>การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน</u>* เป็นสิ่งที่....

สง่า |_____|_____|_____|_____|_____|_____|_____| ซอมซ่อ

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

7. คนที่มีความสำคัญต่อฉันส่วนมากคิดว่าฉัน .....*นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*

ควร |_____|_____|_____|_____|_____|_____|_____| ไม่ควร

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

8. คนส่วนใหญ่ที่ฉันเคารพนับถือ..... *การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน* ของฉัน

สนับสนุน |_____|_____|_____|_____|_____|_____|_____| ไม่สนับสนุน

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

9. คนที่มีความสำคัญต่อฉัน คาดหวังให้ฉัน*นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*

เป็นไปได้ |_____|_____|_____|_____|_____|_____|_____| เป็นไปไม่ได้

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

10. นิสิตจุฬาฯปี1คนอื่นๆ *นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่มาเรียน*

เป็นไปได้ |_____|_____|_____|_____|_____|_____|_____| เป็นไปไม่ได้

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

11. มีนิสิตจุฬาฯปี1คนอื่นๆมากเท่าไร *นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่มาเรียน*

จำนวนมาก |_____|_____|_____|_____|_____|_____|_____| จำนวนน้อย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

12. นิสิตจุฬาฯปี1คนอื่นๆ *นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่มาเรียน*

เห็นด้วย |_____|_____|_____|_____|_____|_____|_____| ไม่เห็นด้วย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

13. ถ้าฉันต้องการ ฉันมั่นใจว่าฉันสามารถ*นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*

เห็นด้วย |_____|_____|_____|_____|_____|_____|_____| ไม่เห็นด้วย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

14. ถ้าฉันต้องการ ฉันสามารถ*นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*ได้

เห็นด้วย |_____|_____|_____|_____|_____|_____|_____| ไม่เห็นด้วย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

15. สำหรับฉัน *การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*เป็นเรื่องที่...

เป็นไปได้ |_____|_____|_____|_____|_____|_____|_____| เป็นไปไม่ได้

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

16. *การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน* ขึ้นอยู่กับตัวฉัน

เห็นด้วย |_____|_____|_____|_____|_____|_____|_____| ไม่เห็นด้วย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

17. ตัวฉันเป็นคนกำหนดว่าฉันจะ*นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*หรือไม่

เห็นด้วย |_____|_____|_____|_____|_____|_____|_____| ไม่เห็นด้วย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

18. ฉันเชื่อว่าฉันเป็นคนควบคุม*การนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*

เห็นด้วย |_____|_____|_____|_____|_____|_____|_____| ไม่เห็นด้วย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

19. ฉันตั้งใจที่จะ*นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*

เห็นด้วย |_____|_____|_____|_____|_____|_____|_____| ไม่เห็นด้วย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

20. ฉันวางแผนที่จะ*นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*

เห็นด้วย |_____|_____|_____|_____|_____|_____|_____| ไม่เห็นด้วย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

21. ฉันมีเจตนาที่จะ*นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯภายใน 5 วันข้างหน้าที่ฉันมาเรียน*

เห็นด้วย |_____|_____|_____|_____|_____|_____|_____| ไม่เห็นด้วย

มาก ปานกลาง น้อย ไม่ใช่ทั้งสอง น้อย ปานกลาง มาก

ตอนที่ 3

คำชี้แจง: โปรดพิจารณาข้อความต่อไปแล้วเขียนเครื่องหมาย O ลงในช่องที่ตรงกับความเป็นจริงของท่านมากที่สุด เพียงข้อละ 1 คำตอบ

คำถาม	ระดับความคิดเห็น						
	เห็นด้วยอย่างยิ่ง (1)	เห็นด้วย (2)	ค่อนข้างเห็นด้วย (3)	เห็นด้วยไม่เห็นด้วยพอๆกัน (4)	ค่อนข้างไม่เห็นด้วย (5)	ไม่เห็นด้วย (6)	ไม่เห็นด้วยอย่างยิ่ง (7)
1.ฉันระมัดระวังสุขภาพของฉันอย่างมาก	1	2	3	4	5	6	7
2.โดยปกติแล้ว ฉันใจใส่ต่อความรู้สึกข้างในเกี่ยวกับสุขภาพของฉัน	1	2	3	4	5	6	7
3.ฉันคิดคำนึงถึงสุขภาพของตัวฉันอย่างมาก	1	2	3	4	5	6	7
4.ฉันเป็นห่วงสุขภาพของฉันตลอดเวลา	1	2	3	4	5	6	7
5.ฉันสังเกตว่าฉันรู้สึกทางกายอย่างไรอยู่ตลอดทั้งวัน	1	2	3	4	5	6	7
6.ฉันรับผิดชอบต่อสภาวะสุขภาพของตัวฉันเอง	1	2	3	4	5	6	7
7.สุขภาพที่ดีต้องใช้การลงมือลงแรงอย่างกระตือรือร้นของตัวฉัน	1	2	3	4	5	6	7
8.การใช้ชีวิตโดยไม่มีโรคภัยไข้เจ็บเป็นสิ่งที่สำคัญกับฉันอย่างมาก	1	2	3	4	5	6	7
9.สุขภาพของฉันขึ้นอยู่กับว่าฉันดูแลตัวเองดีเพียงใด	1	2	3	4	5	6	7
10.การมีชีวิตที่มีสุขภาพดีที่สุดเท่าที่เป็นได้ เป็นสิ่งสำคัญสำหรับฉัน	1	2	3	4	5	6	7

ขอบคุณครับ

Questionnaire volume 2: แบบสอบถามเกี่ยวกับพฤติกรรมการใช้กระบอกน้ำพกพาภายในบริเวณจุฬาลงกรณ์มหาวิทยาลัย และความเป็นห่วงสุขภาพ ชุดที่ 2

ชื่อผู้วิจัย: อรุช ปทุมเทวาภิบาล

ตำแหน่ง: นิสิตปริญญาโทจุฬาลงกรณ์มหาวิทยาลัย

คณะ: จิตวิทยา

ชื่อโครงการวิจัย: บทบาทของสติสุขภาพภายใต้กรอบแนวคิดทฤษฎีพฤติกรรมตามแผนที่มีต่อพฤติกรรมการใช้กระบอกน้ำที่มหาวิทยาลัยของนิสิตปี 1 จุฬาลงกรณ์มหาวิทยาลัย

คำชี้แจง: แบบสอบถามฉบับนี้มีวัตถุประสงค์ที่จะสำรวจความคิดเห็นของนิสิตระดับปริญญาตรีชั้นปีที่ 1 จุฬาลงกรณ์มหาวิทยาลัย ต่อการใช้กระบอกน้ำภายในบริเวณจุฬาลงกรณ์มหาวิทยาลัยภายในช่วงเวลา 5 วันข้างหน้าที่นิสิตมาเรียน ผลการสำรวจนี้จะเป็นแนวทางในการรณรงค์การใช้กระบอกน้ำของนิสิตจุฬาลงกรณ์มหาวิทยาลัย ข้อมูลทุกอย่างจะถูกเก็บเป็นความลับ แบบสอบถามฉบับนี้มีจำนวนทั้งสิ้น 1 ตอน รวม 2 ข้อ

โปรดระบุและเขียนเครื่องหมาย ✓ หน้าข้อความที่ตรงกับสภาพความเป็นจริงของนิสิต

1) รหัสนิสิต: ☐☐☐ ☐☐☐☐☐ ☐☐

2) 5 วันที่นิสิตมาเรียนที่จุฬาฯ หลังจากวันที่นิสิตตอบแบบสอบถามการใช้กระบอกน้ำพกพา นิสิตนำกระบอกน้ำมาใช้ในบริเวณจุฬาฯกี่วัน

☐ 0 วัน ไม่ได้นำกระบอกน้ำมาใช้ในบริเวณจุฬาฯเลย

☐ 1 วัน

☐ 2 วัน

☐ 3 วัน

☐ 4 วัน

☐ 5 วัน

ขอบคุณครับ

Appendix C

Linear Structural Modeling Code

Appendix 1C: The theory of planned behavior code

observed variables

ATT NORM PBC INT BEH

correlation matrix

1

.699 1

.601 .607 1

.652 .618 .614 1

.407 .350 .396 .591 1

sample sizes = 120

relationships

BEH = INT PBC

INT = ATT NORM PBC

path diagram

lisrel output: ME = ML MI EF SS SC ND=3

end of problem

Appendix 2C: The theory of planned behavior LISREL outputs

Correlation Matrix

	INT	BEH	ATT	NORM	PBC
INT	1.000				
BEH	0.591	1.000			
ATT	0.652	0.407	1.000		
NORM	0.618	0.350	0.699	1.000	
PBC	0.614	0.396	0.601	0.607	1.000

Parameter Specifications

BETA

	INT	BEH
INT	0	0
BEH	1	0

GAMMA

	ATT	NORM	PBC
INT	2	3	4
BEH	0	0	5

PHI

	ATT	NORM	PBC

ATT	6		
NORM	7	8	
PBC	9	10	11

PSI

INT	BEH
12	13

Number of Iterations = 3

LISREL Estimates (Maximum Likelihood)

BETA

	INT	BEH
INT	- -	- -
BEH	0.558	- -
	(0.095)	
	5.892	

GAMMA

	ATT	NORM	PBC
INT	0.332	0.213	0.285
	(0.094)	(0.095)	(0.085)
	3.515	2.244	3.363

BEH	- -	- -	0.053
			(0.095)
			0.561

Covariance Matrix of Y and X

	INT	BEH	ATT	NORM	PBC
INT	1.000				
BEH	0.591	1.000			
ATT	0.652	0.396	1.000		
NORM	0.618	0.377	0.699	1.000	
PBC	0.614	0.396	0.601	0.607	1.000

PHI

	ATT	NORM	PBC
ATT	1.000		
	(0.131)		
	7.616		
NORM	0.699	1.000	
	(0.113)	(0.131)	
	6.170	7.616	
PBC	0.601	0.607	1.000
	(0.108)	(0.109)	(0.131)

5.548 5.589 7.616

PSI Note: This matrix is diagonal.

INT	BEH
0.477	0.649
(0.063)	(0.085)
7.616	7.616

Squared Multiple Correlations for Structural Equations

INT	BEH
0.523	0.351

Squared Multiple Correlations for Reduced Form

INT	BEH
0.523	0.202

Reduced Form

	ATT	NORM	PBC
INT	0.332	0.213	0.285
	(0.094)	(0.095)	(0.085)
	3.515	2.244	3.363

BEH	0.185	0.119	0.213
	(0.061)	(0.057)	(0.094)
	3.019	2.097	2.264

Goodness of Fit Statistics

Degrees of Freedom = 2

Minimum Fit Function Chi-Square = 0.477 (P = 0.788)

Normal Theory Weighted Least Squares Chi-Square = 0.476 (P = 0.788)

Estimated Non-centrality Parameter (NCP) = 0.0

90 Percent Confidence Interval for NCP = (0.0 ; 3.249)

Minimum Fit Function Value = 0.00401

Population Discrepancy Function Value (F0) = 0.0

90 Percent Confidence Interval for F0 = (0.0 ; 0.0280)

Root Mean Square Error of Approximation (RMSEA) = 0.0

90 Percent Confidence Interval for RMSEA = (0.0 ; 0.118)

P-Value for Test of Close Fit (RMSEA < 0.05) = 0.836

Expected Cross-Validation Index (ECVI) = 0.241

90 Percent Confidence Interval for ECVI = (0.241 ; 0.269)

ECVI for Saturated Model = 0.259

ECVI for Independence Model = 3.365

Chi-Square for Independence Model with 10 Degrees of Freedom = 380.386

Independence AIC = 390.386

Model AIC = 26.476

Saturated AIC = 30.000

Independence CAIC = 409.323

Model CAIC = 75.714

Saturated CAIC = 86.812

Normed Fit Index (NFI) = 0.999

Non-Normed Fit Index (NNFI) = 1.021

Parsimony Normed Fit Index (PNFI) = 0.200

Comparative Fit Index (CFI) = 1.000

Incremental Fit Index (IFI) = 1.004

Relative Fit Index (RFI) = 0.994

Critical N (CN) = 2298.313

Root Mean Square Residual (RMR) = 0.00761

Standardized RMR = 0.00761

Goodness of Fit Index (GFI) = 0.998

Adjusted Goodness of Fit Index (AGFI) = 0.988

Parsimony Goodness of Fit Index (PGFI) = 0.133

Modification Indices and Expected Change

Modification Indices for BETA

	INT	BEH
INT	- -	0.008
BEH	- -	- -

Expected Change for BETA

	INT	BEH
INT	- -	0.014
BEH	- -	- -

Standardized Expected Change for BETA

	INT	BEH
INT	- -	0.014
BEH	- -	- -

Modification Indices for GAMMA

	ATT	NORM	PBC
INT	- -	- -	- -
BEH	0.042	0.250	- -

Expected Change for GAMMA

	ATT	NORM	PBC
INT	- -	- -	- -
BEH	0.022	-0.051	- -

Standardized Expected Change for GAMMA

	ATT	NORM	PBC
INT	- -	- -	- -
BEH	0.022	-0.051	- -

No Non-Zero Modification Indices for PHI

Modification Indices for PSI

	INT	BEH
INT	- -	
BEH	0.008	- -

Expected Change for PSI

	INT	BEH
INT	- -	
BEH	0.009	- -

Standardized Expected Change for PSI

	INT	BEH
INT	- -	
BEH	0.009	- -

Modification Indices for THETA-EPS

	INT	BEH
INT	0.008	
BEH	0.008	- -

Expected Change for THETA-EPS

	INT	BEH
INT	-0.017	

BEH	0.009	- -

Modification Indices for THETA-DELTA-EPS

	INT	BEH
ATT	0.214	0.214
NORM	0.422	0.422
PBC	0.045	0.051

Expected Change for THETA-DELTA-EPS

	INT	BEH
ATT	-0.040	0.022
NORM	0.058	-0.032
PBC	-0.045	0.030

Maximum Modification Index is 0.42 for Element (3, 2) of THETA-DELTA

Standardized Solution

BETA

	INT	BEH
INT	- -	- -
BEH	0.558	- -

GAMMA

	ATT	NORM	PBC

	ATT	NORM	PBC
INT	0.332	0.213	0.285
BEH	- -	- -	0.053

Correlation Matrix of Y and X

	INT	BEH	ATT	NORM	PBC
INT	1.000				
BEH	0.591	1.000			
ATT	0.652	0.396	1.000		
NORM	0.618	0.377	0.699	1.000	
PBC	0.614	0.396	0.601	0.607	1.000

PSI Note: This matrix is diagonal.

INT	BEH
0.477	0.649

Regression Matrix Y on X (Standardized)

	ATT	NORM	PBC
INT	0.332	0.213	0.285
BEH	0.185	0.119	0.213

Total and Indirect Effects

Total Effects of X on Y

	ATT	NORM	PBC
INT	0.332	0.213	0.285
	(0.094)	(0.095)	(0.085)
	3.515	2.244	3.363
BEH	0.185	0.119	0.213
	(0.061)	(0.057)	(0.094)
	3.019	2.097	2.264

Indirect Effects of X on Y

	ATT	NORM	PBC
INT	- -	- -	- -
BEH	0.185	0.119	0.159
	(0.061)	(0.057)	(0.055)
	3.019	2.097	2.920

Total Effects of Y on Y

	INT	BEH
INT	- -	- -
BEH	0.558	- -
	(0.095)	
	5.892	

Largest Eigenvalue of B*B' (Stability Index) is 0.312

Standardized Total and Indirect Effects

Standardized Total Effects of X on Y

	ATT	NORM	PBC
INT	0.332	0.213	0.285
BEH	0.185	0.119	0.213

Standardized Indirect Effects of X on Y

	ATT	NORM	PBC
INT	- -	- -	- -
BEH	0.185	0.119	0.159

Standardized Total Effects of Y on Y

	INT	BEH
INT	- -	- -
BEH	0.558	- -

Appendix 3C: The extended theory of planned behavior with health consciousness code

observed variables

HC ATT NORM PBC INT BEH

correlation matrix

1

.508 1

.497 .699 1

.537 .601 .607 1

.471 .652 .618 .614 1

.256 .407 .350 .396 .591 1

sample sizes = 120

relationships

BEH = INT PBC

INT = HC ATT NORM PBC

path diagram

lisrel output: ME = ML MI EF SS SC ND=3

end of problem

Appendix 4C: The extended theory of planned behavior with health consciousness LISREL outputs

Correlation Matrix

	INT	BEH	HC	ATT	NORM	PBC
INT	1.000					
BEH	0.591	1.000				
HC	0.471	0.256	1.000			
ATT	0.652	0.407	0.508	1.000		
NORM	0.618	0.350	0.497	0.699	1.000	
PBC	0.614	0.396	0.537	0.601	0.607	1.000

Parameter Specifications

BETA

	INT	BEH
INT	0	0
BEH	1	0

GAMMA

	HC	ATT	NORM	PBC
INT	2	3	4	5
BEH	0	0	0	6

PHI

	HC	ATT	NORM	PBC
HC	7			
ATT	8	9		
NORM	10	11	12	
PBC	13	14	15	16

PSI

	INT	BEH
	17	18

Number of Iterations = 3

LISREL Estimates (Maximum Likelihood)

BETA

	INT	BEH
INT	- -	- -
BEH	0.558	- -
	(0.095)	
	5.867	

GAMMA

	HC	ATT	NORM	PBC
INT	0.067	0.318	0.202	0.264

	(0.080)	(0.096)	(0.096)	(0.089)
	0.842	3.315	2.107	2.981
BEH	- -	- -	- -	0.053
				(0.095)
				0.559

Covariance Matrix of Y and X

	INT	BEH	HC	ATT	NORM	PBC
INT	1.000					
BEH	0.591	1.000				
HC	0.471	0.292	1.000			
ATT	0.652	0.396	0.508	1.000		
NORM	0.618	0.377	0.497	0.699	1.000	
PBC	0.614	0.396	0.537	0.601	0.607	1.000

PHI

	HC	ATT	NORM	PBC
HC	1.000			
	(0.132)			
	7.583			
ATT	0.508	1.000		
	(0.105)	(0.132)		
	4.857	7.583		

NORM	0.497	0.699	1.000	
	(0.104)	(0.114)	(0.132)	
	4.773	6.144	7.583	
PBC	0.537	0.601	0.607	1.000
	(0.106)	(0.109)	(0.109)	(0.132)
	5.073	5.524	5.564	7.583

PSI

Note: This matrix is diagonal.

INT	BEH
0.474	0.649
(0.063)	(0.086)
7.583	7.583

Squared Multiple Correlations for Structural Equations

INT	BEH
0.526	0.351

Squared Multiple Correlations for Reduced Form

INT	BEH
0.526	0.203

Reduced Form

	HC	ATT	NORM	PBC
INT	0.067	0.318	0.202	0.264
	(0.080)	(0.096)	(0.096)	(0.089)
	0.842	3.315	2.107	2.981
BEH	0.038	0.177	0.113	0.201
	(0.045)	(0.061)	(0.057)	(0.096)
	0.833	2.886	1.983	2.093

Goodness of Fit Statistics

Degrees of Freedom = 3

Minimum Fit Function Chi-Square = 0.800 (P = 0.849)

Normal Theory Weighted Least Squares Chi-Square = 0.798 (P = 0.850)

Estimated Non-centrality Parameter (NCP) = 0.0

90 Percent Confidence Interval for NCP = (0.0 ; 2.580)

Minimum Fit Function Value = 0.00673

Population Discrepancy Function Value (F0) = 0.0

90 Percent Confidence Interval for F0 = (0.0 ; 0.0224)

Root Mean Square Error of Approximation (RMSEA) = 0.0

90 Percent Confidence Interval for RMSEA = (0.0 ; 0.0865)

P-Value for Test of Close Fit (RMSEA < 0.05) = 0.896

Expected Cross-Validation Index (ECVI) = 0.339

90 Percent Confidence Interval for ECVI = (0.339 ; 0.362)

ECVI for Saturated Model = 0.365

ECVI for Independence Model = 4.530

Chi-Square for Independence Model with 15 Degrees of Freedom = 509.003

Independence AIC = 521.003

Model AIC = 36.798

Saturated AIC = 42.000

Independence CAIC = 543.728

Model CAIC = 104.973

Saturated CAIC = 121.537

Normed Fit Index (NFI) = 0.998

Non-Normed Fit Index (NNFI) = 1.022

Parsimony Normed Fit Index (PNFI) = 0.200

Comparative Fit Index (CFI) = 1.000

Incremental Fit Index (IFI) = 1.004

Relative Fit Index (RFI) = 0.992

Critical N (CN) = 1687.814

Root Mean Square Residual (RMR) = 0.0101

Standardized RMR = 0.0101

Goodness of Fit Index (GFI) = 0.998

Adjusted Goodness of Fit Index (AGFI) = 0.984

Parsimony Goodness of Fit Index (PGFI) = 0.143

Modification Indices and Expected Change

Modification Indices for BETA

	INT	BEH
INT	- -	0.031
BEH	- -	- -

Expected Change for BETA

	INT	BEH
INT	- -	0.028
BEH	- -	- -

Standardized Expected Change for BETA

	INT	BEH
INT	- -	0.028
BEH	- -	- -

Modification Indices for GAMMA

	HC	ATT	NORM	PBC
INT	- -	- -	- -	- -
BEH	0.329	0.042	0.248	- -

Expected Change for GAMMA

	HC	ATT	NORM	PBC
INT	- -	- -	- -	- -
BEH	-0.052	0.022	-0.051	- -

Standardized Expected Change for GAMMA

	HC	ATT	NORM	PBC
INT	- -	- -	- -	- -

BEH -0.052 0.022 -0.051 - -

No Non-Zero Modification Indices for PHI

Modification Indices for PSI

	INT	BEH
INT	- -	
BEH	0.031	- -

Expected Change for PSI

	INT	BEH
INT	- -	
BEH	0.018	- -

Standardized Expected Change for PSI

	INT	BEH
INT	- -	
BEH	0.018	- -

Modification Indices for THETA-EPS

	INT	BEH
INT	0.031	
BEH	0.031	- -

Expected Change for THETA-EPS

	INT	BEH
INT	-0.033	
BEH	0.018	- -

Modification Indices for THETA-DELTA-EPS

	INT	BEH
HC	0.311	0.311
ATT	0.286	0.286
NORM	0.333	0.333
PBC	0.216	0.240

Expected Change for THETA-DELTA-EPS

	INT	BEH
HC	0.060	-0.034
ATT	-0.046	0.026
NORM	0.051	-0.028
PBC	-0.086	0.055

Maximum Modification Index is 0.33 for Element (4, 3) of THETA-DELTA

Standardized Solution

BETA

	INT	BEH

INT	- -	- -
BEH	0.558	- -

GAMMA

	HC	ATT	NORM	PBC
INT	0.067	0.318	0.202	0.264
BEH	- -	- -	- -	0.053

Correlation Matrix of Y and X

	INT	BEH	HC	ATT	NORM	PBC
INT	1.000					
BEH	0.591	1.000				
HC	0.471	0.292	1.000			
ATT	0.652	0.396	0.508	1.000		
NORM	0.618	0.377	0.497	0.699	1.000	
PBC	0.614	0.396	0.537	0.601	0.607	1.000

PSI

Note: This matrix is diagonal.

INT	BEH
0.474	0.649

Regression Matrix Y on X (Standardized)

	HC	ATT	NORM	PBC

	---	---	---	---
INT	0.067	0.318	0.202	0.264
BEH	0.038	0.177	0.113	0.201

Total and Indirect Effects

Total Effects of X on Y

	HC	ATT	NORM	PBC
	---	---	---	---
INT	0.067	0.318	0.202	0.264
	(0.080)	(0.096)	(0.096)	(0.089)
	0.842	3.315	2.107	2.981
BEH	0.038	0.177	0.113	0.201
	(0.045)	(0.061)	(0.057)	(0.096)
	0.833	2.886	1.983	2.093

Indirect Effects of X on Y

	HC	ATT	NORM	PBC
	---	---	---	---
INT	- -	- -	- -	- -
BEH	0.038	0.177	0.113	0.148
	(0.045)	(0.061)	(0.057)	(0.056)
	0.833	2.886	1.983	2.658

Total Effects of Y on Y

	INT	BEH

INT	- -	- -
BEH	0.558	- -
	(0.095)	
	5.867	

Largest Eigenvalue of B*B' (Stability Index) is 0.312

Standardized Total and Indirect Effects

Standardized Total Effects of X on Y

	HC	ATT	NORM	PBC
INT	0.067	0.318	0.202	0.264
BEH	0.038	0.177	0.113	0.201

Standardized Indirect Effects of X on Y

	HC	ATT	NORM	PBC
INT	- -	- -	- -	- -
BEH	0.038	0.177	0.113	0.148

Standardized Total Effects of Y on Y

	INT	BEH
INT	- -	- -
BEH	0.558	- -

Appendix 5C: The new health consciousness model codes

The new health consciousness model

observed variables

HC ATT NORM PBC INT BEH

correlation matrix

1

.508 1

.497 .699 1

.537 .601 .607 1

.471 .652 .618 .614 1

.256 .407 .350 .396 .591 1

sample sizes = 120

relationships

BEH = INT PBC

INT = ATT NORM PBC

ATT NORM PBC = HC

set the error between ATT and NORM

set the error between NORM and PBC

set the error between ATT and PBC

path diagram

lisrel output: ME=ML MI EF SS SC ND=3

Appendix 6C: The new health consciousness model LISREL outputs

Correlation Matrix

	ATT	NORM	PBC	INT	BEH	HC
ATT	1.000					
NORM	0.699	1.000				
PBC	0.601	0.607	1.000			
INT	0.652	0.618	0.614	1.000		
BEH	0.407	0.350	0.396	0.591	1.000	
HC	0.508	0.497	0.537	0.471	0.256	1.000

Parameter Specifications

BETA

	ATT	NORM	PBC	INT	BEH
ATT	0	0	0	0	0
NORM	0	0	0	0	0
PBC	0	0	0	0	0
INT	1	2	3	0	0
BEH	0	0	4	5	0

GAMMA

	HC
ATT	6
NORM	7

PBC 8

INT 0

BEH 0

PHI

HC

9

PSI

	ATT	NORM	PBC	INT	BEH
ATT	10				
NORM	11	12			
PBC	13	14	15		
INT	0	0	0	16	
BEH	0	0	0	0	17

Number of Iterations = 0

LISREL Estimates (Maximum Likelihood)

BETA

	ATT	NORM	PBC	INT	BEH
ATT	- -	- -	- -	- -	- -
NORM	- -	- -	- -	- -	- -

PBC	- -	- -	- -	- -	- -
INT	0.332	0.213	0.285	- -	- -
	(0.094)	(0.094)	(0.084)		
	3.545	2.264	3.391		
BEH	- -	- -	0.053	0.558	- -
			(0.094)	(0.094)	
			0.566	5.943	

GAMMA

	HC

ATT	0.508
	(0.079)
	6.407
NORM	0.497
	(0.080)
	6.222
PBC	0.537
	(0.078)
	6.915
INT	- -
BEH	- -

Covariance Matrix of Y and X

	ATT	NORM	PBC	INT	BEH	HC
ATT	1.000					
NORM	0.699	1.000				
PBC	0.601	0.607	1.000			
INT	0.652	0.618	0.614	1.000		
BEH	0.396	0.377	0.396	0.591	1.000	
HC	0.508	0.497	0.537	0.428	0.267	1.000

PHI

	HC
	1.000
	(0.130)
	7.681

PSI

	ATT	NORM	PBC	INT	BEH
ATT	0.742				
	(0.097)				
	7.681				
NORM	0.447	0.753			
	(0.080)	(0.098)			

	5.571	7.681	
PBC	0.328	0.340	0.712
	(0.073)	(0.074)	(0.093)
	4.472	4.577	7.681
INT	- -	- -	- -	0.477
			(0.062)
			7.681
BEH	- -	- -	- -	- -	0.649
				(0.084)
				7.681

Squared Multiple Correlations for Structural Equations

ATT	NORM	PBC	INT	BEH
0.258	0.247	0.288	0.523	0.351

Squared Multiple Correlations for Reduced Form

ATT	NORM	PBC	INT	BEH
0.258	0.247	0.288	0.183	0.071

Reduced Form

HC

ATT 0.508

(0.079)

6.407

NORM 0.497

(0.080)

6.222

PBC 0.537

(0.078)

6.915

INT 0.428

(0.066)

6.509

BEH 0.267

(0.057)

4.706

Goodness of Fit Statistics

Degrees of Freedom = 4

Minimum Fit Function Chi-Square = 1.531 (P = 0.821)

Normal Theory Weighted Least Squares Chi-Square = 1.521 (P = 0.823)

Estimated Non-centrality Parameter (NCP) = 0.0

90 Percent Confidence Interval for NCP = (0.0 ; 3.271)

Minimum Fit Function Value = 0.0129

Population Discrepancy Function Value (F0) = 0.0

90 Percent Confidence Interval for F0 = (0.0 ; 0.0277)

Root Mean Square Error of Approximation (RMSEA) = 0.0

90 Percent Confidence Interval for RMSEA = (0.0 ; 0.0832)

P-Value for Test of Close Fit (RMSEA < 0.05) = 0.887

Expected Cross-Validation Index (ECVI) = 0.322

90 Percent Confidence Interval for ECVI = (0.322 ; 0.350)

ECVI for Saturated Model = 0.356

ECVI for Independence Model = 4.415

Chi-Square for Independence Model with 15 Degrees of Freedom = 509.003

Independence AIC = 521.003

Model AIC = 35.521

Saturated AIC = 42.000

Independence CAIC = 543.728

Model CAIC = 99.908

Saturated CAIC = 121.537

Normed Fit Index (NFI) = 0.997

Non-Normed Fit Index (NNFI) = 1.019

Parsimony Normed Fit Index (PNFI) = 0.266

Comparative Fit Index (CFI) = 1.000

Incremental Fit Index (IFI) = 1.005

Relative Fit Index (RFI) = 0.989

Critical N (CN) = 1032.754

Root Mean Square Residual (RMR) = 0.0117

Standardized RMR = 0.0117

Goodness of Fit Index (GFI) = 0.996

Adjusted Goodness of Fit Index (AGFI) = 0.978

Parsimony Goodness of Fit Index (PGFI) = 0.190

Modification Indices and Expected Change

Modification Indices for BETA

	ATT	NORM	PBC	INT	BEH
ATT	- -	- -	- -	0.722	0.296
NORM	- -	- -	- -	0.722	0.413
PBC	- -	- -	- -	0.722	0.055
INT	- -	- -	- -	- -	0.008
BEH	0.043	0.254	- -	- -	- -

Expected Change for BETA

	ATT	NORM	PBC	INT	BEH
ATT	- -	- -	- -	-0.444	0.043
NORM	- -	- -	- -	-0.561	-0.050
PBC	- -	- -	- -	-0.289	0.031
INT	- -	- -	- -	- -	0.014
BEH	0.022	-0.051	- -	- -	- -

Standardized Expected Change for BETA

	ATT	NORM	PBC	INT	BEH
ATT	- -	- -	- -	-0.444	0.043
NORM	- -	- -	- -	-0.561	-0.050
PBC	- -	- -	- -	-0.289	0.031

INT	- -	- -	- -	- -	0.014
BEH	0.022	-0.051	- -	- -	- -

Modification Indices for GAMMA

	HC
ATT	- -
NORM	- -
PBC	- -
INT	0.722
BEH	0.330

Expected Change for GAMMA

	HC
ATT	- -
NORM	- -
PBC	- -
INT	0.067
BEH	-0.051

Standardized Expected Change for GAMMA

	HC
ATT	- -
NORM	- -
PBC	- -

INT	0.067
BEH	-0.051

No Non-Zero Modification Indices for PHI

Modification Indices for PSI

	ATT	NORM	PBC	INT	BEH
ATT	- -				
NORM	- -	- -			
PBC	- -	- -	- -		
INT	0.722	0.722	0.722	- -	
BEH	0.382	0.346	0.182	0.008	- -

Expected Change for PSI

	ATT	NORM	PBC	INT	BEH
ATT	- -				
NORM	- -	- -			
PBC	- -	- -	- -		
INT	-0.212	-0.268	-0.138	- -	
BEH	0.032	-0.030	0.037	0.009	- -

Standardized Expected Change for PSI

	ATT	NORM	PBC	INT	BEH
ATT	- -				
NORM	- -	- -			

PBC	- -	- -	- -		
INT	-0.212	-0.268	-0.138	- -	
BEH	0.032	-0.030	0.037	0.009	- -

Modification Indices for THETA-EPS

	ATT	NORM	PBC	INT	BEH
ATT	0.722				
NORM	0.722	0.722			
PBC	0.382	1.034	0.465		
INT	0.634	0.107	0.903	0.008	
BEH	0.305	0.331	0.257	0.008	- -

Expected Change for THETA-EPS

	ATT	NORM	PBC	INT	BEH
ATT	0.639				
NORM	0.445	1.257			
PBC	0.183	0.411	0.373		
INT	-0.064	0.028	-0.114	-0.017	
BEH	0.026	-0.028	0.055	0.009	- -

Modification Indices for THETA-DELTA-EPS

	ATT	NORM	PBC	INT	BEH
HC	0.722	0.722	0.564	1.017	0.313

Expected Change for THETA-DELTA-EPS

	ATT	NORM	PBC	INT	BEH
HC	-0.131	-0.204	-0.133	0.046	-0.033

Maximum Modification Index is 1.03 for Element (3, 2) of THETA-EPS

Standardized Solution

BETA

	ATT	NORM	PBC	INT	BEH
ATT	- -	- -	- -	- -	- -
NORM	- -	- -	- -	- -	- -
PBC	- -	- -	- -	- -	- -
INT	0.332	0.213	0.285	- -	- -
BEH	- -	- -	0.053	0.558	- -

GAMMA

	HC
ATT	0.508
NORM	0.497
PBC	0.537
INT	- -
BEH	- -

Correlation Matrix of Y and X

	ATT	NORM	PBC	INT	BEH	HC

ATT	1.000					
NORM	0.699	1.000				
PBC	0.601	0.607	1.000			
INT	0.652	0.618	0.614	1.000		
BEH	0.396	0.377	0.396	0.591	1.000	
HC	0.508	0.497	0.537	0.428	0.267	1.000

PSI

	ATT	NORM	PBC	INT	BEH
ATT	0.742				
NORM	0.447	0.753			
PBC	0.328	0.340	0.712		
INT	- -	- -	- -	0.477	
BEH	- -	- -	- -	- -	0.649

Regression Matrix Y on X (Standardized)

	HC
ATT	0.508
NORM	0.497
PBC	0.537
INT	0.428
BEH	0.267

Total and Indirect Effects

Total Effects of X on Y

	HC

ATT	0.508
	(0.079)
	6.407
NORM	0.497
	(0.080)
	6.222
PBC	0.537
	(0.078)
	6.915
INT	0.428
	(0.066)
	6.509
BEH	0.267
	(0.057)
	4.706

Indirect Effects of X on Y

	HC

ATT	- -

NORM - -

PBC - -

INT 0.428

(0.066)

6.509

BEH 0.267

(0.057)

4.706

Total Effects of Y on Y

	ATT	NORM	PBC	INT	BEH
ATT	- -	- -	- -	- -	- -
NORM	- -	- -	- -	- -	- -
PBC	- -	- -	- -	- -	- -
INT	0.332	0.213	0.285	- -	- -
	(0.094)	(0.094)	(0.084)		
	3.545	2.264	3.391		
BEH	0.185	0.119	0.213	0.558	- -
	(0.061)	(0.056)	(0.093)	(0.094)	
	3.044	2.115	2.284	5.943	

Largest Eigenvalue of B*B' (Stability Index) is 0.317

Indirect Effects of Y on Y

	ATT	NORM	PBC	INT	BEH
ATT	- -	- -	- -	- -	- -
NORM	- -	- -	- -	- -	- -
PBC	- -	- -	- -	- -	- -
INT	- -	- -	- -	- -	- -
BEH	0.185	0.119	0.159	- -	- -
	(0.061)	(0.056)	(0.054)		
	3.044	2.115	2.945		

Standardized Total and Indirect Effects

Standardized Total Effects of X on Y

	HC
ATT	0.508
NORM	0.497
PBC	0.537
INT	0.428
BEH	0.267

Standardized Indirect Effects of X on Y

	HC
ATT	- -
NORM	- -
PBC	- -
INT	0.428
BEH	0.267

Standardized Total Effects of Y on Y

	ATT	NORM	PBC	INT	BEH
ATT	- -	- -	- -	- -	- -
NORM	- -	- -	- -	- -	- -
PBC	- -	- -	- -	- -	- -
INT	0.332	0.213	0.285	- -	- -
BEH	0.185	0.119	0.213	0.558	- -

Standardized Indirect Effects of Y on Y

	ATT	NORM	PBC	INT	BEH
ATT	- -	- -	- -	- -	- -
NORM	- -	- -	- -	- -	- -
PBC	- -	- -	- -	- -	- -
INT	- -	- -	- -	- -	- -
BEH	0.185	0.119	0.159	- -	- -

VITA

NAME	Aruch Patumtaewapibal
DATE OF BIRTH	4 August 1990
PLACE OF BIRTH	Bangkok
INSTITUTIONS ATTENDED	Portland State University Chulalongkorn University
HOME ADDRESS	495 Pichai Dusit Bangkok Thailand 10300

Aarts, H., Gollwitzer, P. M., & Hassin, R. R. (2004). Goal contagion: Perceiving is for pursuing. *Journal of Personality and Social Psychology, 87*(1), 23-37.

Abdourrahmane, M., & Sukhabot, S. (2014). An international consumer's perception and attitude towards the purchase intentions of OTOP snack food products. *TNI Journal of Business Administration and Languages, 2*(1), 54-60.

Abraham, C., & Sheeran, P. (2003). Acting on intentions: The role of anticipated regret. *British Journal of Social Psychology, 42*(4), 495-511.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Akhondan, H. H., Johnson-Carroll, K., & Rabolt, N. (2015). Health consciousness and organic food consumption. *Journal of Family and Consumer Sciences, 107*(3), 27-32.

Albarracín, D., Johnson, B. T., Fishbein, M., & Muellerleile, P. A. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin, 127*(1), 142-161.

Armitage, C. J., & Conner, M. (1999). Distinguishing perceptions of control from self-efficacy: Predicting consumption of a low-fat diet using the theory of planned behavior. *Journal of Applied Social Psychology, 29*(1), 72-90.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*(4), 471-499.

Armitage, C. J., Norman, P., & Conner, M. (2002). Can the theory of planned behaviour mediate the effects of age, gender and multidimensional health locus of control? *British Journal of Health Psychology, 7*(3), 299-316.

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology, 81*(6), 1014-1027.

Basu, A., & Dutta, M. J. (2008). The relationship between health information seeking and community participation: The roles of health information orientation and efficacy. *Health Communication, 23*(1), 70-79.

Berman, E. R., & Johnson, R. K. (2015). The unintended consequences of changes in beverage options and the removal of bottled water on a university campus. *American Journal of Public Health, 105*(7), 1404-1408.

Bhesyanavin, J., & Pichalai, T. (2015). *Prediting undergraduate students' intention to use reusable liquid container on campus based on an extended theory of planned behavior* (Master's thesis). Faculty of Psychology Chulalongkorn University.

Bläsing, M., & Amelung, W. (2018). Plastics in soil: Analytical methods and possible sources. *Science of the Total Environment, 612*, 422-435.

Buaprommee, N., & Polyorat, K. (2016). The antecedents of purchase intention of meat with traceability in Thai consumers. *Asia Pacific Management Review, 21*(3), 161-169.

Chen, M. F. (2013). Influences of health consciousness on consumers' modern health worries and willingness to use functional foods. *Journal of Applied Social Psychology, 43*, E1-E12.

Cheung, S. F., Chan, D. K.-S., & Wong, Z. S.-Y. (1999). Reexamining the theory of planned behavior in understanding wastepaper recycling. *Environment and Behavior, 31*(5), 587-612.

Cho, J., Park, D., & Lee, H. E. (2014). Cognitive factors of using health apps: Systematic analysis of relationships among health consciousness, health information orientation, eHealth literacy, and health app use efficacy. *Journal of Medical Internet Research, 16*(5), e125.

Choate, B., Davis, B. Y., & Verrecchia, J. (2018). Campus bottled water bans, not always the solution. *International Journal of Sustainability in Higher Education, 19*(5), 987-997.

Cialdini, R. B. (2001). Harnessing the science of persuasion. *Harvard Business Review, 79*(9), 72-81.

Clayton, S., & Myers, G. (2015). *Conservation psychology: Understanding and promoting human care for nature* (2nd ed.). West Sussex, UK: John Wiley & Sons.

Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology, 28*(15), 1429-1464.

Conner, M., & McMillan, B. (1999). Interaction effects in the theory of planned behavior: Studying cannabis use. *British Journal of Social Psychology, 38*(2), 195-222.

Custers, R., & Aarts, H. (2010). The unconscious will: How the pursuit of goals operates outside of conscious awareness. *Science, 329*(5987), 47-50.

Davis, L. E., Ajzen, I., Saunders, J., & Williams, T. (2002). The decision of African American students to complete high school: An application of the theory of planned behavior. *Journal of Educational Psychology, 94*(4), 810-819.

Divya, M., & Nakkeeran, S. (2018). The mediating effect of perceived knowledge, subjective norms, health consciousness on willingness to consume functional foods in India. *Taga Journal of Graphic Technology, 14*, 1101-1120.

Drossaert, C. H. C., Boer, H., & Seydel, E. R. (2003). Prospective study on the determinants of repeat attendance and attendance patterns in breast cancer screening using the theory of planned behaviour. *Psychology and Health, 18*(5), 551-565.

Dutta-Bergman, M. J. (2004). Primary sources of health information: Comparisons in the domain of health attitudes, health cognitions, and health behaviors. *Health Communication, 16*(3), 273-288.

Dutta, M. J. (2007). Health information processing from television: The role of health orientation. *Health Communication, 21*(1), 1-9.

Dutta, M. J., & Feng, H. (2007). Health orientation and disease state as predictors of online health support group use. *Health Communication, 22*(2), 181-189.

Ellison, B., Lusk, J. L., & Davis, D. (2013). Looking at the label and beyond: The effects of calorie labels, health consciousness, and demographics on caloric intake in restaurants. *International Journal of Behavioral Nutrition and Physical Activity, 10*(1), 21.

Environmental Research Institute. Chulalongkorn University. (2017). *The Chulalongkorn university zero waste report*. Retrieved from https://www.chula.ac.th/en/academic/environmental-research-institute/

Ertz, M., Huang, R., Jo, M.-S., Karakas, F., & Sarigöllü, E. (2017). From single-use to multi-use: Study of consumers' behavior toward consumption of reusable containers. *Journal of Environmental Management, 193*, 334-344.

Feather, N. T. (1959). Success probability and choice behavior. *Journal of Experimental Psychology, 58*(4), 257-266.

Feather, N. T. (Ed.) (1982). *Expectations and actions: Expectancy-value models in psychology*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Fishbein, M., & Ajzen, I. (2011). *Predicting and changing behavior: The reasoned action approach*. NY: Psychology Press.

Furnham, A., & Forey, J. (1994). The attitudes, behaviors and beliefs of patients of conventional vs. complementary (alternative) medicine. *Journal of Clinical Psychology, 50*(3), 458-469.

Giles, M., & Cairns, E. (1995). Blood donation and Ajzen's theory of planned behaviour: an examination of perceived behavioural control. *British Journal of Social Psychology, 34*(2), 173-188.

Giles, M., & Larmour, S. (2000). The theory of planned behavior: A conceptual framework to view the career development of women. *Journal of Applied Social Psychology, 30*(10), 2137-2157.

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion, 11*(2), 87-98.

Godin, G., Valois, P., Lepage, L., & Desharnais, R. (1992). Predictors of smoking behaviour: An application of Ajzen's theory of planned behaviour. *British Journal of Addiction, 87*(9), 1335-1343.

Gould, S. J. (1988). Consumer attitudes toward health and health care: A differential perspective. *Journal of Consumer Affairs, 22*(1), 96-118.

Gould, S. J. (1990). Health consciousness and health behavior: The application of a new Health Consciousness Scale. *American Journal of Preventive Medicine, 6*(4), 228-237.

Greenwald, A. G., Carnot, C. G., Beach, R., & Young, B. (1987). Increasing voting behavior by asking people if they expect to vote. *Journal of Applied Psychology, 72*(2), 315-318.

Hagger, M. S., Chatzisarantis, N. L., & Biddle, S. J. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology, 24*(1), 3-32.

Hagger, M. S., Chatzisarantis, N. L., & Harris, J. (2006). The process by which relative autonomous motivation affects intentional behavior: Comparing effects across dieting and exercise behaviors. *Motivation and Emotion, 30*(4), 306-320.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Upper saddle River, NJ: Pearson Education International.

Hong, H. (2009). Scale Development for Measuring Health Consciousness: Re-conceptualization. *Proceedings of the 12th Annual International Public Relations Research Conference*, 212-233. Holiday Inn University of Miami.

Hong, H. (2011). An extension of the extended parallel process model (EPPM) in television health news: The influence of health consciousness on individual message processing and acceptance. *Health Communication, 26*(4), 343-353.

Horton, A. A., Walton, A., Spurgeon, D. J., Lahive, E., & Svendsen, C. (2017). Microplastics in freshwater and terrestrial environments: Evaluating the current understanding to identify the knowledge gaps and future research priorities. *Science of the Total Environment, 586*, 127-141.

Hrubes, D., Ajzen, I., & Daigle, J. (2001). Predicting hunting intentions and behavior: An application of the theory of planned behavior. *Leisure Sciences, 23*(3), 165-178.

Hughner, R. S., McDonagh, P., Prothero, A., Shultz, C. J., & Stanton, J. (2007). Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behaviour: An International Research Review, 6*(2-3), 94-110.

Hwang, J., & Cranage, D. A. (2015). College students' health perceptions of individual fast food menu items according to nutrition knowledge and health consciousness. *Journal of Foodservice Business Research, 18*(5), 520-535.

Iversen, A. C., & Kraft, P. (2006). Does socio-economic status and health consciousness influence how women respond to health related messages in media? *Health Education Research, 21*(5), 601-610.

Jaccard, J., McDonald, R., Wan, C. K., Dittus, P. J., & Quinlan, S. (2002). The accuracy of self-reports of condom use and sexual behavior. *Journal of Applied Social Psychology, 32*(9), 1863-1905.

Jayanti, R. K., & Burns, A. C. (1998). The antecedents of preventive health care behavior: An empirical study. *Journal of the Academy of Marketing Science, 26*(1), 6-15.

Kallgren, C. A., Reno, R. R., & Cialdini, R. B. (2000). A focus theory of normative conduct: When norms do and do not affect behavior. *Personality and Social Psychology Bulletin, 26*(8), 1002-1012.

Kaskutas, L. A., & Greenfield, T. K. (1997). The role of health consciousness in predicting attention to health warning messages. *American Journal of Health Promotion, 11*(3), 186-193.

Kassem, N. O., & Lee, J. W. (2004). Understanding soft drink consumption among male adolescents using the theory of planned behavior. *Journal of Behavioral Medicine, 27*(3), 273-296.

Kaynak, R., & Eksi, S. (2011). Ethnocentrism, religiosity, environmental and health consciousness: Motivators for anti-consumers. *Eurasian Journal of Business and Economics, 4*(8), 31-50.

Kraft, F. B., & Goodell, P. W. (1993). Identifying the health conscious consumer. *Journal of Health Care Marketing, 13*(3), 18-25.

Lapham, S. C., C'de Baca, J., Chang, I., Hunt, W. C., & Berger, L. R. (2002). Are drunk-driving offenders referred for screening accurately reporting their drug use? *Drug and Alcohol Dependence, 66*(3), 243-253.

Latimer, A. E., & Martin Ginis, K. A. (2005). The theory of planned behavior in prediction of leisure time physical activity among individuals with spinal cord injury. *Rehabilitation Psychology, 50*(4), 389-396.

Lee, M., King, K. W., & Reid, L. N. (2015). Factors influencing consumers' attitudinal and behavioral responses to direct-to-consumer and over-the-counter drug advertising. *Journal of Health Communication, 20*(4), 431-444.

Li, R. (2008). Expression and meaning of health concept. *Journal of Shanxi University of Traditional Medicine, 9*(5), 52-55.

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology, 22*(140), 1-55.

Mai, R., & Hoffmann, S. (2012). Taste lovers versus nutrition fact seekers: How health consciousness and self-efficacy determine the way consumers choose food products. *Journal of Consumer Behaviour, 11*(4), 316-328.

Mai, R., & Hoffmann, S. (2015). How to combat the unhealthy = tasty intuition: The influencing role of health consciousness. *Journal of Public Policy and Marketing, 34*(1), 63-83.

Melody, L., W., & Shang-Hui, L. (2013). A study on the relationship amidst health consciousness, ecological affect, and purchase intention of green production. *International Journal of Organizational Innovation, 5*(4), 124-137.

Meng, F., & Wang, H. (2000). The physical exercise and healthy consciousness of college students in Gansu Province. *Journal of Gansu University, Social Science Edition, 28*, 307-310.

Mikhailovich, K., & Fitzgerald, R. (2014). Community responses to the removal of bottled water on a university campus. *International Journal of Sustainability in Higher Education, 15*(3), 330-342.

Milne, S., Orbell, S., & Sheeran, P. (2002). Combining motivational and volitional interventions to promote exercise participation: Protection motivation theory and implementation intentions. *British Journal of Health Psychology, 7*(2), 163-184.

Moorman, C., & Matulich, E. (1993). A model of consumers' preventive health behaviors: The role of health motivation and health ability. *Journal of Consumer Research, 20*(2), 208-228.

Norman, P., & Smith, L. (1995). The theory of planned behaviour and exercise: An investigation into the role of prior behaviour, behavioural intentions and attitude variability. *European Journal of Social Psychology, 25*(4), 403-415.

Ogaji, D. S. (2018). *Development and validation of the Patient Evaluation Scale (PES) for assessing the quality of primary health care in Nigeria* (Doctoral dissertation). The University of Manchester, United Kingdom.

Orbell, S., Blair, C., Sherlock, K., & Conner, M. (2001). The theory of planned behavior and ecstasy use: Roles for habit and perceived control over taking versus obtaining substances. *Journal of Applied Social Psychology, 31*(1), 31-47.

Osgood, C. E., Suci, G. J., & Tannenbaum, P. H. (1957). *The measurement of meaning*. Urbana, IL: University of Illinois press.

Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin, 124*(1), 54-74.

Patumtaewapibal, A., Jakkapark, J., & Simarangsarit, N. (2017). *The theory of planned behavior explaining intention the use of reusable bottle among Chulalongkorn students*. Unpublished article.

Prestwich, A., Sheeran, P., Webb, T. L., & Gollwitzer, P. M. (2015). Implementation intentions. In M. Conner & P. Norman (Eds.), *Predicting health behavior* (3rd ed., pp. 321-357). NY: McGraw-Hill.

Reno, R. R., Cialdini, R. B., & Kallgren, C. A. (1993). The transsituational influence of social norms. *Journal of Personality and Social Psychology, 64*(1), 104-112.

Richard, R., de Vries, N. K., & van der Pligt, J. (1998). Anticipated regret and precautionary sexual behavior. *Journal of Applied Social Psychology, 28*(15), 1411-1428.

Rise, J., Sheeran, P., & Skalle, S. (2006). *The role of self-identity in the theory of planned behavior: A meta-analysis*. Unpublished manuscript, Norwegian Institute for Alcohol and Drug Abuse, Oslo, Norway.

Rodgers, S., Chen, Q., Duffy, M., & Fleming, K. (2007). Media usage as health segmentation variables. *Journal of Health Communication, 12*(2), 105-119.

Royne, M. B., Fox, A. K., Deitz, G. D., & Gibson, T. (2014). The effects of health consciousness and familiarity with DTCA on perceptions of dietary supplements. *Journal of Consumer Affairs, 48*(3), 515-534.

Schwarz, N., Groves, R. M., & Schuman, H. (1998). Survey methods. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology* (4th ed., Vol. 1, pp. 143-179). Boston, MA: McGraw-Hill.

Sheeran, P., & Orbell, S. (1998). Do intentions predict condom use? Meta-analysis and examination of six moderator variables. *British Journal of Social Psychology, 37*(2), 231-250.

Sheeran, P., & Taylor, S. (1999). Predicting intentions to use condoms: A meta-analysis and comparison of the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology, 29*(8), 1624-1675.

Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research, 15*(3), 325-343.

Sherman, S. J. (1980). On the self-erasing nature of errors of prediction. *Journal of Personality and Social Psychology, 39*(2), 211-221.

Singhal, N. (2017). A study of consumer behavior towards organic food and the moderating effects of health consciousness. *IUP Journal of Marketing Management, 16*(3), 45-79.

Sinkevičius, M. (2016). Intention to purchase alcohol by adults in the country in transition: The effects of health consciousness, self-efficacy and religion importance. *Organizations and Markets in Emerging Economies, 7*(14), 25-42.

Slater, M. D., & Flora, J. A. (1991). Health lifestyles: Audience segmentation analysis for public health interventions. *Health Education Quarterly, 18*(2), 221-233.

Sparks, P., & Shepherd, R. (1992). Self-identity and the theory of planned behavior: Assessing the role of identification with "green consumerism". *Social Psychology Quarterly, 55*(4), 388-399.

Sperber, A. D. (2004). Translation and validation of study instruments for cross-cultural research. *Gastroenterology, 126*, S124-S128.

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education, 48*(6), 1273-1296.

Thompson, R. C., Moore, C. J., vom Saal, F. S., & Swan, S. H. (2009). Plastics, the environment and human health: Current consensus and future trends. *Philosophical Transactions of the Royal Society B: Biological Sciences, 364*(1526), 2153-2166.

Tourangeau, R., & Yan, T. (2007). Sensitive questions in surveys. *Psychological Bulletin, 133*(5), 859-883.

Turner, J. C. (1991). *Mapping social psychology series. Social influence*. Belmont, CA: Thomson Brooks/Cole.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Cambridge, MA: Basil Blackwell.

van den Putte, B., Hoogstraten, J., & Meertens, R. (1993). *20 years of the theory of reasoned action of Fishbein and Ajzen: A meta-analysis* (Unpublished doctoral dissertation). University of Amsterdam.

Verplanken, B., & Wood, W. (2006). Interventions to break and create consumer habits. *Journal of Public Policy and Marketing, 25*(1), 90-103.

Villarruel, A. M., Jemmott, J. B., III., Jemmott, L. S., & Ronis, D. L. (2004). Predictors of sexual intercourse and condom use intentions among Spanish-dominant Latino youth: A test of the planned behavior theory. *Nursing Research, 53*(3), 172-181.

Wagner, G. J., & Rabkin, J. G. (2000). Measuring medication adherence: Are missed doses reported more accurately than perfect adherence? *AIDS Care, 12*(4), 405-408.

Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin, 132*(2), 249-268.

Zhang, J., Sun, L., & Khan, A. (2018). A review and assessment of the existing health consciousness models. *International Management Review, 14*(1), 17-66.