



# Development of a Canadian Behaviour, Attitude and Nutrition Knowledge Survey (BANKS)



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# Executive Summary

# 1

## Executive Summary

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Health and disease prevention is strongly related to food selection. Dietary intakes low in fruit/vegetables and fibre are related to increased chronic disease rates. Individuals who consume less than 3 servings of fruit/vegetables per day are more likely to be classified as obese compared to their 5+ serving of fruit/vegetable counterparts (Statistics Canada, 2003). The interrelationship between food practice behaviours, nutrition attitudes and knowledge is of great interest as an understanding of these underpinnings could provide insight into best practice models supporting Canadians to achieve healthy lifestyle patterns.

In order to determine the value and impact of nutrition education programs or activities, it is crucial to have access to valid and reliable evaluation instruments. Validity indicates the degree to which an instrument actually measures what it purports to measure; the accuracy of the measurement. Reliability indicates the degree to which the instrument will yield the same results consistently over many uses. The availability of a survey that examines behaviours, attitudes and nutrition knowledge in a single assessment tool has not yet been developed for the Canadian population. In the United States, the department of Agriculture (USDA) created the Diet and Health Knowledge Survey (DHKS) to monitor nutrition and related research programs. The DHKS tool has undergone extensive testing to establish a strong degree of validity and reliability within the United States population. However, as similar as the Canadian and American populations might appear, food selection and government messaging are somewhat different and the transferability of this tool is unknown.

The project described here relates to the initial stages of survey development. Survey development often takes a number of years to finalize with many research projects that contribute to building the survey. The purpose of this research was to begin building a valid and reliable survey tool designed to measure behaviours, attitudes and nutrition knowledge (BANKS) in the Canadian population knowing that the final survey may actually take years to finalize.

The intention of validating a survey is essentially to address the question of “whether the survey measures what it is supposed to measure?” This is a seemingly simplistic question yet has major complexity when trying to clearly define “what we are supposed to measure.” To answer this question, the primary research team has endeavored to define and frame this question, and then rely on experts to finalize it.

We began by addressing the accuracy of the Canadian BANKS tool using a modified Ebel procedure. The use of multiple experts/judges is a critical step in validation of an assessment tool. The process of evaluating the accuracy of the BANKS assessment tool began with experts/judges representing educational expertise in the field of nutrition from Nova Scotia, Ontario, Manitoba, Saskatchewan and Alberta. As the initial survey was built on a previously established U.S. instrument, it is interesting to note that experts identified multiple item refinements as well as items to be omitted. New concepts were identified as important factors for inclusion, such as knowledge of fluid intake and physical activity levels. Items to address this content were added to the tool. Final expert/judge consensus was reached on all scale items providing a measure of content accuracy for the Canadian BANKS tool. In order to address the reliability of the Canadian BANKS tool, post secondary students completed the survey before and after an introductory nutrition course. Reliability was evaluated as an element of the *within* survey response. Consistency (reliability) was determined and initial analysis of the Canadian BANKS tool indicates that it bears a strong degree of reliability. Future work on this scale will require item refinement and higher level evaluation of validity.

Canadian researchers, community practitioners and developers should consider the selection of assessment tools carefully. If an assessment tool has not been demonstrated to be both accurate and consistent then it is possible that the information collected by the use of that tool may be both inaccurate and/or inconsistent. The DHKS tool did not translate well when evaluated by the Canadian expert team. The Canadian environment is a unique context, in so much as culture, nationality and laws are different from other nations. These environment-related factors influence validity and reliability and as such, the transferability of these qualities cannot be assumed from imported survey tools.

# Introduction

Employment of valid and reliable instruments to measure nutrition knowledge, attitudes and behaviours is critical within a Canadian context. Previous work in this realm has been completed by the United States Department of Agriculture with a similar purpose to the current study, but it has been done within an American context. Work presented in this report will focus on the initial stages of instrument (also known as tool or survey) development with particular focus on content validation and initial reliability testing. Moreover, this study is important for a number of reasons:

- Canadian researchers, community practitioners and developers require access to nutrition knowledge and behaviour assessment instruments to measure the impact of policy and nutrition education program initiatives directed at healthy eating. The majority of available nutrition assessment instruments are American in origin. In addition, few assessment instruments measure the constructs of behaviour practices, attitudes and knowledge in a single survey. Currently, no comprehensive valid and reliable Canadian based instrument exists. Long term, it is hoped the development of the Canadian BANKS assists in filling this knowledge gap.
- The adaptation of existing assessment instruments for an alternate audience (American to Canadian population) requires an assessment of factors that influence psychometric soundness when it is translated from one context to the other.. Differences in culture, governmental policy and health messaging between the two countries provide potentially strong modulators influencing validity and reproducibility. This study addresses these concerns and provides evidence that sufficient differences between populations exist such that transferability of psychometric soundness (validity and reproducibility) is not guaranteed.
- Canadian culture encompasses variation from province to province. The validation process undertaken in this study included nutrition experts from five provinces representing eastern, central and western Canada. This national representation of experts provides opportunity for a national stakeholder audience.

We wish to acknowledge and thank:

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*Thank you for your time, commitment and cooperation.*

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# Background

## PROJECT DESCRIPTION

Nutrition knowledge dissemination is considered a crucial intervention for shaping health attitudes and behaviours of Canadians. At present, no psychometrically established nutrition knowledge assessment instrument specific to the Canadian content exists surrounding the 2007 Canada Food Guide. This project spans the development of a Canadian context specific survey tool; the initial testing of logical and content validity of the scale, and the internal consistency of that scale. Good scale construction is an iterative process, thus future research will be required to refine scale items through factor analysis and work towards establishing construct validity. Once created, there will be a wealth of opportunity to apply this instrument in other populations across Canada. The ultimate goal will be to employ the tool to measure the impact on change in health behaviours and attitudes through knowledge interventions such as introductory nutrition classes (post-secondary) or seminars.

## PURPOSE

The purpose of this project was to:

- Create an instrument to measure nutrition knowledge, attitudes and food choice behaviours for the Canadian population (Canadian BANKS).
- Establish psychometric soundness of the Canadian BANKS through:
  - Engagement of nutrition experts, both locally and nationally, to evaluate and shape the overall survey tool, thus establishing content validity through a consensus building model (Ebel procedure).
  - Assessment of the finalized survey reproducibility through statistical analysis of internal consistency (Cronbach's  $\alpha$ ).

## CCL APPROVAL

The project proposal was submitted to the Canadian Council on Learning for the Health and Learning RFP and approved December 8<sup>th</sup>, 2006. An interim report was submitted in February, 2008.

# Literature Review

In Canada, deaths due to chronic disease such as cardiovascular disease, cancer, respiratory disease, and diabetes account for approximately 75% of all deaths each year (Public Health Agency of Canada, 2009). Intermediary identifiers predicting chronic disease development include raised blood pressure and blood glucose, abnormal blood lipids as well as overweight/obesity. The modifiable risk factors common to these chronic diseases include an unhealthy diet, physical inactivity, tobacco and alcohol use. An unhealthy diet is often assessed through poor fruit and vegetable intake and estimates suggest that 2.7 million deaths worldwide are attributable to low fruit and vegetable intake (World Health Organization (WHO), 2002). In Canada, the cost to the Canadian health care system has been calculated to be: \$20.6 billion for cardiovascular disease; \$17.9 billion for cancer; \$3.87 billion for respiratory disease; and \$9.9 billion for diabetes related expenses (Patra et al., 2007). The impact of an unhealthy diet on mortality and morbidity as well as the economic burdens for individuals and society, provide strong impetus to investigate the 'drivers' of food choice. Much scientific effort and health resources are focused on disease treatment, however, to improve health more emphasis needs to be placed on the prevention of chronic disease development (WHO, 2002).

## 4.1 Reducing Health Risks

Research that focuses on identifying cost-effective assessment tools in order to identify the impact of interventions aimed at preventing or reducing health risks is needed. A key objective identified in the Global Strategy on Diet, Physical Activity and Health (WHO, 2004) was the increased awareness and understanding of the role diet plays in personal health and the potential benefits of preventative interventions.

*A balance between government, community and individual action is necessary. For example, community action should be supported by nongovernmental organizations, local groups, the media and others. At the same time, individuals should be empowered and encouraged to make positive, life-enhancing health decisions for themselves on matters such as tobacco use, excessive alcohol consumption, unhealthy diet and unsafe sex.*

*World Health Organization Report, 2002 (p.11)*

Prevention was identified as the critical element in reversing deadly health trends and creating a healthier human population. Health Canada's goals align with this concept with a priority on encouraging Canadians to "*take an active role in their health, such as increasing their level of physical activity and eating well*" (Health Canada, 2009).

## 4.2 The State of Canadians

Nutrition knowledge and its application in food choice determination are critical factors shaping health care attitudes and behaviours of Canadians, however there is a paucity of information on the determinants of Canadians' eating practices (Public Health Agency of Canada, 2005; WHO, 2004). The Canadian Community Health Survey (CCHS) Cycle 2.2 provides information on Canadians' health and well being including vegetable and fruit consumption (Statistics Canada, 2003) but does not explore the interplay of factors affecting food selection. In general, it is known that overall healthy behaviour practices in Canadians are poor, most pronouncedly demonstrated by the low consumption of fruit and vegetables coupled with physical inactivity. Individuals with a body mass index (BMI) identified as obese consume fewer fruit and vegetable servings (<3 per day) and tend to have overall lower physical activity (Statistics Canada, 2003; Statistics Canada, 2006).

Overall health and disease prevention has been significantly linked to food selection. Diets high in fibre may help to moderate calorie intake and benefit blood lipid profiles thus decreasing potential obesity related diseases (Holt & Delargy, 1999). Adequate intake of fruit and vegetables is related to a reduced rate of mortality due to chronic disease (Joshi-pura et al., 2001; Khaw et al., 2008). Diets high in sodium, low in potassium are related to hypertension and cardiovascular disease (Cook et al., 2009) whereas low levels of calcium and vitamin D predispose individuals to osteoporosis (Roux et al., 2008; Varenna, Binelli, Casari, Zucchi, & Sinigaglia, 2007).

The relationship between these behaviours/food practices, nutrition attitudes and knowledge is of great interest as an understanding of these underpinnings could provide insight into best practice models supporting Canadians to achieve healthy lifestyle patterns.

## 4.3 Psychometrics: Validity and Reliability

Psychometrics is the scientific study of psychological measurements (Jones & Thissen, 2007). It guides the development and use of assessment instruments directed at quantifying psychological characteristics commonly used in education and social sciences. The Canadian-BANKS development encompasses both educational measurement (i.e. knowledge in BANKS) and social sciences (i.e. behaviour and attitudes in BANKS). An assessment tool is the collection of questions or scaled response items aimed at providing information about aspects of knowledge, behaviour or attitudes being investigated (Haynes, Richard & Kubany, 1995). Validity and reliability are fundamental to psychometric tool development and thus the cornerstone of the research in the development of the C-BANKS.

### 4.3.1 Validity

Validity refers to the degree that a test instrument measures what it purports to measure (Hopkins, 1998). Messick (1995) clarifies that *“validity is not a property of the test...but rather of the meaning of the test scores”* (p.741). Validity provides an evaluation of the truthfulness of the scores provided by the test instrument. As such, to work with a tool or test instrument that has not been subjected to the validation process brings into question the truthfulness of the results. Zumbo (2007, p. 48) states that *“without validation, any inferences made from a measure are potentially meaningless, inappropriate and of limited usefulness”*.

Conceptualizations of validity have been traditionally interpreted in a tripartite categorization of separate types of validity; content, criterion and construct (Anastasi, 1986). However, current perspectives hold a more comprehensive approach to validity (Cisek, Rosenberg & Koons, 2008). Validity is believed to be *“an evolving property”* that integrates aspects of content, criterion and score consequence into a construct framework in *“a continuing process”* (Messick, 1995, p.741). This view has been referred to as the unitary view of validity (Messick, 1980, 1989). In these terms, all processes to ensure the truthfulness of measurement scores build toward the construct validity of a measure. Central to this view is the assertion that validity must be constructed in a purposeful approach from multiple avenues and cannot be evaluated from a single set of observations (Clark & Watson, 1995). Lissitz & Samuelson (2007) suggest that initial test development and analysis are

internal matters related to the test and that these characteristics should be evaluated employing methods specifically of content validity and internal reliability testing.

Content validity refers to the degree to which the content of the questions and scaled responses of the assessment instrument are relevant and representative of the targeted constructs being investigated. Content validity directly affects the inferences that can be made from the scores provided by the measure and thus is a very important part of the overall process of developing measurement validity. Haynes, Richard & Kubany (1995) offer five guidelines for content validation. First, define the constructs being investigated and subject them to content validation. Second, include all elements of the assessment instrument to the validation procedure. Third, use multiple judges and quantify judgement using a formalized procedure. Fourth, disseminate the results of content validation as important aspects of construct validation. Lastly, use further psychometric analysis for item refinement. The modified Ebel procedure (Butterwick, Paskevich, Lagumen, Vallevand, & Lafave, 2006; Ebel, 1979; Lafave, Katz, & Butterwick, 2008) provides a structural approach (in the aforementioned third guideline) to managing judges/expert decisions regarding item inclusion, refinement or exclusion.

The inferences made from instrument scores with adequate indices of various forms of validity but lacking in content validation are of questionable value (Haynes, Richard, & Kubany, 1995). Content validity, is of key importance because unlike other forms of validity it is critical in the understanding of the research findings (Lynn, 1986).

### 4.3.2 Reliability

Reliability can be defined as the consistency of a measurement over time and conditions (Hopkins, 1998). Fundamental to establishing the validity of the test scores is the knowledge that the test scores are being measured in a reproducible fashion. Thus, reliability is an important aspect of overall construct validity. Generally, reliability is expressed as a number between 0 and 1 (Streiner & Norman, 2003). A score of zero indicates a situation where no reliability between the items exists. A score of one indicates a perfect reliability score. Reliability can be assessed using stability, equivalent-form, internal consistency, and inter-rater reliability. Internal consistency is the form of reliability which measures the degree to which the items within a single scale are inter-correlated (Clark & Watson, 1995).

## 4.4 Assessment Tools for Evaluating Food Choice

Few validated assessment instruments are available to evaluate dietary knowledge and food choice. In the United States a substantial body of research has focused on the Diet and Health Knowledge Survey (DHKS 1994-1996) which measures knowledge and attitudes regarding nutrition and health in the U.S. population (United States Department of Agriculture, 2009). The USDA has done considerable work to develop a psychometrically sound tool that measures changes in diet and health knowledge.

Obayashi and colleagues (Obayashi et al., 2003) evaluated the validity and reliability of the DHKS survey. Constructs were separated into the following categories with a number of items in each category:

1. knowledge of nutrient contents between products
2. knowledge of diet-disease relationships
3. perceived barriers to using food label
4. perceived benefit of using food label
5. perceived understanding of food label
6. perceived importance of practicing healthy dietary habits
7. use of food labels

Items in categories one and two were designed to measure nutrition knowledge constructs while categories three to six (inclusively) were designed to measure nutritional psychosocial behaviour constructs and the final category was intended to measure the impact of food labels in both constructs.

The survey was tested for validity and reliability in its capacity to measure nutrition knowledge, nutrition-related social-psychological factors and dietary behaviours (Obayashi et al., 2003). The study employed a complex stratified, multistage area probability sampling method across geographic location, degree of urbanization and an over-sampling of lower socioeconomic status.

The DHKS was found to possess moderate validity and a reliability of (.70), based on the United States nutrition and health systems.

Subsequently, researchers have used the tool to evaluate preventative nutrition interventions. Capps, Cleveland, and Park (2002) used the DHKS to identify dietary behaviours that correlated with individuals who consumed a reduced fat intake consistent with government guidance recommendations. Using these questions the authors identified specific behaviours that appeared to make the largest impact in an individual's effort to reduce dietary fat intake. These behaviours were identified as key targets for financial resources in so much as effort and financial resources focussed on changing these behaviours would provide the most effective means to achieving the desired nutritional behaviour.

The DHKS was also used as an assessment tool to measure the effectiveness of a nutrition education seminar on changes in nutrition knowledge and eating patterns of college students (Pires, Pumerantz, Silbart, & Pescatello, 2008). Students' perceptions regarding the importance of making healthy food choices such as moderate consumption of salt and sugar, lower fat intake and higher fibre intake, favourably increased after the educational seminar. Overall, the authors listed that a notable strength of the study lay in the fact that a psychometric sound tool (DHKS) was used for assessment of nutrition knowledge, behaviours and attitudes.

## 4.5 Determinants of Food Choice Behaviours

Understanding the determinants of food choice provides an important foundation in planning and delivering nutrition education intervention programs aimed at supporting healthy eating.

Furthermore, nutrition experts from the Dietitians of Canada and the Public Health Agency of Canada have identified the need for nutrition knowledge and behaviour instruments to measure the impact of nutrition related education programming and policy outcomes (Wegener, 2007). Food choice behaviours are complex and multifaceted. Theories of behaviour change can assist in better understanding health behaviours including the underpinnings of food choice. Four theoretical models will be reviewed below: Social Cognitive Learning Theory; Transtheoretical Model; Theory of Reasoned Action; and The Theory of Planned Behaviour. Each of them has had a strong influence

in the development of the C-BANKS, yet not one seems to completely capture the essence of the underlying purpose and constructs being targeted with it.

#### **4.5.1 Social Cognitive Learning Theory (Bandura, 1986)**

Social Cognitive Theory (SCT) postulates that behaviour is explained by a continual interaction between personal factors, environmental influences and behaviour (Bandura, 1986). Bandura (1997) applied social cognitive theory in the context of health promotion and disease prevention. He identified five core determinants related to health behaviours. The first determinant is knowledge of health risks and benefits. The individual must first ‘know’ how the behaviour influences their health and “how” to execute the healthy behaviour. Knowledge is the precondition to change as without the knowledge of healthy food choices, the behaviour is unlikely to occur. Measuring one’s nutritional knowledge underpins the current research reported herein. The second determinant is a belief in self efficacy. Bandura (1997) explains that self efficacy refers to a person’s belief that they have the capability to exercise control over their own health. He presents this determinant as the foundation of human motivation and action. Beliefs are not measured in the current measurement tool reported herein. The third determinant is outcome expectation. This refers to the concept that an individual’s health behaviour is impacted by their expectation of potential outcomes as a result of their action. The outcomes relate to: potential physical pleasure or displeasure related to the behaviour; social reactions to the behaviour; and self satisfaction or dissatisfaction related to the behaviour. Expectations are not measured in the current measurement tool reported herein. The fourth determinant relates to personal goals such that they provide self incentives to continue with the behaviour. Lastly are barriers or impediments to changing one’s behaviour. Barriers or impediments are not measured in the current measurement tool reported herein.

Social cognitive theory can be used to understand health behaviours such as nutrition related food choice. Adequate knowledge related to nutritional value and the impact of proper nutrition on disease development has been shown to be correlated with healthier food choices (Colavito, Guthrie, Hertzler, & Webb, 1996; Shepherd & Towler, 1992; Wardle, Parmenter, & Waller, 2000a; Wolf et al., 2008); however the predictive quality of nutrition knowledge as a variable has been modest. In the literature, the relationship between nutrition knowledge and dietary behaviours has been inconsistent. For example, nutrition knowledge scores were found to be a factor in predicting Mexican American eating patterns in the USDA food groups of grains, dairy and meats but not fruit or vegetables (Sharma, Gernand, & Day, 2008). Conversely, in Belgium, the nutrition

knowledge of middle aged women was significantly correlated with vegetables and fruit intake, but not for other foods groups (De Vriendt, Matthys, Verbeke, Pynaert, & De Henauw, 2009). In many instances where nutrition knowledge has not been found to correlate with improved food choice behaviours, the study has not employed a psychometrically sound tool to measure this knowledge (Wardle, Parmenter, & Waller, 2000b) thus calling into question the predictive validity of the results. Nonetheless, at face value, multiple factors also appear to be critical in explaining food choice decisions

#### **4.5.2 Transtheoretical Model of Change (Prochaska & DiClemente, 1983)**

The Transtheoretical Model (TTM) of change (Prochaska & DiClemente, 1983) has been related to the SCT in that increases self efficacy correlate with movement through the five stages of TTM (Campbell et al., 1999). TTM describes various stages of transition that individuals undergo when engaging in a behavioural change. According to Prochaska & DiClemente (1983) the pre-contemplation stage is represented by individuals who lack awareness or are unwilling to address of the need for change. Arguably, this stage could be considered parallel with the knowledge stage in the SCT and thus, would be measured as part of the current research project. The contemplation stage is characterized by individuals recognizing the need for change but still not actively pursuing this change. This stage may be measured in the current research since the C-BANKS should be able to distinguish between those individuals who know, yet chose to not make change compared with those who do not know about healthy food choices. In the preparation stage, individuals prepare for change through planning activities such as preparing an action plan. In the action stage, individuals actively engage in the new behaviours. Once the action stage has been entered individuals may relapse to old behaviors or move into the final maintenance stage which involves commitment to the new behaviour paradigm (Prochaaska & DiClemente, 1983). None of the last three stages of this model are measured in the current research.

The “5 a Day” program for encouraging consumption of fruit and vegetables has incorporated the theoretical perspectives of TTM and SCT in designing the guidelines for intervention (Campbell et al., 1999). Identifying individuals in various stages of change has been found to be predictive of eventual health behaviour change such as with calcium intake (Tucker, Snelling, & Adams, 2002) and fruit and vegetable intake (Greene et al. 1999).

### 4.5.3 Theory of Reasoned Action (Ajzen & Fishbein, 1980)

There is an assumption that exposing an individual to new information will increase nutrition knowledge and that will in turn impact food choices. One postulation suggests that nutrition knowledge influences food choice behaviours through its impact on attitudes. In several instances attitude has been shown to correlate with food choice (Aikman, Min, & Graham, 2006; Byrd-Bredbenner & Shear, 1982; Shepherd & Towler, 1992). The Theory of Reasoned Action (TRA) model (Ajzen & Fishbein, 1980) postulates that performance of a given behaviour is largely determined by the strength of the persons' intention to perform the behaviour. Intentions are a function of the individual's attitude toward performing the behaviour and the perception the

$$\text{Attitude} = \sum \text{belief} * \text{evaluation}$$

individual has regarding the importance of the behaviour in the eyes of their significant others. In other words, attitudes are predicted by a sum of beliefs multiplied by the personal assessment of the value of these beliefs. In this context both taste and health benefits have been identified as key determinants of attitude toward food choice (Shepherd & Towler, 1992). Experimental validation of the TRA model has demonstrated good predictive power for food choice and attitudes (Shepherd & Stockley, 1987; Tuorila, 1987). The current research study does attempt to measure attitudes through a number of items and thus, the tool may subscribe to some of the tenets of the TRA.

### 4.5.4 The Theory of Planned Behaviour (Ajzen, 1991)

The Theory of Planned Behaviour (TPB) model (Ajzen, 1991) is an extension of the TRA. In TPB, three central beliefs guide behaviour. First is the individuals' belief regarding the behaviour's positive or negative outcome termed 'behavioral beliefs'. Second is the belief about the expectation of others termed 'normative beliefs'. The third is the belief of factors which may support or impede the performance of these behaviours termed 'control beliefs'. TPB has been shown to be a robust predictor of food choice (Armitage & Conner, 1999). In this context both taste and health benefits have been identified as key determinants of attitude toward food choice (Shepherd & Towler, 1992).

In summary, each theoretical framework/model looks to predict a variety of factors associated with food choice. None of the models seem to completely capture the purpose and constructs being measured by the C-BANKS. More research is needed to elucidate the interrelationships of knowledge, attitude

and behaviour in order to translate nutrition education into healthy eating behaviours (Byrd-Bredbenner & Shear, 1982).

## 4.6 Present Availability of Assessment Tools in Canada

Often assumptions are made that data collected in the United States can be extrapolated to the Canadian population. Although the USDA and Health Canada have similar educational mandates, Health Canada employs a different system than the USDA for educating the public on healthy living and food choices (Health Canada, 2007; United States Department of Agriculture, 2009). Roughly speaking, both systems cover food groups, but have different educational systems to represent the message. In Canada, the “Food Guide” is employed while the USDA employs a “Food Pyramid”. The DHKS has been designed with all major categories in the Food Pyramid and thus, does not meet the same educational requirements and standards taught in the Canadian education system (K-12 and the post-secondary system). In addition distinct cultural differences exist between the two nations. Shepherd (1999) clearly indicates that food choice is influenced by social and cultural factors. Streiner (2003) states that reliability is not a constant characteristic of the instrument, but a trait of the scores based on the population being studied. Implicit in this statement is the fact that should the population change, the reliability would not be generalizable to the new population. Thus reliability is required to be reassessed in the new environment and new context. These socio-political differences raise serious questions regarding whether the psychometric soundness would be transferable to the Canadian context. At present, no psychometrically established instrument equivalent is currently available in Canada

## 4.7 Objectives

The overarching goal of this research is to create a psychometrically sound nutrition assessment tool. The creation of a psychometrically sound tool takes years to complete and includes multiple research studies to establish overall validity and reliability. Structured assessment of content validity is a fundamental initial stage in the eventual establishment of construct validity. As such, the goal of this project was to establish the psychometric soundness in the early stages of tool development.

# Method

## 5.1 Participants and Recruitment

### Local Expert Validators

Key characteristics for the recruitment of local experts included identifying individuals with experience in nutrition education. The criteria to be an expert in this local group included holding current qualifications of either a registered dietician or nurse as well as teaching nutrition at the post secondary level or responsible for developing curriculum or educational materials at the post secondary level. Four validators, local to Calgary Alberta, agreed to participate in the initial development of the assessment tool. Alberta Health Services [formerly Calgary Health Region] partnered with two nutrition experts. Two additional experts were from Mount Royal University [formerly Mount Royal College].

### National Expert Validators

Formal content validation involved nutrition experts from across Canada. The criteria to be an expert in the national group included holding current qualifications of either a registered dietician or nurse as well as teaching nutrition at the post secondary level or responsible for developing curriculum or educational materials at the post secondary level representing institutions or communities outside of Calgary Alberta. A group of twenty experts across Canada were identified and contacted. Ten validators agreed to serve on the national expert validation panel and were faculty members from Acadia University, University of Western Ontario, University of Guelph, University of Manitoba, University of Saskatchewan, University of Alberta and Mount Royal College. The committee members represented provinces from across Canada (Nova Scotia, Ontario, Manitoba, Saskatchewan & Alberta); nine held doctoral degrees; five were members of the Dietitians of Canada and seven had taught an introductory nutrition course at a post-secondary institution.

### Student Participants

A target of 250 post secondary students was recruited to participate in the reliability testing portion of this study. The criteria to be a participant in this group included being enrolled in a post

secondary introductory nutrition course offered in winter or fall of 2008. Students with a diagnosis of an eating disorder were not included in the sample population. Students were informed of the purpose of the study and asked to participate in the research. No financial compensation was provided. Of the 303 students' enrolled, the final convenience sample consisted of 259 Canadian university undergraduate students. A total of 209 valid surveys were collected for analysis. Incomplete surveys were attributed to absence [various reasons including a blizzard on survey day]. Students were tested at course completion in an attempt to standardize exposure to nutrition knowledge.

## 5.2 Research Design and Procedure

Validity and reliability testing of the Canadian BANKS was completed through a multi-stage approach (**figure 1**).

### Psychometric Property: Validity – Content Validity

To establish content validity a modified Ebel procedure (Butterwick, Paskevich, Lagumen, Vallevand, & Lafave, 2006; Ebel, 1979; Lafave, Katz, & Butterwick, 2008) was employed. Agreement consensus scores were tabulated for each item (**figure 2**) as a proportion of expert rating an item as essential for inclusion in the assessment survey tool. Consensus was defined as 80% expert agreement (Ebel, 1979; Butterwick et al., 2006; Lafave et al., 2008).

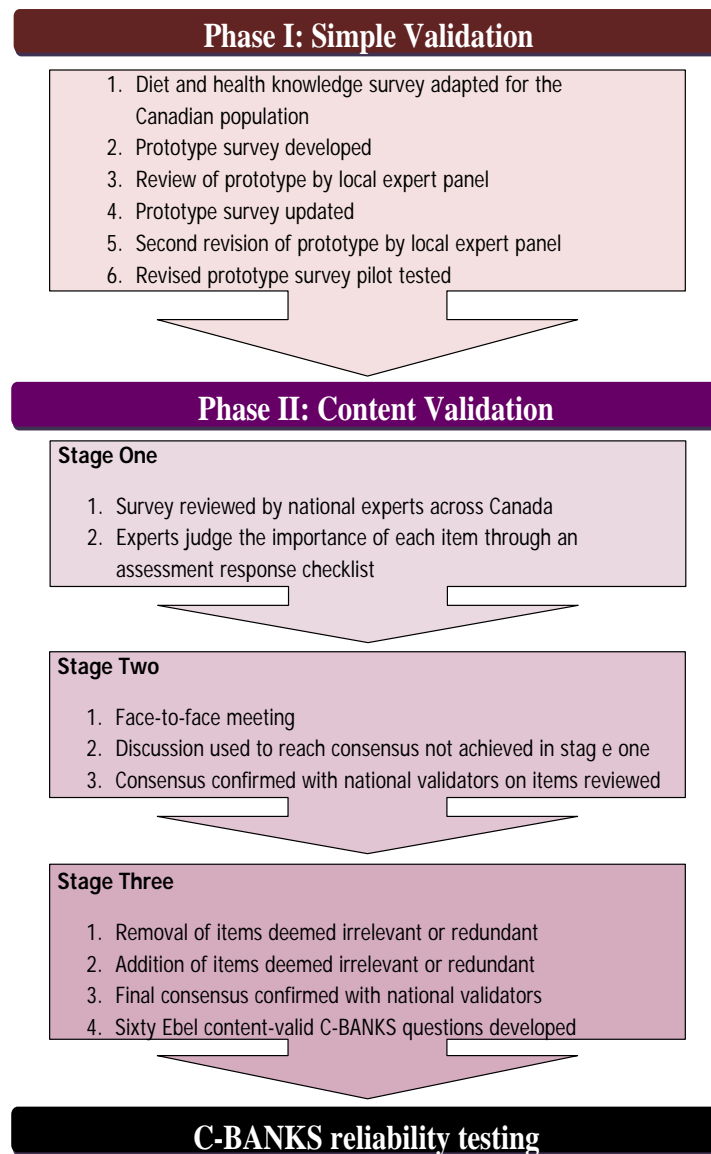
### Phase I: Simple Validation

The DHKS was modified for the Canadian context in regards to food availability, terminology and government messaging. This modified, Canadian version of the DHKS was then subjected to simple validation by the local expert validators. Local expert validators (n=4) were provided an electronic version of the assessment survey tool and given 4 weeks to assess the tool on a three-level scale of importance (essential, important, not as important or not applicable). Items that achieved consensus were automatically included in the instrument. Items that did not achieve consensus were subjected to two face-to-face meetings to discuss the decisions regarding inclusion or removal of items. After consensus was reached, this second version was ready to submit for the national expert committee review.

## Phase II: Content Validation

In the second phase of validation, experts (n=10) from across Canada reviewed the modified survey. Experts were sent a digital copy of the assessment survey tool and afforded 6 weeks to assess and return the survey (figure 1; phase II; stage one). Specific instructions were included to enable validators to classify the importance of each item (Ebel, 1979; Lafave et al., 2008) on a three-level scale of importance (essential, important, not as important or not applicable).

**Figure 1**



Responses were collected and merged to create a single document with arrays for each evaluator on each item. Items that achieved the required minimum expert agreement (80% consensus) were included in the survey. Items that did not achieve the required minimum expert agreement provided the discussion points for subsequent expert face-to-face meetings. The validation committee met one month later to discuss items that did not achieve consensus during the initial electronic mail-out validation (figure 1; phase II; stage two). A third stage was added to the process because new important nutrition related constructs were identified as important through the interactive face-to-face meeting (figure 1; phase II; stage three). The expert committee created a loose framework for the items to be added. These items were then further developed over the following two weeks and resubmitted to the expert committee for consensus. Consensus on these remaining items was confirmed and sixty content valid items were finalized. Final BANKS content validity was established with the consensus achieved through the face-to-face validators meeting.

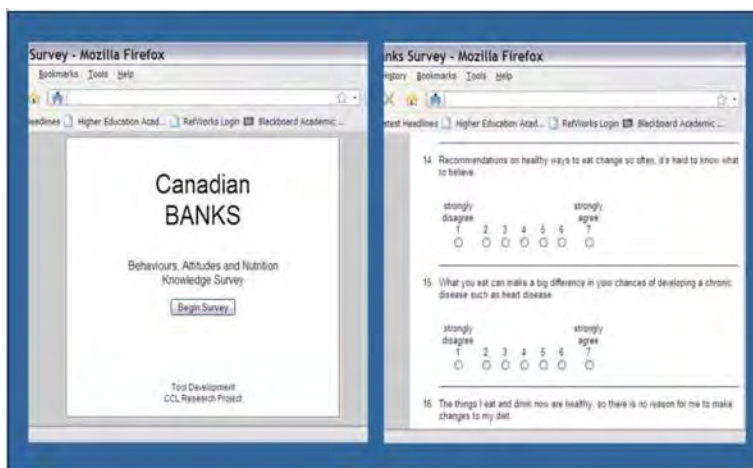
**Figure 2**

| C-BANKS National Feedback Summary Table  |   |            |           |                  |                  |                   |   | Reviewer Comments   |  |
|--|---|------------|-----------|------------------|------------------|-------------------|---|---|--|
|  | Respondents rated as essential or important | Ebel Score |           |                  | Not Yet Answered | Total Respondents | Validator #1  | Validator #2  |  |
|  |   | Essential  | Important | Not as Important |                  |                   |   |   |  |
| 1. How many servings from the following Canada's Food Guide groups should a person of your age and sex eat each day for good health? | 100%  | 67%        | 11%       | 0%               | 22%              | 100%              |   |   |  |
| Responses  | 7   | 6          | 1         | 0                | 2                | 9                 |   |   |  |
|  | 6   | 1          | 5         | 2                | 1                | 9                 |   |   |  |
| 11. One cup of juice constitutes how many servings from the vegetable and fruit group?   | 88%   | 67%        | 11%       | 11%              | 11%              | 100%              | You might want to consider using mLs. That is, how many servings are in 250 mL (1 cup)                        | For me, no one question is absolutely essential but these questions are very good.                                      |  |
|  | 7   | 6          | 1         | 1                | 1                | 9                 |   |   |  |
| 12. Identify which of the following foods represents a plant based "meat alternative" from the Meat & Alternatives Group?            | 100%  | 56%        | 33%       | 0%               | 11%              | 100%              |   | change "beans" to "beans/legumes/lentils"; most students think of beans as "green beans" and identify it as a vegetable |  |
|  | 8   | 5          | 3         | 0                | 1                | 9                 |   |   |  |
| 13. A regular store bought bagel constitutes how many servings from the Grain Products Group?  | 88%   | 44%        | 33%       | 11%              | 11%              | 100%              | change beginning of Q to "A store-bought regular-sized bagel. " emphasizes the idea of a regular-sized bagel. |   |  |
|  | 7   | 4          | 3         | 1                | 1                | 9                 |   |   |  |
| 14. Canadians are encouraged to eat a minimum of how many Food Guide servings of fish per week?                                      | 100%  | 56%        | 33%       | 0%               | 11%              | 100%              |   |   |  |
|  | 8   | 5          | 3         | 0                | 1                | 9                 |   |   |  |

### Psychometric Property: Reliability – Internal consistency

Sixty questions, comprising 70 items, were included in the final survey. These 70 items represented: one composite knowledge score (37 items represented as a single percentage score), 39 behaviour items and 30 attitude items. These scores included the use of a 7-point scaling response with the anchors “not confident – confident” or “strongly agree – strongly disagree” employed for the attitude construct and “rarely – always” for the behaviour construct (see appendix). A computer program was created to deliver the final survey online and the data collected onto a secure database (**figure 3**). Students were tested at course completion in an attempt to standardize exposure to nutrition knowledge.

**Figure 3**



### 5.3 Statistical Analysis

Data for reliability testing were entered into SPSS version 14.0 (SPSS inc., Chicago, IL). Scale reliability analysis (Cronbach  $\alpha$ ) was completed on the Canadian BANKS. The Cronbach  $\alpha$  was used as a measure of internal consistency for the assessment survey tool.

## 5.4 Ethical Considerations

This study received approval from the Human Research Ethics Board of Mount Royal, Calgary, Alberta, Canada. Informed consent was obtained from all participants prior to the start of the study.

# RESULTS

### 6.1 Psychometric Property: Validity – Content Validity

The initial 55 item survey was developed using the Diet and Health Knowledge Survey as the base for Canadian conversion [Table 1]. After consultation with local experts 5 items were removed for lack of Canadian context or item importance and an additional 23 items added due to perceived gaps in key constructs measured. This resulted in a survey of 73 items proposed to measure behaviour, attitude or nutrition knowledge constructs [listed in table 2] which were subsequently sent out to the national expert committee.

**Table 1**

Evolution of C-BANK survey question inclusion or exclusion as a result of local and national expert review

| Item (frequency) |               |                        |       |             |
|------------------|---------------|------------------------|-------|-------------|
|                  | Initial items | Removed or amalgamated | Added | Final items |
| <b>Phase I</b>   | 55            | 5                      | 23    | 73          |
| <b>Phase II</b>  |               |                        |       |             |
| <b>Stage 2</b>   | 73            | 33                     | 3     | 44          |
| <b>Stage 3</b>   | 44            | 1                      | 17    | 60          |

In phase II, only 5 of the 73 items reviewed achieved 80% consensus through digital reply communication. The remaining 68 items were discussed further upon meeting face-to-face. Generally, a heavy focus on a single nutrient or repetitive items were identified as the key motivators for removing 27 items or the amalgamation of an item which might enhance subject response (6 items). The expert committee expanded the questions on the Canadian BANKS to address broader nutrition concepts relative to those originally found in the DHKS.

Seventeen items were identified as important or missing (constructs surrounding physical activity, water needs and nutrition information sources) and conceptually constructed during the meeting. These items were further developed, sent out for evaluation and ultimately added to the final survey. By the last stage of development, 65% of the original DHKS questions had been deleted or changed.

| <b>Table 2</b>  |                    |                  |                         |                |               |
|---|--------------------|------------------|-------------------------|----------------|---------------|
| <b>Consensus from initial grading of the survey to the final C-BANKS survey</b> |                    |                  |                         |                |               |
| <b>Clustered Constructs</b>   | <b>% Consensus</b> |                  |                         |                |               |
|   | <b>Stage 2</b>     |                  |                         | <b>Stage 3</b> |               |
|   | <b>Essential</b>   | <b>Important</b> | <b>Not as Important</b> | <b>Accept</b>  | <b>Remove</b> |
| <b>Knowledge of food guide</b>  | 32                 | 44               | 24                      | 99             | 1             |
| <b>Attitude towards healthy eating statements</b>                               | 54                 | 30               | 17                      | 100            | 0             |
| <b>Food choice behaviour indicators</b>   | 47                 | 52               | 1                       | 100            | 0             |
| <b>Knowledge of nutrition &amp; health interrelationships</b>                   | 54                 | 30               | 16                      | 100            | 0             |
| <b>General nutrition knowledge</b>  | 38                 | 46               | 17                      | 86             | 14            |
| <b>Nutrient adequacy awareness</b>  | 22                 | 56               | 22                      | 95             | 5             |
| <b>Food label knowledge</b>   | 58                 | 22               | 20                      | 100            | 0             |
| <b>Food label usage</b>   | 44                 | 56               | 0                       | 100            | 0             |
| <b>Food purchase behaviour decision</b>   | 67                 | 0                | 33                      | 100            | 0             |
| <b>Food label confidence indicator</b>  | 56                 | 33               | 11                      | 100            | 0             |
| <b>Physical activity knowledge</b>  | n/a*               | n/a*             | n/a*                    | 95             | 5             |
| <b>Nutrition information sources</b>  | n/a*               | n/a*             | n/a*                    | 100            | 0             |
| <b>Water intake knowledge</b>   | n/a*               | n/a*             | n/a*                    | 100            | 0             |

## 6.2 Psychometric Property: Reliability – Internal consistency

Two hundred and fifty nine subjects agreed to participate in the study. A total of two hundred and nine valid completed surveys were collected and used to test the internal consistency of the Canadian BANKS. The overall Canadian- BANKS Cronbach  $\alpha$  reliability coefficient was 0.75.

**Table 3**

Demographic characteristics of student participants

| Characteristic   | Participants |             |
|------------------|--------------|-------------|
|                  | Mean, SD     | Range       |
| Age              | 21.25 ± 4.5  | 18 - 40     |
| Body mass index  | 22.75 ± 3.8  | 16.3 - 44.1 |
| Body weight (kg) | 64.1 ± 13.0  | 41 - 132    |
| Body height (cm) | 167.4 ± 8.6  | 145 - 191   |
|                  | <i>n</i>     | %           |
| Female           | 180          | 86.1        |
| Male             | 29           | 13.9        |
| Current smoker   | 6            | 3           |
| Vegetarians      | 12           | 6           |

# Discussion

The purpose of this study was to establish initial validity and reliability in the early stages of tool development for the assessment of nutrition related behaviours, attitudes and nutrition knowledge in the Canadian population. This goal was accomplished by employing a unique use of the modified Ebel procedure (Ebel, 1979; Butterwick et al., 2006; Lafave et al., 2008) traditionally employed in high stakes practical examinations (Violato, Marini, & Lee, 2003). In the context of the Canadian college age student environment, content validation for the Canadian BANKS was achieved.

Content validation of a survey is often overlooked or skipped during the development stage of assessment tools (Wardle, Parmenter, & Waller, 2000a). The expectation that face validity with adequate reliability provides a valid tool or test is a common error seen in the literature (Lafave et al., 2008). It is possible that an instrument may possess adequate indices of various forms of validity and simultaneously unsatisfactory content validity (Haynes, Richard & Kubany, 1995). In these circumstances, inferences made from resultant scores obtained from such an assessment instrument would be suspect. Indeed it is the “*content validation process that ensures that the mathematics test reflects the domain of interest*” (Lissitz & Samuelson, 2007, p.440). It has been recommended that a rigorous staged approach to evaluating content validity is fundamental to the validation of all instrumentation (Lynn, 1986).

Lynn (1986) recommends a structured two stage approach to evaluating content validity where Stage I involves the development of items for the assessment instrument. Stage II refers to the judgment-quantification stage where judge/experts assert whether or not the items are content valid and finally whether the entire instrument is valid based on a predetermined threshold. The number of experts required in this stage is somewhat variable but Lynn (1986) indicates that a minimum of five and a maximum of ten experts provide a suitable guideline. In this 4 scale evaluation (where 1 indicates an item is irrelevant and 4 is very relevant) items “*that do not achieve the required minimum agreement of the experts should be eliminated or further revised*” (p.384). Consensus, defined by the minimum agreement value, is dependent on the number of experts participating. The use of ten experts requires an endorsement proportion of 0.78 or 78% to establish content validity beyond the .05 level of significance. Expert identification of areas that have been omitted would necessitate the development of new items to cover these missing constructs.

Haynes, Richard & Kubany (1995) clearly outline a thirteen step procedure and sequence for establishing content validation. In step 10 the use of multiple judge/experts using a formalized scaling procedure is recommended which is similar to the modified Ebel method (Butterwick et al., 2006) used in the present study. Experts should provide feedback on the dimensions of relevance, representativeness, specificity and clarity. Nunnally & Bernstein (1994) indicate that descriptive statistics can provide an outline towards establishing content validity. Similar to Lynn (1986), experts can provide qualitative feedback to both identify areas that are ambiguous requiring refinement/rewording as well as areas that have been omitted requiring item additions.

The Ebel method (Ebel, 1979) has traditionally been used in high stakes examinations. In the present study a modified Ebel procedure (Butterwick et al., 2006) was used to provide a structured staged approach to evaluating content validity and provides a key foundational step towards in the journey towards establishing the psychometric soundness of the Canadian BANKS survey tool.

A review of nutrition questionnaires (Parmenter & Wardle, 1999; Wegener, 2007) indicate there is a lack of psychometric validation among nutrition assessment tools or in some instances, these tools evaluate a very narrow set of constructs within the realm of nutrition knowledge. These errors limit the explanatory potential of nutrition knowledge assessment tools regarding food choice behaviour (Sapp & Jensen, 1997). A lack of psychometric understanding or a lack of value in the property might contribute to the use of untested assessment tools. However, confidence in the results obtained from utilizing a tool hinges on the appropriate validation achieved and thus reduces the power of the resultant findings.

The base of the initial survey was the DHKS which has been validated in a variety of publications in the United States (Obayashi et al., 2003). It might be assumed, given that the validity of the tool has been established in the U.S. population, it could simply be adapted to the Canadian context. However, validity is context specific (Messick, 1998) and possibly due to differences between the two countries in culture, nationality or law, the validity of the survey was not transferable in its original form. Content validity is believed to be conditional to the targeted population (Nunnally & Bernstein, 1994). A change in constructs from the DHKS to the Canadian BANKS is logical when considering the change in geographical location. Much of the item exclusion and item regrouping of content during the expert validator process was due to the change in context from the American to Canadian population.

The next important property in tool development relates to the reliability of the tool. How reliable or repeatable are the results? The results of this investigation demonstrate adequate tool reliability for the Canadian BANKS (0.75) as determined by Cronbach's coefficient  $\alpha$  analysis. Nunnally & Bernstein (1994) recommend that in the early stages of research a reliability of 0.70 or better is appropriate. Streiner (2003) suggests that an  $\alpha$  over 0.90 "most likely indicates unnecessary redundancy rather than a desirable level of internal consistency" (p. 103).

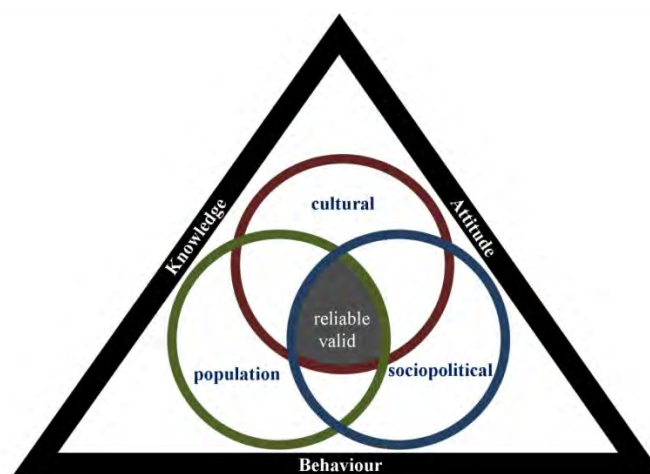
Ultimately it is the food behaviour choices made by individuals that impact overall health. These behaviours occur in complex interplay of influences and are mediated by a multitude of factors. The use of a social-cognitive framework is helpful in providing context to nutrition knowledge and additional factors influencing food choice behaviours.

Knowledge of healthy food choices is a key underpinning to directing healthy food behaviours (Donato, 2006). While a change in knowledge does not necessarily lead to behaviour change, it is a critical first step in the behaviour change process. It has been suggested that nutrition knowledge provides only a minimal explanation in behaviour change (Axelson, Federline, & Brinberg, 1985; Shepherd & Stockley, 1987). However, emerging research utilizing accurate assessment techniques suggest that knowledge is an important factor in explaining variations in food choice (Colavito et al., 1996; De Vriendt et al., 2009; Kolodinsky, Harvey-Berino, Berlin, Johnson, & Reynolds, 2007; Sharma et al., 2008; Wardle, Parmenter, & Waller, 2000a; Wolf et al., 2008). While knowledge plays a role, it is clear that knowledge is a component of a larger context which ultimately drives food choice behaviours.

The Theory of Reasoned Action suggests that attitudes strongly influence behaviours. The modulators of attitude are beliefs as evaluated by the individual. Shepherd & Towler (1992) found both taste and health benefit beliefs to be key determinants of food choice attitude. Patterson, Kristal, and White (1996) found that a belief in the connection between dietary choice and cancer development in conjunction with knowledge of dietary recommendations preceded healthful dietary behaviour change. However, simple identification of food composition did not provide a factor in predicting positive health changes. These findings indicate that the level of nutrition knowledge (superficial versus deep) might be a useful discrimination point in understanding the determinants of food choice behaviour.

Nutrition knowledge, attitudes and food choice behaviours are all greatly influenced by environmental factors. Cultural norms exert a tremendous impact on food choice due potentially to rules of cuisine, religious practices or historical patterns (Mela, 1999). Sociopolitical factors may also impact choice. The perceived social acceptability of a food choice was found to be a significant modulator of an individual's food choice decision (Sapp & Harrod, 1989). Several studies have found individuals in lower socio-economic status groups to be correlated with a consumption of diets poor micronutrient density (Giskes K., Turrell G., Patterson C., & Newman, 2002). Daily fruit and vegetable consumption was more common in households with higher education and higher household incomes (Estaquio et al., 2008). Population is also a modulator regarding attitudes and food choice. Population characteristics correlated with trying to eat a healthier diet include female gender and increasing age (Ha & Caine-Bish, 2009; Kearney, Kearney, Dunne, & Gibney, 2000) in comparison to males and youth, respectively. The impact and interrelationship of all these factors provided the underpinnings for the formulation of a theoretical model supporting the development of the Canadian BANKS (**figure 4**).

Although initial validity and reliability have been established, further tool refinement is critical. Construct validity can only take place over time and over the course of a number of experiments/studies (Streiner & Norman, 2003). Future research will include more data collection to facilitate construct validation through a factor analysis. This is the first step in many future studies that will evaluate the validity and reliability of this tool in the Canadian context.



**Figure 4:** Constructs underpinning the development of the Canadian BANKS

# **Limitations & Conclusion**

## Limitations

The selection of validators was based on professional curriculum vitae information posted online and literature publication in the area of nutrition education. Although validators were selected from across Canada, this process of selection may be considered a limitation. A convenience sample rather than a random sample was used. As a result, the study population may not represent traditional college students. Students were enrolled in a required nutrition class restricted to nursing or physical education students. This population may have a stronger belief in healthful behaviour indicative of their career choice patterns. In addition, the ratio of female to male students was not representative of the institutions general enrolment proportions indicating an oversampling of female students. Finally, the recruitment of 259 students for the analysis of internal consistency was too low to run factor analysis.

## Conclusion

This study encompassed the development of a questionnaire for use in determining nutrition knowledge, attitudes and dietary behaviour practices of Canadians. The final questionnaire has face and content validity and a satisfactory Cronbach's  $\alpha$  value. Tool development is an iterative process (Violato, Marini, & McDougall, 1998) and the results of the current study will permit the research team to move forward on further validation and tool testing. Future investigations will focus on tool refinement and item reduction. In order to establish construct validation of the Canadian BANKS, further data collection will be required to perform factor analysis.

Nutrition experts from the Dietitians of Canada and the Public Health Agency of Canada have identified the need for nutrition knowledge and behaviour instruments to measure the impact of nutrition related education programming and policy outcomes (Wegener, 2007). This tool will help fill this gap by providing assessment regarding nutrition education programs and help guide future policy decisions aimed at supporting healthy eating initiatives with evidence based feedback. Food choice behaviours are complex and multifaceted.

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# Appendices



7. How confident do you feel estimating serving sizes of the foods you eat?

|                       |                       |                       |                       |                       |                       |                       |                       |  |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|
| Not Confident         |                       |                       |                       |                       |                       |                       | Very Confident        |  |
| 1                     | 2                     | 3                     | 4                     | 5                     | 5                     | 6                     | 7                     |  |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |  |

8. Identify foods in this list which provide a good source of the following vitamins?

|             | Folate                | Vitamin B12           | Vitamin A / beta carotene | Vitamin D             |
|-------------|-----------------------|-----------------------|---------------------------|-----------------------|
| baked beans | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     | <input type="radio"/> |
| spinach     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     | <input type="radio"/> |
| fish        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     | <input type="radio"/> |
| broccoli    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     | <input type="radio"/> |
| oranges     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     | <input type="radio"/> |
| beef        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     | <input type="radio"/> |
| milk        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     | <input type="radio"/> |
| nuts        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     | <input type="radio"/> |

9. Identify foods in this list which provide a good source of the following minerals?

|             | Calcium               | Iron                  | Zinc                  |
|-------------|-----------------------|-----------------------|-----------------------|
| baked beans | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| spinach     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| broccoli    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| raisins     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| beef        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| milk        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| nuts        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**Read the following statements and indicate to what extent you agree or disagree with this statement.**

10. A healthy diet means choosing empty calorie foods less often.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| strongly<br>disagree  |                       |                       |                       |                       |                       |                       | strongly<br>agree     |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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11. Canada's Food Guide is a useful tool for planning my food choices.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| strongly<br>disagree  |                       |                       |                       |                       |                       |                       | strongly<br>agree     |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

12. A healthy body weight can be achieved through proper diet and exercise.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| strongly<br>disagree  |                       |                       |                       |                       |                       |                       | strongly<br>agree     |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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13. Eating food rich in carbohydrates (such as bread, potatoes and rice), makes people overweight.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| strongly<br>disagree  |                       |                       |                       |                       |                       |                       | strongly<br>agree     |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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14. Recommendations on healthy ways to eat change so often, it's hard to know what to believe.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| strongly<br>disagree  |                       |                       |                       |                       |                       |                       | strongly<br>agree     |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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15. What you eat can make a big difference in your chances of developing a chronic disease such as heart disease.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| strongly<br>disagree  |                       |                       |                       |                       |                       |                       | strongly<br>agree     |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

16. The things I eat and drink now are healthy, so there is no reason for me to make changes to my diet.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| strongly disagree     |                       |                       |                       |                       |                       |                       | strongly agree        |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

17. Do you think that your intake (from food and supplements) of the following is:

|               | Too low?<br>1         | Too high?<br>2        | About right?<br>3     | do not know<br>8      |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|
| carbohydrate  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| protein       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| total fat     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| saturated fat | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| cholesterol   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| vitamin C     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| vitamin D     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| calcium       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| iron          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| salt (sodium) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| fibre         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| sugar         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| alcohol       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**When making food choices, how often do you...**

18. Limit foods high in salt.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

19. Limit butter, hard margarine, lard and shortening.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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20. Choose a diet with plenty of fruits and vegetables.

|                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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21. Limit foods high in sugar.

|                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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22. Choose whole grain products (e.g. whole wheat bread).

|                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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23. Eat a variety of foods from each of the food groups daily.

|                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

24. Choose foods low in saturated fat.

|                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

25. Choose brightly colored (dark green and orange) vegetables each day.

|                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

26. Choose foods low in trans fat.

|                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

27. Select fish, lean meats and/or poultry.

|                       |                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Vegetarian            | Rarely                |                       |                       |                       |                       |                       |                       | Always                |
| X                     | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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28. Select plant-based alternatives to meat (e.g. tofu or nuts):

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

29. Consume source(s) of unsaturated fat each day (e.g. canola oil, olive oil, flax seed):

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

30. Eat fish two times per week.

|                       |                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Vegetarian            | Rarely                |                       |                       |                       |                       |                       |                       | Always                |
| X                     | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

31. Drink at least two cups milk or fortified soy beverage daily.

|                       |                       |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Rarely                |                       |                       |                       |                       |                       |                       | Always                |
| 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

---

**When answering the following questions, think about possible health problems related to the consumption of these nutrients**

32. Have you heard of any health problems related to eating too much fat?

yes

no

If yes, type in these health problems in the boxes below

N/A

Do you think you are at risk for any of these health problems (y/n)?

yes

no

---

33. Have you heard of any health problems related to eating too little fibre?

yes

no

If yes, type in these health problems in the boxes below

N/A

Do you think you are at risk for any of these health problems (y/n)?

yes

no

---

34. Have you heard of any health problems related to eating too much salt (sodium)?

yes

no

If yes, type in these health problems in the boxes below

N/A

Do you think you are at risk for any of these health problems (y/n)?

yes

no

---

35. Have you heard of any health problems related to consuming too little calcium?

yes

no

If yes, type in these health problems in the boxes below

N/A



Do you think you are at risk for any of these health problems (y/n)?

yes

no

---

36. Have you heard of any health problems related to consuming too little vitamin D?

yes

no

If yes, type in these health problems in the boxes below

N/A



Do you think you are at risk for any of these health problems (y/n)?

yes

no

---

37. Have you heard of any health problems related to consuming too much Trans fat?

yes

no

If yes, type in these health problems in the boxes below

N/A



Do you think you are at risk for any of these health problems (y/n)?

yes

no

---

38. Have you heard of any health problems related to eating too much sugar?

yes

no

If yes, type in these health problems in the boxes below

N/A

Do you think you are at risk for any of these health problems (y/n)?

yes

no

---

39. Which of the following contains **more saturated fat** based on equal portion sizes?

- butter
- soft margarine
- canola oil
- do not know

---

40. Which of the following contains **more saturated fat** based on equal portion sizes?

- skim milk
- whole milk
- soy beverage
- do not know

---

41. Cholesterol is found in \_\_\_\_\_. (Select all that apply).

- olive oil
- almonds
- steak
- 2% Milk
- tuna
- avocado
- do not know

42. Compared to a regular product, a product with the word "light" on the label may be? (check all that apply)

- lower in calories
- lower in fat
- lighter in texture
- lighter in flavour
- lighter in colour
- do not know

43. Which of the following contains more fibre based on equal portion size

- lentils
- corn flakes
- orange juice
- do not know

44. Please rate the importance of the following on your decision to purchase a food item.

|                     | Not Important         |                       |                       |                       |                       |                       | Very Important        |                       |
|---------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                     | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |                       |
| food safety:        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| nutritional value:  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| price:              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| best before date:   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| convenience         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| occasion            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| culture             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| health              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| organic             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ethics              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| locally produced    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| habit               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| ease of preparation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| taste               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

45. When purchasing foods, identify the extent to which you use the following to help you make a decision.

|   | Very Confident        |                       |                       | Not Confident         |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| the ingredient list   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| the Nutrition Facts table   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| nutrient content claims (such as "low fat" or "good source of fibre")   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| health claims (statements on the food label that describe health benefits of the food or nutrients in the food) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| the serving size  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

46. When reading information on the Nutrition Facts table do you look for information about:

|               | Very Confident        |                       |                       | Not Confident         |                       |                       |                       |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|               | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| calories      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| sodium        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| fat           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| saturated fat | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| trans fat     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| vitamin A     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| vitamin C     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| iron          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| fibre         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| sugars        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

47. Do you use the Nutrition Facts table to make decisions to purchase:

|  | Don't<br>buy<br>X     | Never<br>1            | 2                     | 3                     | 4                     | 5                     | 6                     | Often<br>(always)<br>7 |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| dessert items like cookies or cake mixes?                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  |
| frozen/prepared dinners or main dishes?                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  |
| breakfast cereals?                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  |
| cheese?  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  |
| butter or margarine?                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  |
| processed meat products like hot dogs or luncheon meats? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  |
| snack items like chips or pretzels?                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  |
| canned foods   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  |
| beverages?   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>  |

**When answering the following questions think about your confidence in interpreting or understanding information presented on the food label which includes the nutrition facts table, ingredient list and the nutrition content claims found on packaged foods.**

48. When reading the food label, how confident are you interpreting the:

|  | Very<br>Confident<br>1 | 2                     | 3                     | 4                     | 5                     | 6                     | Not<br>Confident<br>7 |
|--|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| the ingredient list  | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| nutrient claims such as "low fat" or "good source of fibre"      | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| calories per serving?  | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| the number of grams or milligrams of a nutrient (such as sodium) | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| % Daily Value  | <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

49. In order to create a healthy diet, indicate the importance of eating at the following meals:

|           | Not Important         |                       |                       | Very Important        |                       |                       |                       |
|-----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|           | 1                     | 2                     | 3                     | 4                     | 5                     | 6                     | 7                     |
| breakfast | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| lunch     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| dinner    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| snacks    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

50. According to Canada's Food Guide recommendations, how many moderate physical activity minutes should be accumulated per day to maintain good health for a person of your age?

minutes

---

51. Would you say that your actual physical activity is greater than, less than, or the same as the recommended number of physical activity minutes for a person of your age?

- greater than
  - less than
  - similar
- 

52. Which of the macronutrients should supply the largest portion of your energy (calorie) intake?

- protein
  - carbohydrates
  - fats
- 

53. How many calories should a person of your age, activity level, height and weight consume per day?

calories

---

54. Would you say your usual energy (calorie) intake is higher, lower or similar to your daily energy (calorie) needs?

- greater than
  - less than
  - similar
-

55. What resources do you usually use to update your nutrition knowledge? (Place a check mark in all boxes that apply).

- internet sites
- government materials
- health associations (Cancer / Diabetes /Heart)
- popular health magazines
- newspaper articles
- books
- nutrition textbooks
- research journals
- radio and /or television programs
- family physicians
- nurses
- registered dietitian or public health nutritionist
- other nutritionist
- fitness trainers
- family and /or friends
- Other health professionals
- Other (please specify)

N/A

---

56. Which of the following resources would you identify as being reliable sources of nutrition information? (Place a check mark in all boxes that apply).

- internet sites
- government materials
- health associations (Cancer / Diabetes /Heart)
- popular health magazines
- newspaper articles
- books
- nutrition textbooks
- research journals
- radio and /or television programs
- family physicians
- nurses
- registered dietitian or public health nutritionist
- other nutritionist
- fitness trainers
- family and /or friends
- Other health professionals
- Other (please specify)

N/A

**The following questions relate to water knowledge.**

57. Generally, how much water should you consume each day? Provide your response in answer box below (you may submit your answer in either cups or litres).

cups

litres

---

58. This water intake should come from

- plain water
  - foods
  - beverages
  - a combination of all of the above
- 

59. Are you aware of any health problems related to an insufficient intake of water?

yes

no

If yes, type in these health problems in the boxes below

Do you think you are at risk for any of these health problems (y/n)?

yes

no

60. Which, if any, of the following supplements do you take on a weekly basis?

- multi-vitamin
- single vitamins or minerals
- herbal or dietary supplements
- do not take any supplements

**Let us get to know you.**

Name:

Age:

Sex:  Male  
 Female  
 Female - pregnant  
 Female - lactating

Height:  Feet - Inches  
 Centimeters

Weight:  Pounds  
 Kilograms

Self-reported activity level:  
[How active am I?](#)  sedentary  
 low active  
 active  
 very active

Special considerations:  vegetarian  
 smoker