

# Developing a Questionnaire to Evaluate College Students' Knowledge, Attitude, Behavior, Self-efficacy, and Environmental Factors Related to Canned Foods

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## ABSTRACT

**Objective:** Develop a questionnaire to measure students' knowledge, attitude, behavior, self-efficacy, and environmental factors related to the use of canned foods.

**Methods:** The Knowledge–Attitude–Behavior Model, Social Cognitive Theory, and Canned Foods Alliance survey were used as frameworks for questionnaire development. Cognitive interviews were conducted with college students (n = 8). Nutrition and survey experts assessed content validity. Reliability was measured via Cronbach  $\alpha$  and 2 rounds (1, n = 81; 2, n = 65) of test-retest statistics. Means and frequencies were used.

**Results:** The 65-item questionnaire had a test-retest reliability of .69. Cronbach  $\alpha$  scores were .87 for knowledge (9 items), .86 for attitude (30 items), .80 for self-efficacy (12 items), .68 for canned foods use (8 items), and .30 for environment (6 items).

**Conclusions and Implications:** A reliable questionnaire was developed to measure perceptions and use of canned foods. Nutrition educators may find this questionnaire useful to evaluate pretest–posttest changes from canned foods–based interventions among college students.

**Key Words:** college students, canned foods, nutrition survey, Knowledge–Attitude–Behavior Model, Social Cognitive Theory (*J Nutr Educ Behav.* 2016; ■:1–8.)

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## INTRODUCTION

Canned foods have many advantages for consumers, including a long shelf life without refrigeration, minimal storage space requirements, year-round variety, convenience for use in recipes,<sup>1</sup> and favorable cost and nutrition compared with fresh and frozen forms.<sup>2–4</sup> The Dietary Guidelines for Americans 2015–2020 (DGA) states, “All forms of foods, including fresh, canned, dried, and frozen, can be included in healthy eating patterns.”<sup>5</sup> However, consumers have some misconceptions about canned foods and 42% of consumers surveyed in 2013 did not know that canned foods contribute to healthy eating patterns.<sup>6</sup>

A recent study suggested that adults and children who consume canned produce have better diet quality, higher nutrient intakes, and higher fruit and vegetable consumption, which help them come closer to meeting the DGA.<sup>7</sup> Few young adults, including college students, consume optimal diets consistent with the DGA.<sup>8–10</sup> Involvement in home food preparation for this age group was linked with better diet quality.<sup>10–12</sup> Barriers to home cooking for this demographic group include a lack of time in busy schedules to shop, cook, and clean up,<sup>11,13–15</sup> limited cooking skills,<sup>11,14–16</sup> and low confidence in preparing foods.<sup>14–16</sup> Cost is another barrier,<sup>11,13–15</sup> as are limited kitchen equipment and the belief that food will spoil before it can be eaten.<sup>15</sup> In addition, it is possible that an apartment shared by students may have inadequate food storage space in the refrigerator, freezer, or cupboards. Using canned foods may help students address barriers to home cooking by saving time, providing convenient ingredients for easy preparation, reducing costs, and requiring no refrigerated storage.

Researchers have recommended designing interventions to help improve college students' cooking skills.<sup>11,14–17</sup> A previous intervention study showed that college students who tasted recipes

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made with canned foods and prepared by others had significant positive changes in perceptions and use of canned foods.<sup>18</sup> To the authors' knowledge no other interventions with canned foods in college students have been reported. To reduce college students' barriers to home cooking, the authors developed an intervention to promote students' use of canned foods in recipes through a class assignment for an introductory nutrition course. To evaluate the intervention, the authors designed a questionnaire to measure students' knowledge, attitude, behavior, self-efficacy, and environmental factors related to the use of canned foods. The purpose of this article was to describe the development of the questionnaire.

## METHODS

### Questionnaire Development

The Perceptions and Use of Canned Foods (PUCF) online questionnaire (Qualtrics, Provo, UT) was developed by initially reviewing information from the Canned Food Alliance consumer survey<sup>19</sup> and Web site educational materials,<sup>20</sup> evaluating previous canned foods research with a college student population,<sup>18</sup> and considering misconceptions expressed by students in the authors' introductory nutrition courses, which had a diverse enrollment (92% were not nutrition majors). Using the Knowledge–Attitude–Behavior (KAB) Model and Social Cognitive Theory (SCT) as the theoretical framework,<sup>21,22</sup> the PUCF aimed to assess college students' knowledge, attitudes, and behavior about canned foods generally or about specific canned foods (legumes, meat, vegetables, and fruit), food storage space, cooking habits, and students' confidence (self-efficacy) in using canned foods in recipes (Table 1). The KAB Model suggests that knowledge about a topic leads to changes in a person's attitudes and, ultimately, behavior.<sup>21</sup> The SCT denotes a triadic relationship between a person's internal belief system, the external environment, and behavior.<sup>22</sup> Demographic questions applicable to college students and debriefing questions<sup>23</sup> including students' perceptions about the length of the questionnaire and level of ease or difficulty in completing the questionnaire were included. The Brigham Young University's Institutional

Review Board for Human Subjects approved this research.

Definitions of specific terms were provided on the questionnaire immediately preceding statements using the terms. Canned foods referred to foods that were shelf stable after being processed in metal cans, bottles, or plastic containers. Legumes were defined as including beans such as black, kidney, pinto, etc, but not green beans or green peas. Furthermore, dry legumes were defined as beans that must be soaked in water for a few hours to soften and then cook, whereas canned legumes were defined as beans that were already softened and cooked, packaged in cans, and ready to use. Canned meats were defined as meats such as chicken, tuna, salmon, Vienna sausages, and Spam. Canned vegetables and fruit were given no additional explanation.

Items in the knowledge construct (9 items) included verifiable statements of fact. Items about attitude (30 items) addressed students' opinions about canned foods, students' use of canned foods in preparing meals, and how much students liked or disliked each category of canned foods. Self-efficacy (12 items), a person's confidence in carrying out a behavior,<sup>22</sup> addressed students' self-reported ability to prepare meals or parts of meals and confidence in using canned vegetables, fruit, legumes, and meat in recipes. Students' canned foods use (8 items) were questions adapted from the National Cancer Institute's validated Diet History Questionnaire–II (DHQ II).<sup>24</sup> Specifically, the question stem, Over the past month, how often did you eat [food]? was modified in the questionnaire to the past 7 days (1-week) time frame and each canned food category replaced the DHQ II's selected food. Response options for frequency of consumption also modeled the DHQ II; the month time frame was replaced with in the past 7 days (Table 1). For the amount of canned foods consumed by participants in the current study, response options on the DHQ II were selected. For canned fruit, the amount listed for applesauce on the DHQ II was used (<0.5 cup; 0.5–1 cup; >1 cup). For canned vegetables, the amount listed for green beans was used (<0.5 cup; 0.5–1 cup; >1 cup). For canned legumes, the amount for

cooked dried beans was used (<0.5 cup; 0.5–1 cup; >1 cup). For canned meats, the amount for canned tuna was used (<0.25 cup or <2 oz; 0.25–0.5 cup or 2–3 oz; >0.5 cup or >3 oz). Environment (6 items), external factors that provide opportunities or social support for the behavior,<sup>22</sup> was measured with items about household access to space in cupboards, refrigerators, or freezers to store food, the person(s) responsible for preparing main meals each day, and canned food use in students' households as children.

The knowledge, self-efficacy, attitude (for 22 of 28 items), and environment (1 of 6 items) constructs were formatted as 5-point Likert scales from strongly disagree to strongly agree, with a neutral midpoint of neither agree nor disagree and an I don't know option (Table 1). Response options for the remaining attitude and environment items varied and are presented in Table 1. Response options for level of ease or difficulty in completing the questionnaire were very easy, easy, somewhat easy, neutral, somewhat difficult, difficult, and very difficult. For opinions on the length of time for taking the questionnaire, response options were extremely too long, too long, just about right, too short, and much too short.

### Cognitive Interviews

Cognitive interviews were conducted with 8 undergraduate students from a variety of colleges across campus (life sciences,  $n = 5$ ; business,  $n = 1$ ; physical and mathematical sciences,  $n = 1$ ; and undecided major,  $n = 1$ ) to determine overall clarity and understandability of all questionnaire items (Figure). Cognitive interviews are an in-depth evaluation method in which a trained interviewer asks subjects to think out loud for each question, meaning the subject will be asked to talk out loud about overall reactions to the question, including what the question is asking, what the subject thought of when answering the question, and the overall clarity of the question.<sup>23</sup> Students received a \$10 university campus gift card for study participation.

### Content Validity

The questionnaire was sent to 4 nutrition and survey research experts outside

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