Development and validation of the Thai Eating Questionnaire (TEQ)

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ABSTRACT

This paper describes the development and validity assessment of the Thai Eating Questionnaire (TEQ) to assess the healthiness of Thai adolescents' eating behavior, based on the Theory of Planned Behavior.

The TEQ was developed in English according to standard methodology, assessed for content validity index (CVI) by a panel of experts, translated into Thai and back-translated into English. TEQ was piloted with 34 Thai adolescents, then repeated one week later to assess test-retest reliability. It was tested again with 336 Thai adolescents.

The TEQ has very good content validity (CVI 0.980), acceptable internal consistency (Cronbach's alpha 0.870 and 0.853 with small and large group) and high test-retest reliability (0.900)

The TEQ appears to be a valid and reliable instrument suitable for use in further studies of Thai adolescents from both urban and rural areas in Thailand.

Keywords: adolescents / questionnaire / development / healthy eating

INTRODUCTION

Eating behavior is associated with health in all age group (Theobald, 2004). Therefore, factors influencing healthy eating behavior need to be scientifically examined in order to best promote healthy eating behavior. Adolescence may be the most effective period for influencing lifestyle in order to successfully prevent of adult chronic diseases such as heart disease, hypertension, and type 2 diabetes (WHO, 2005). Dietary behavior is very complex and influenced by many factors, including psychosocial factors (Kim, Reicks & Sjoberg, 2003; Neumark-Sztainer & Perry, 1999). Theories have been developed to explain dietary behavior including theoretical models developed in health psychology to explain day to day decision making in relation to health behaviors, including eating behavior. One model based on cognitive decision-making is the Theory of Planned Behavior (TPB) (Conner & Norman, 2007). The TPB has been applied to examine a wide range of different health-related behavior, including drug use, sexual behavior, physical activity, dietary behavior, and screening behavior (Conner & Norman, 2007; Armitage & Conner, 2001). In the studies which have examined healthy eating intention and behavior it is reported that the components of the TPB were found to be a useful predictor of healthy eating intention and healthy eating behavior with varying degree of success (Conner & Norman, 2007; Armitage & Conner, 2001).

However no instruments regarding eating behavior have been developed based on the total model of the TPB for use with adolescents in Thailand. Therefore, the new questionnaire, namely the Thai Eating Questionnaire (TEQ) has been developed based on the TPB for the purpose of study.

OBJECTIVE

This study aimed to develop and validate an instrument to assess Thai adolescent eating behavior over five constructs of the TPB.

LITERATURE REVIEW

THE THEORY OF PLANNED BEHAIOR (TPB)

The TPB [7] was developed from Ajzen and Fishbein's the Theory of Reasoned Action (TRA), 1980. The TRA is typically applied to predict individual's volitional behavior or individual's intention to perform behavior. However, most behavior is not under complete volitional control, as there are many factors that not be an individual's control. Therefore, control over performance of the behavior was added as an additional predictor of behavior not under volitional control in the TPB (Conner & Norman, 2007; Ajzen, 1991). The TPB proposes that behavior is determined individual's intention to perform the behavior and perceptions of control over performance of the behavior (Conner & Norman, 2007; Ajzen, 1991). Intention to perform behavior, in turn, is influenced by three major components which included attitude towards the behavior, subjective norm (social pressure), and perceived behavioral control (PBC) (Conner & Norman, 2007; Ajzen, 1991). Attitudes are determined by beliefs about the likely positive or negative outcomes of the behavior and their importance (behavioral beliefs). Subjective norms are determined by the social pressure perceived by individual to perform or not perform behavior and individual's motivation to comply (normative beliefs). The PBC is determined by control beliefs that can facilitate or impede performance of behavior such as internal control factors (e.g. skills, abilities, information) and external control factors (e.g. obstacles, opportunities) (Conner & Norman, 2007; Ajzen, 1991).

Figure1: Schematic representation of the Theory of Planned Behaviour [8]
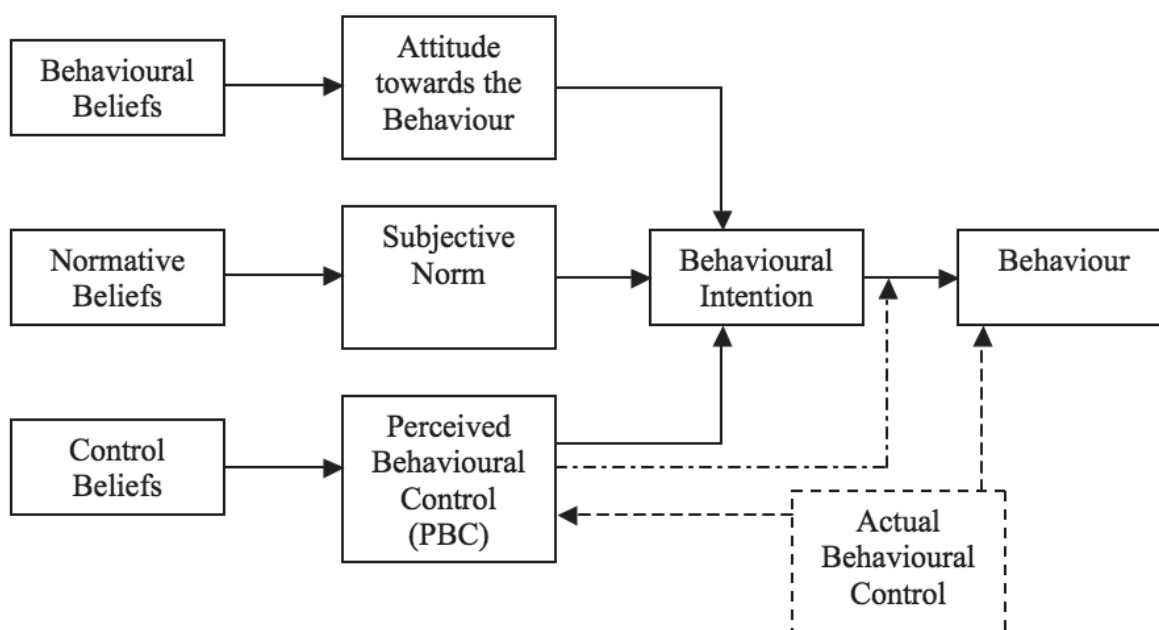
RESEARCH METHODOLOGY

This study had been approved by the Faculty of Health Research Ethics Committee, University of East Anglia. There are three phases for development and validation the TEQ, comprising, Phase 1: Constructing a preliminary questionnaire based on the TPB, Phase 2: Assessing content validity index (CVI), Phase 3: Questionnaire translation process as follow.

PHASE 1: CONSTRUCTING A PRELIMINARY QUESTIONNAIRE BASED ON THE TPB

When the TPB used as a framework for the development of a questionnaire, it should be developed based on pilot work (Ajzen, 2006). In this study, the pilot interview using 8 open-ended questions followed Azjen's format were used to generate common beliefs related to healthy eating behavior, comprising behavioral, normative, and control beliefs (Ajzen, 2006). It was conducted in November 2008 with 10 female and 10 male students, age 15 to 18 years, from 2 high schools which will be the setting for data collection for research in Ratchaburi province, Thailand. The common beliefs, along with ideas from a review of literature and the current dietary guidelines for Thai people or Thailand Nutrition Flag (Working Group on Food-Based Dietary Guideline for Thai People, 2001) were used to develop the initial questionnaire, which developed into the Thai Eating Questionnaire (TEQ).

PHASE 2: ASSESSING CVI

When a new instrument is developed, its validity and reliability are examined to establish its accuracy (Pilot and Beck, 2006). Validity refers to how well variables of interest are measured by an instrument Thomson & Panacek (2007). Traditionally, content validity is the first step in the development

of the new measurement, particularly with self-report. CVI has been widely used to quantify content validity in nursing research (Rubio et al., 2003). Three steps were used to assess the CVI as follow.

Firstly, a panel of experts should be drawn up, composed of content and lay experts (Rubio et al., 2003). The content experts should include at least three of professions who work and publish in the area relevant to the measure. The lay experts should not work in the area, and while the content experts are invited to determine how items represent the constructs or variables used to develop the instrument, lay experts will be asked to determine general problematic issues such as unclear meaning of specific items (Pilot and Beck, 2006; Rubio et al., 2003). In this study, three content experts in the fields relevant to the questionnaire were asked to rate on each TEQ question in terms of relevance to the underlying constructs of the TPB. For this work the experts included Dr Janet Ramjeet (an expert in Health Psychology), Dr Lee Hooper (a dietitian and researcher in nutrition), from the University of East Anglia, United Kingdom and Dr Prannarat Sangperm (an expert in Pediatrics Nursing who had carried out research on healthy eating behavior in Thai adolescent using selected constructs of the TPB) from Mahidol University, Thailand. In addition, two post graduate students who study in Economics and Computer Science at the University of East Anglia were asked to read the TEQ as lay experts.

Experts were asked to rate each question in the TEQ in term of relevance to the underlying constructs or the component of the TPB [10]. The preliminary draft of the TEQ with response forms were sent the expert panel to quantify the CVI of the instrument. Questions were graded using in 4-point ordinal scales so avoiding a neutral and ambivalent midpoint: 1 = not relevant, 2 = somewhat relevant, 3 = quite relevant, and 4 = highly relevant [10, 13].

Then the CVI was defined as the proportion of items on the questionnaire that achieve a rating of quite relevant or highly relevant by the panel of experts. The CVI was computed using a number of items judged to be quite relevant or highly relevant divide by the total number of items in the questionnaire. Many theorists state that a CVI of 0.90 or higher is acceptable (Pilot and Beck, 2006).

PHASE 3: QUESTIONNAIRE TRANSLATION PROCESS

In this study, the TEQ was initially developed in English because the researcher is an international student in the UK. However, the TEQ will be used as the main instrument for data collection in Thailand. Therefore, it was necessary to translate the TEQ from English into Thai. Translation aimed to ensure equivalence between the translated and original versions of the instrument (Maneesriwongul & Dixon, 2004; Chang, Chau & Holroyd, 1999).

Three steps were undertaken in the translation of the TEQ, comprising translation, back-translation, equivalence testing and monolingual testing. The English language TEQ with acceptable CVI was translated in Thai by the researcher as she understood both English and Thai language and is knowledgeable about the content area of the instrument. The TEQ Thai version was then back-translated into English by Associate Professor Dr. Surintorn Kalampakorn, Faculty of Public Health, Mahidol University, Thailand, knowledgeable in both Thai and English languages. Examination and comparison

equivalence of the retranslated English versions with the original English TEQ was carried out by Dr Janet Ramjeet.

The Thai language TEQ was then tested with 34 Thai students from Ratchaborikanukhro School, Ratchaburi Province Thailand. Testing the instrument with participants is necessary to ensure participants' understanding of an instrument and provide feedback used to revise and clarify the meaning of the questions (Chen, Snyder, & Krichbaum, 2002).

As well as the validity of an instrument it is useful to understand its reliability, or its degree of consistency. There are several procedures available to measure reliability in the literature. In this study, internal consistency and test-retest reliability of the TEQ were investigated (Netemeyer, Bearden, Sharma, & Sharma, 2003). The TEQ was tested with participants in the first step of the translation process, and was administrated again one week later. The TEQ was also used for conducting a large study with a similar recruitment strategy between June to August 2009 with 336 female and male students from Benjamarachutit School and Suanphung Wittaya School, Ratchaburi Province, Thailand, as a test instrument.

RESEARCH FINDINGS

Common beliefs from pilot work were elicited and frequencies counted (Table 1). They were used to develop the preliminary TEQ. The TEQ composed of 112 items divided into 6 parts as follows.

Part I   :   Personal Information (9 items)

Part II   :   Eating Behavior (9 items)

Part III :   Eating Intention (9 items)

Part IV   :   Attitude towards Eating Behavior (25 items)

Part V   :   Subjective norm regarding Eating Behavior (18 items)

Part VI   :   Perceived Behavioral Control over Eating Behavior (42 items)

THE CVI of the TEQ

Two of the one hundred and three related constructs of the TPB which rated 2 (somewhat relevant), the remainder scored 3 or more. The CVI was thus calculated as 101 divided by 103, a very satisfactory 0.98 (1.00 is the optimum score). Minor formatting and wording changes were made to the questionnaire following content experts and lay advice.

In the translation process, the result of back-translation indicated no difference meaning between the two English versions of instrument (the source, and the back-translated version).

The TEQ was tested with 34 students at the first step of translation process on May 2009, and it was administrated again to the same student one week later. They were able to complete the TEQ within 25 to 35 minutes. The feedback from 34 students was summarize as follows.

1. The TEQ was easy to understand and complete.

2. The pictures of foods and beverages in the TEQ helped the student to understand items in Part II: eating behavior and III: eating intention.

3. The pictures of foods and beverages in the TEQ helped participants to remain interested while completing the TEQ.

4. Before completing the questionnaire, discussion about household measures of foods and beverages (portions, serving spoons, table spoons, and glasses) was needed.

5. There are very many questions in the TEQ (112items).

RESULTS OF ASSESSING INTERNAL CONSISTENCY AND TEST-RETEST RELIABILITY

All subscales indicated an acceptable reliability when the TEQ was test with small group (34 Thai adolescents). Cronbach's alphas each part ranged from 0.795 to 0.863, and Cronbach's alphas for the entire TEQ was 0.870 (Table 2). The results of further testing the questionnaire with the large group of adolescents (n=336) indicated that the internal consistency reliability of each subscale is acceptable. Cronbach's alpha ranged from 0.640 and 0.871, and Cronbach's alphas for the entire TEQ was 0.853 (Table 2). Inter-item Pearson Correlation analysis showed a reasonable to high association (Harris & Taylor, 2008) of test and retest reliability coefficient of each part that ranged from 0.527 to 0.705 (Table 2), and the total score of test-retest reliability coefficient was 0.900 (p<0.001)

CONCLUSION AND RECOMMENDATIONS

This paper describes the development and validation of an instrument to assess Thai adolescent eating behavior over five constructs of the TPB. Questions were developed from pilot work in the setting which for the large study, to use specific circumstances and factors involved in behavior for the target population. The TEQ has very good CVI (0.98), acceptable internal consistency (Cronbach's alpha 0.870 with small group and 0.853 with large group), high test-retest reliability (0.90). The TEQ appears to be a valid and a reliable instrument suitable for use in further studies of Thai adolescents from both urban and rural areas in Thailand.

This study has a number of limitations. Firstly, during the piloting stage to develop the initial the TEQ, interviewing with semi-structure questions were undertaken in urban and rural schools which was the setting for data collection in later research on factors affecting Thai adolescents' eating behavior. Students who participated in the piloting phase were not selected from random sample. They were convenience samples because the researcher had to approach the students during school time and some students had limited time for participation. As the TPB is based on a cognitive model, there were no questions on emotions and eating behavior because even though emotion such as anxiety can effect eating behavior. The TEQ has been validated for Thai adolescents aged 15 and 18, validation for use in other age groups would be required. The TEQ aims to predict Thai adolescent eating behavior, and while it displays very good CVI, reasonable test-retest reliability, and acceptable internal consistency, the TEQ requires testing with larger populations to establish its predictive value.

The TEQ appears to be a valid and a reliable instrument that is suitable for use in studies on Thai adolescents from both urban and rural areas in Thailand. Furthermore, it may be useful in developing and assessing healthy eating school-based prevention programs.

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