

## University Students' Eating Behaviors: Implications for the Social Cognitive Theory

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### Abstract

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While particular constructs of the Social-Cognitive Theory (SCT) have gained attention in eating behavior research, more investigation about the utility of the framework as it applies to specific population groups is needed. The objective of this study was to determine the utility of a SCT conceptual model to predict dietary outcomes in a sample of 188 university students in Atlantic Canada. Using partial least squares regression analyses, statistically significant relationships were determined among four social-cognitive constructs (situation, behavioral capabilities, self-efficacy and outcome expectancies) and between three constructs (situation, behavior capabilities and self-efficacy) and increased intakes of specific food groups and the foods to limit group. The conceptual models explained 48 to 68% of the variance in dietary outcomes and supported using a composite SCT model for developing comprehensive dietary interventions for university students by focusing on simultaneously enhancing self-efficacy for healthy eating, increasing access to healthy food, decreasing availability of foods to limit, and enhancing behavioral skills for preparing certain foods, specifically vegetables and fruits and grain products.

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**Keywords:** social cognitive theory; university students; eating behavior; nutrition

### 1. Introduction

Concern about the increase in nutrition-related health risks, with impacts on health care costs and productivity rates, has led governments and the public/private sectors to seek effective interventions to promote and support healthy eating behaviors. This study focused on a university student population, a group generally comprised of young adults at a critical stage of development for academic achievement and independent living, but challenged by a range of environmental and internal factors (Brunt & Rhee, 2008). Universities have a social responsibility to their students and their funder to promote and support healthy eating behaviors. Further, they are well positioned for this endeavor, particularly as university is considered a critical time in the formation of life long health behaviors (Brunt & Rhee, 2008).

Taking a theoretical framework approach to understand the influences on eating behaviors and their complex interrelationships particular to a population group is critical to developing such interventions (Langlois & Hallam, 2010).

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## 1.1 University Students

The eating behaviors of university and college students have been examined, with typical findings indicating low intakes of vegetables and fruit, and excessive intakes of high fat and sugary foods (Brunt & Rhee, 2008; Ha & Caine-Bish, 2009; Morse & Driskell, 2009). In the short term, these behaviors can lead to consequences such as weight gain and reduced immunity, which can decrease academic productivity and performance (Gibney, Lanham-New, Cassidy & Vorster, 2009; Burrows, Goldman, Pursey, & Lim, 2016). In the long term, unhealthy dietary behaviors can lead to increased risk for chronic diseases, such as cardiovascular disease, type 2 diabetes and metabolic syndrome, which are leading causes of death in the Western world (Roberts & Barnard, 2005).

## 1.2 Social Cognitive Theory

Theory-based interventions have been found to be, "more effective in altering risk factors than are atheoretical applications" (Langlois & Hallam, 2010). Several prominent theories are used to guide the development of nutrition education programs/interventions, helping planners to identify the most appropriate means for fostering change within the target audience (National Cancer Institute, 2012). The Social Cognitive Theory, developed by Albert Bandura, postulates that behavior is influenced by a dynamic interaction, known as reciprocal determinism, that occurs between the overall categories of behavioral, personal and environmental factors (Bandura, 1978 and 2004; Dewar, Lubans, Plotnikoff & Morgan, 2012). Beyond these three categories, no universally accepted "correct" list of social-cognitive sub-categories, or constructs, was found in extant literature. The most commonly occurring key constructs of the SCT include environmental/situational influences, behavioral capabilities, individual knowledge, expectations, goals or intentions, observational learning (modeling), self-management and reinforcements (Bandura, 2004; Dewar et al., 2012). Of these, situation, behavioral capabilities, intentions, self-efficacy and outcome expectancies were included in the current study.

Situation encompasses perceptions of physical, social and cultural environments. The premise is straightforward: an individual's choice of food will be contingent on the accessibility of food items available in the physical environment (Kubick, Lytle, Hannan, Perry & Story, 2003; Brug, 2008). Behavioral capability refers to an individual's skill; i.e. to perform a behavior, an individual must know how to do it. Intentions are the short and long-term goals for action. Self-efficacy, considered by Bandura (2004) to be the construct most pivotal to the SCT, refers to an individual's belief in their ability to successfully perform a behavior. Lastly is the construct of outcome expectancies, which refers to the value that an individual places on the expected outcomes of a behavior (Bandura, 2004).

## 1.3 Purpose

The purpose of this study was to determine the utility of a SCT conceptual model to predict the dietary outcomes for university students. While much research has investigated the eating behaviors of young adults/university students, a significant portion of which was guided by the SCT, to the authors' knowledge no previous study has assessed the effectiveness of social cognitive constructs in explaining/predicting the dietary behaviors of university students. That being said, Lubans et al. (2012), in a similar study, demonstrated the utility of SCT constructs in explaining dietary behavior of adolescent girls. Their proposed structural representation of the SCT was used as the basis for the proposed conceptual model in this current study. Further testing of the application of the concepts of the SCT with behaviors of diverse populations will contribute to the refinement and subsequent usefulness of this theory in guiding future interventions (National Cancer Institute, 2012).

## 2. Methods

### 2.1 Source of Data

Identification of the social-cognitive constructs and the dietary outcomes of university students was determined from the data collected in 2012 from a sample of 188 university students attending two Atlantic Canadian universities (Mann & Blotnick, 2017). A power analysis was conducted on this sample size, indicating that for a medium effect size of  $f^2=0.15$ , at the 0.05 alpha level, the power of the test was 0.999. This exceeded the norm of 0.80 and thus the sample size was acceptable. A tested and validated questionnaire was completed online, with students being invited by professors who were randomly selected (Mann & Blotnick, 2017). Included in the questionnaire was a three-day food frequency questionnaire (FFQ) based on a validated tool (Rockett, Wolf & Colditz, 1995; Thompson et al, 2004), and questions addressing eating behaviors, as guided by the determinants of healthy eating framework

(Raine, 2005). The main premise of this framework is that the determinants of healthy eating are the individual determinants of personal food choice and collective determinants such as the physical environment and supports for healthy eating (Raine, 2005). Key concepts of this framework overlap with those of the SCT, therefore, the use of data from the questionnaire guided by this framework was appropriate for use in this SCT-focused study.

## 2.2 Dietary Outcomes

The results of the three-day FFQ were converted to daily servings and analyzed using descriptive statistical analysis via SPSS software, including means and standard deviations (Mann & Blotnick, 2017). The term “dietary outcomes” was used to refer to the daily servings consumed by participants of each the current Canada’s Food Guide (CFG) food groups (vegetables and fruit; grain products, milk and alternatives; and meat and alternatives), along with the group termed foods to limit, which included items such as pizza, candy, cake and French fries (Health Canada, 2007).

## 2.3 Social-cognitive Constructs

Four social-cognitive construct scales were developed from responses to appropriate questionnaire items. The resulting social cognitive scales underwent confirmatory factor analysis to ensure unidimensionality (Hair, Anderson, Tatham & Black, 2006) and Cronbach’s alpha to measure scale reliability. The threshold for appropriate confirmatory factor loading was  $\geq 0.5$  and a threshold of 0.70 was used for Cronbach’s alpha (Hair et al., 2006). Any scale items below these thresholds were considered for deletion from the scale. For this reason, the scale item for intentions was incorporated into the self-efficacy construct.

## 2.4. Hypotheses and Conceptual Model

The hypotheses examining the associations between the social cognitive constructs and dietary outcomes were as follows: H1 Situation

- a) As students perceive their situation to be more conducive to eating a healthy diet, they will consume more servings of i) vegetables and fruit; ii) grain products; iii) milk and alternatives; iv) meat and alternatives; and v) fewer servings of foods to limit.
- b) As students perceive their situation to be more conducive to eating a healthy diet, their self-efficacy for eating a healthy diet will increase.
- c) As students perceive their situation to be more conducive to eating a healthy diet, their outcome expectancies for eating a healthy diet will increase.

### H2 Behavioral Capabilities

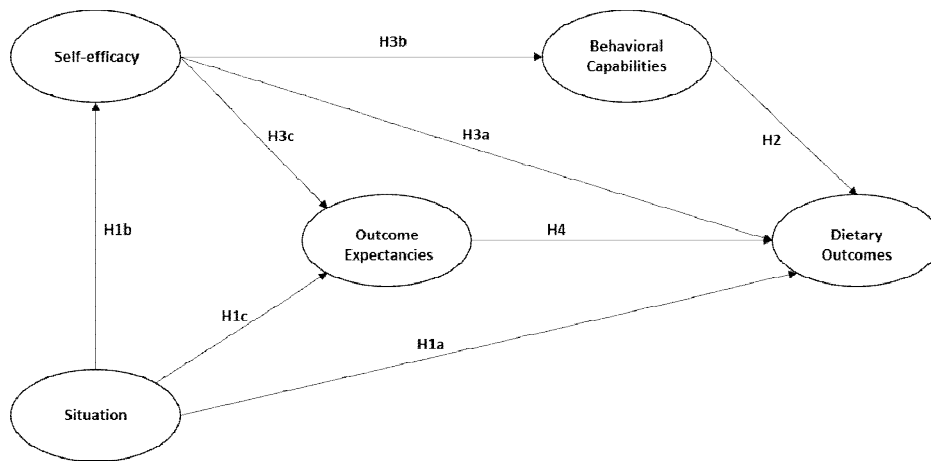
- a) As behavioral capabilities for eating a healthy diet increase, students will consume more servings of i) vegetables and fruit; ii) grain products; iii) milk and alternatives; iv) meat and alternatives; and v) fewer servings of foods to limit.

### H3 Self-efficacy

- a) As self-efficacy increases, students will consume more servings of i) vegetables and fruit; ii) grain products; iii) milk and alternatives; iv) meat and alternatives; and v) fewer servings of foods to limit.
- b) As self-efficacy increases, students’ behavioral capabilities for eating a healthy diet will increase.
- c) As self-efficacy increases, students’ outcome expectancies for eating a healthy diet will increase.

### H4 Outcome Expectancies

- a) As students’ outcome expectancies for eating a healthy diet increase, students will consume more servings of i) vegetables and fruit; ii) grain products; iii) milk and alternatives; iv) meat and alternatives; and v) fewer servings of foods to limit. The social cognitive constructs incorporating the hypotheses were applied to a conceptual model of the SCT Figure 1,



**Figure 1. SCT Conceptual Model 2.6 Analysis**

Partial Least Squares regression (PLS) was used to test the hypotheses in the conceptual model. PLS is a form of structural equation modelling that is suitable for testing models with reciprocal pathways and inter-correlated independent variables, such as those in the conceptual model (Hair et al, 2006). Also, PLS does not rely on large samples and multivariate normality. The 0.05 level of statistical significance or better was used to identify significant relationships within the model. This step was completed for each of the five dietary outcomes of interest.

**3. Results**

**3.1 Dietary Outcomes**

As summarized in Table 1, the mean number of daily servings consumed were below the CFG recommendations for this population group (males and females aged 19-50 years of age) for the first two food groups, slightly above for the milk and alternatives and slightly below for the meat and alternatives groups (Health Canada, 2007).

**Table1. Summary of Dietary Outcomes by Food Groups**

Food Group	Recommended Daily Servings (Health Canada, 2007)	Number of Responses	Mean (±SD)
Vegetables and Fruit	7 - 10	146	3.9 (±2.12)
Grains	6 - 7	155	2.4 (±1.58)
Milk and Milk Alternates	2	158	2.18 (±1.27)
Meat and Meat Alternates	2	158	1.56 (±1.16)
Foods to Limit	n/a	158	1.53 (±1.25)

**3.2 Social-cognitive Constructs**

The variables and statistical results of the social-cognitive constructs used in analysis for this study are summarized in Table 2.

**Insert Table 2 here (landscape).**

**3.4 Conceptual Model and Hypotheses**

The PLS analysis of the formative model resulted in R<sup>2</sup> values for any variables that flowed into other variables, with the flows themselves resulting in beta weights. Significance testing via bootstrap analysis subsequently provided t-values for the relationships (hypotheses labeled H1a to H4) within the model. The critical value for t at a significance level of p=0.05 was calculated to be 1.97, and at a significance level of p=0.01 was 2.60. When t-values exceeded either critical value, the hypotheses were said to be statistically significant. As seen in Figures 2 through 6, the resulting R<sup>2</sup> values for the five dietary outcomes of interest range from 0.48 to 0.68, indicating that the social-cognitive constructs flowing into these outcomes together explained 48% to 68% of variance in intake of the five food groups with the lowest for the vegetables and fruits group.

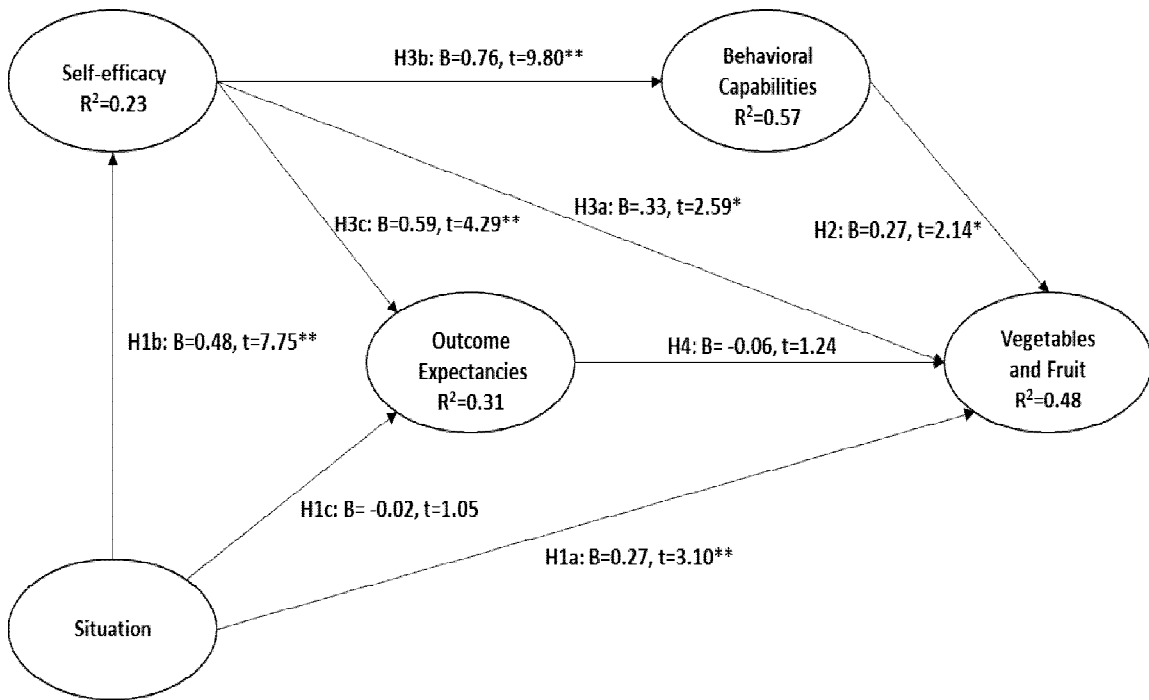


Figure 2. SCT Conceptual Model for Vegetables and Fruit

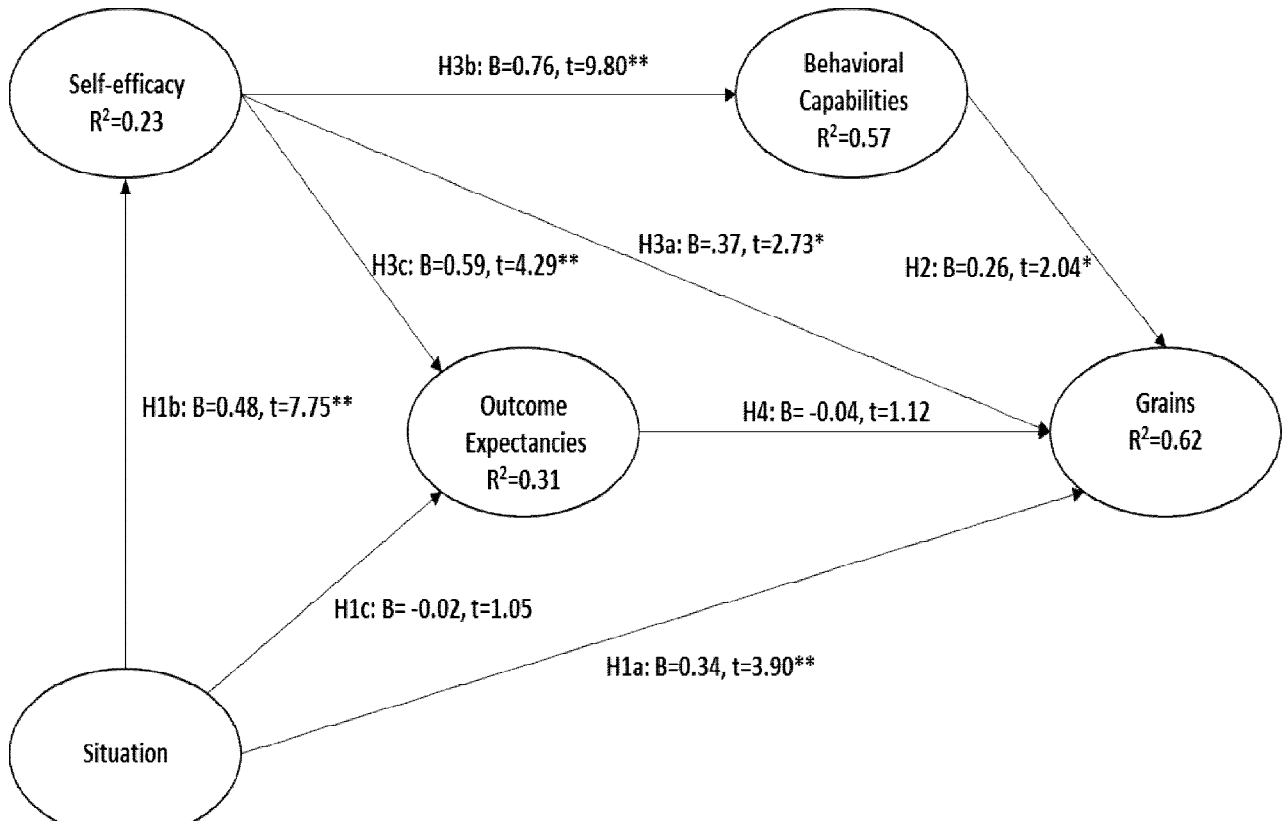


Figure 3. SCT Conceptual Model for Grains

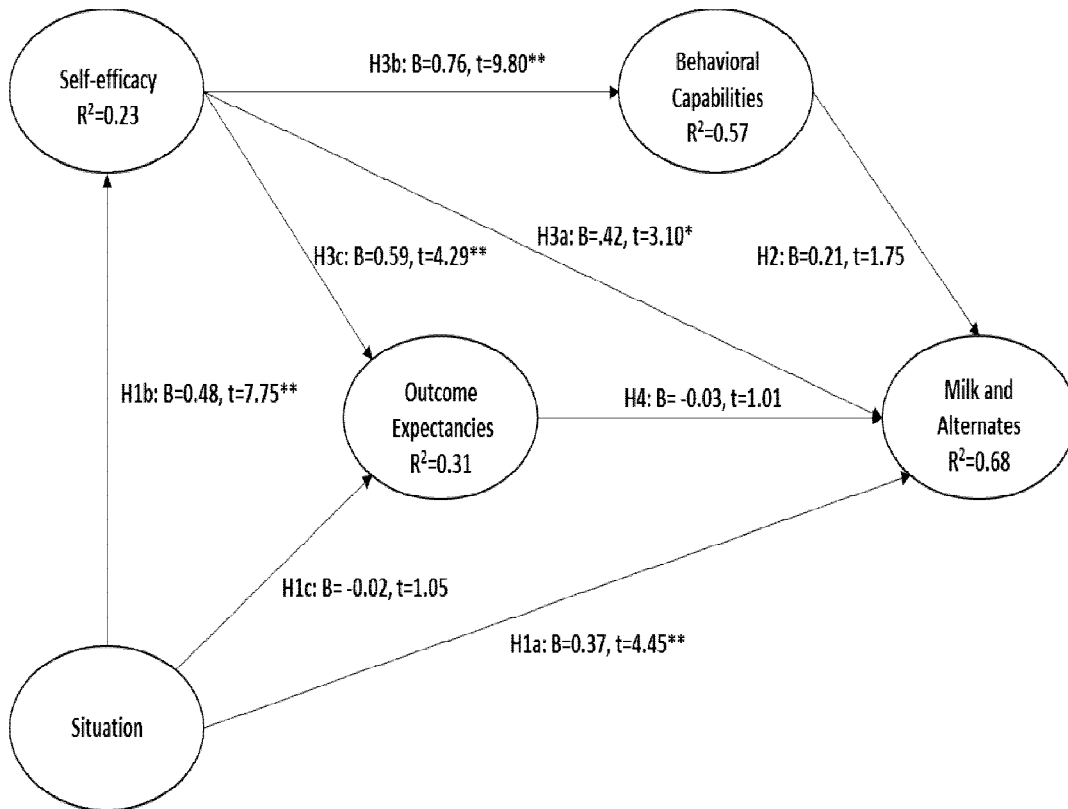


Figure 4. SCT Conceptual Model for Milk and Alternates

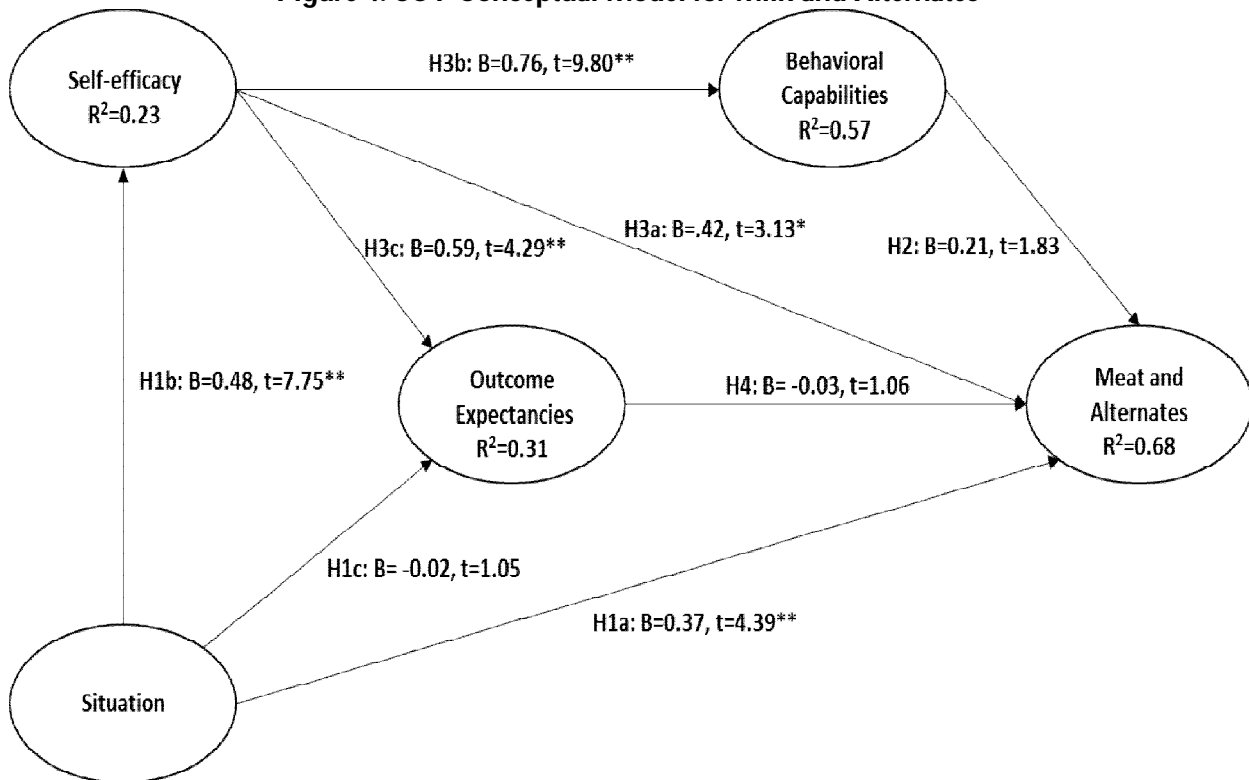
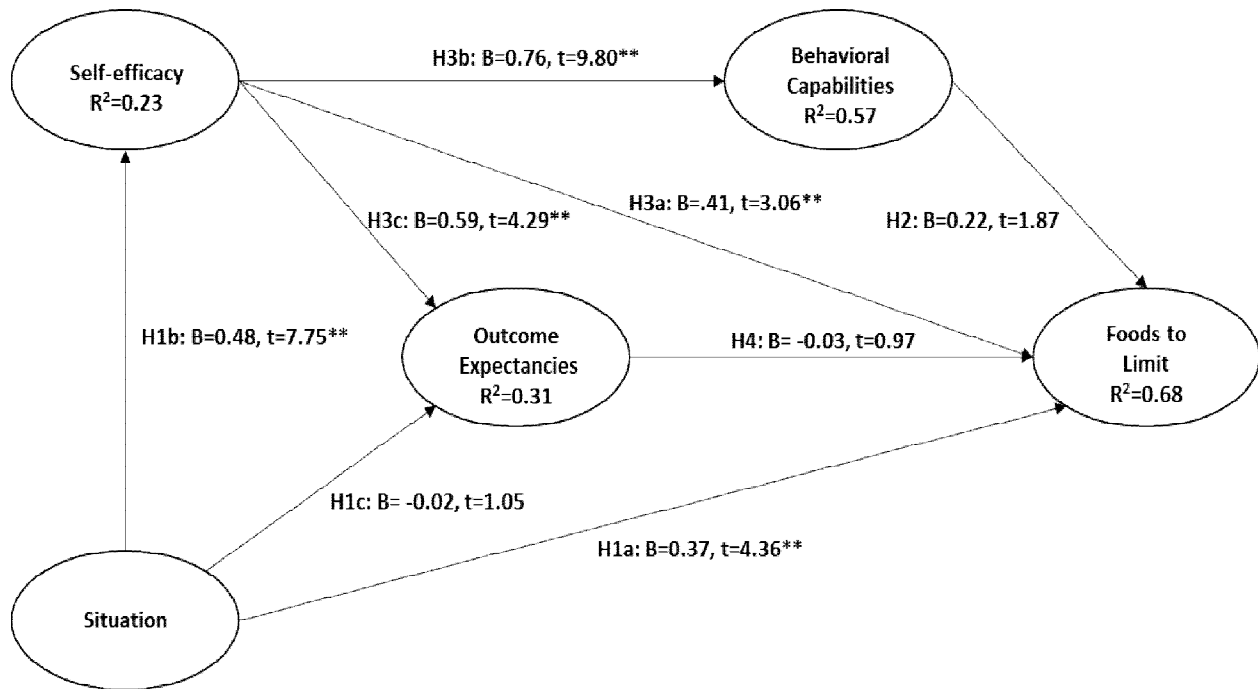


Figure 5. SCT Conceptual Model for Meat and Alternates



**Figure 6. SCT Conceptual Model for Foods to Limit**

**H1 Situation**

Hypothesis 1a predicted that as students perceived their situation to be more conducive to eating a healthy diet they would consume more servings from each of the four food groups and fewer servings of foods to limit. Beta values relating directly to intake of dietary outcomes were positive for all food groups (H1a,i-v), indicating positive correlations. The t-values for these hypothesized relationships all exceeded the critical value of 1.97, indicating statistical significance at the p=0.05 level for all food groups. However, only the hypotheses regarding situation and intake of food groups i-v were supported. The statistically significant correlation between situation and intake of foods to limit was positive, rather than negative as hypothesized, thus not supported. Hypotheses 1b and 1c predicted that as students perceived their situation to be more conducive to eating a healthy diet, self-efficacy and outcome expectancies for eating a healthy diet would also increase. A statistically significant positive correlation was found between situation and self-efficacy, thus the hypothesis 1b was supported. However, a negative correlation was found between situation and outcome expectancies, for which the t-value did not exceed the critical limit. As such, the relationship was non-significant and the hypothesis 1c was not supported.

**H2 Behavioral Capabilities**

Hypothesis 2 predicted that as students' behavioral capabilities for eating a healthy diet increase, they would consume more servings from each of the four food groups and fewer servings of foods to limit. Beta values relating directly to intake of dietary outcomes of interest were positive for all food groups (H2,i-v), indicating positive correlations. The t-values for the hypothesized relationships exceeded the critical limit and were statistically significant for intake of fruits and vegetables and grain products only. As such, the only iterations of H2 that were supported were those concerning behavioral capabilities and intakes of vegetables and fruit and grain products groups.

**H3 Self-Efficacy**

Hypothesis 3a postulated that as self-efficacy for eating a healthy diet increased, students would consume more servings from each of the four food groups and fewer servings of foods to limit. Beta values relating directly to intake of dietary outcomes were positive for all food groups (H3a,i-v), indicating positive correlations. As with situation, the t-values for these direct relationships all exceeded the critical value of 1.97, indicating statistical significance at the p=0.05 level for all food groups. However, only the hypotheses regarding self-efficacy and intake of food groups i-v were supported.

Despite the relationship between self-efficacy and foods to limit (*v*) being statistically significant, a negative correlation between these constructs was presumed, rather than the resulting positive correlation. As such the hypothesis that as self-efficacy increases, intake of foods to limit will decrease, was not supported.

Hypotheses 3b and 3c predicted that as self-efficacy increased behavioral capabilities and outcome expectancies for eating a healthy diet would also increase. Positive and statistically significant correlations were found between self-efficacy and behavioral capabilities (H2b) and between self-efficacy and outcome expectancies (H2c); supporting these hypotheses.

#### H4 Outcome Expectancies

Hypothesis 4 postulated that as students' outcome expectancies for eating a healthy diet increase, they would consume more servings from each of the four food groups and fewer servings of foods to limit. Beta values relating to dietary outcomes of interest were negative for all food groups (H4,i-v), indicating negative correlations. No corresponding t-values exceeded the critical limits, thus indicating statistical non-significance for all relationships. Furthermore, positive correlations were postulated for all food groups except for foods to limit, rather than the resulting negative correlations. As such, no hypotheses regarding outcome expectancies and dietary outcomes of interest were supported.

## 4. Discussion

### 4.1 Conceptual Model

The SCT conceptual model explained 48% of the variance in students' vegetable and fruit intake, 62% of variance in grain intake and 68% each of variance in students' intake of milk and alternatives, meat and alternatives, and foods to limit. The final models with best fit-indices differ from models proposed by Bandura (2004), as well as the model proposed and tested by Lubans et al. (2012). These differences indicate that the final models have indeed been refined and are now tailored to explaining dietary behaviors of university students, while still falling within the overarching SCT.

Similar to Lubans et al. (2012), this study was not able to determine any utility for the social-cognitive construct for intentions (Dewar et al., 2012; Bandura, 2004). As noted in a recent review article, intentions become less predictive of the dietary outcomes when the behavior has become habitual (van'triet, Sijtsma, Dagevos & De Bruijn, 2011). Therefore, it could be expected that eating behaviors for university students as young adults have become more habitual.

### 4.2 Situation

Situation was measured as students' satisfaction with their physical food environment, and this study found that an increase in satisfaction was significantly associated with all four CFG food groups. This indicates that as with self-efficacy, for the population of university students the situation construct plays an integral role within the SCT. The basic premise of this fundamental role is that, in order to change health behavior, the provisions of new structures or resources (i.e. environmental change) can enable and/or facilitate desired behaviors (Glanz, Rimer & Viswanath, 2008). Literature reviews on this topic revealed that despite a movement in recent times towards a focus on how the environment impacts diet, most existing studies are inconsistent, examining different aspects of the environment. A systematic review by Giskes et al. (2007) examined 81 associations between dietary intake and various environmental factors and found approximately 50% of these to be significant. They suggested that there was "insufficient evidence to conclude that environmental factors do or do not influence obesogenic or unhealthy dietary behaviors" (Giskes et al., 2007). Similarly, a review by Kamphuis, van Lenthe, Giskes, Brug and Mackenbach (2006) examined environmental factors and vegetables and fruit intake specifically and again found that just over 50% of associations were significant. While the authors concluded that vegetables and fruit intake was positively associated with individuals who had local availability of these foods, they also stated that evidence remains "too thin to justify large-scale interventions targeting those environmental determinants" (Kamphuis et al., 2006). However, the implication here is not that there is an absence of association between the environment and dietary behaviors, as weak conclusions may be due to a lack of high-quality studies and study replications, as well as inconsistency among the environmental factors being studied (Brug, 2008).



### 4.3 Behavioral Capabilities

This study found that an increase in behavioral capabilities was significantly associated with vegetables and fruit and grain intake. This link between food preparation skills and intake of fruits and vegetables and grains is corroborated by findings from Larson, Perry, Story and Neumark-Sztainer (2006), who examined food preparation behaviors and cooking skills among young adults. The authors found that participants with greater food preparation skills were more likely to meet dietary recommendations for fat, calcium, vegetables, fruits and whole grains. Similarly, Kourajian (2015) found that university students having higher levels of skills and cooking scores was related to a higher vegetable intake. Overall, the findings of this study, and of previous research, indicates that interventions aiming at improving students' meal preparation/cooking skills and grocery shopping skills will be most effective if the focus is on vegetables, fruits and whole grain products.

### 4.4 Self-efficacy

The proposed conceptual model hypothesized that as students' self-efficacy for eating a healthy diet increased, their intake of the four food groups recommended by CFG (Health Canada, 2007) would increase, while their intake of foods to limit would decrease. Self-efficacy was found to significantly predict student's intake from all four food groups, indicating that this construct is one of the strongest correlates within the SCT, which is congruent with findings from Lubans et al. (2012) who reported that self-efficacy was significantly correlated with dietary behavior in each model tested among their sample of adolescent girls. This construct appears to play a strong role among dietary behaviors. Pearson, Ball and Crawford (2011) found that dietary self-efficacy was positively associated with vegetables and fruit intake among adolescents, and Luszczyńska, Tryburcy and Schwarzer (2007) found that an increase in self-efficacy among adults predicted an increase in vegetables and fruit consumption. This research supports the rationale for implementing interventions/programs aimed at increased dietary self-efficacy as means of increasing students' intake not only of vegetables and fruit, but also of grains, milk and alternatives, and meat and alternatives.

### 4.5 Outcome Expectancies

Regarding outcome expectancies, this study found no significant associations between students' self-rated importance of healthy eating and their dietary intake, as was also the case with findings from Lubans et al. (2012) study. A possible rationale for this lack of significance is that even if students perceive themselves as valuing a healthy diet, other factors, such as food availability/convenience and pleasure, override and nullify this construct's influence.

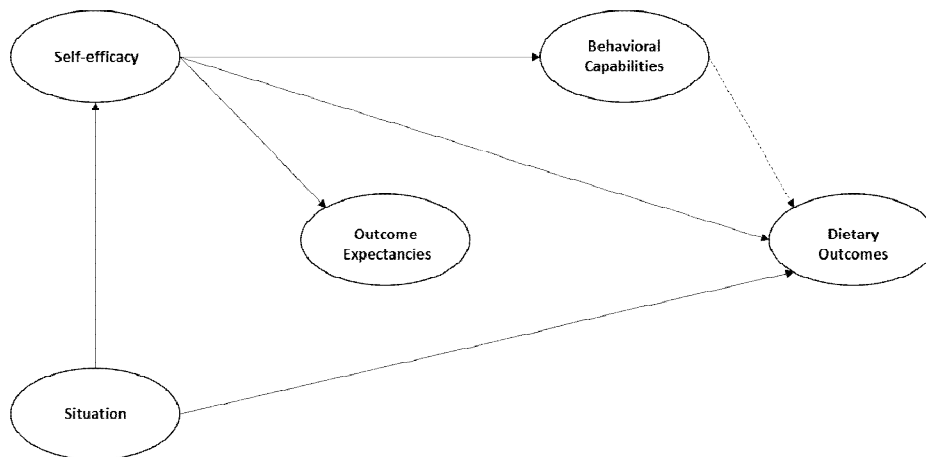
### 4.6 SCT Interrelationships

In terms of how the social-cognitive constructs influence each other, embodying the notion of reciprocal determinism (Bandura, 1978 and 2004), self-efficacy significantly predicted behavioral capabilities and outcome expectancies, and situation significantly predicted students' self-efficacy. While these inner relationships have undergone minimal previous statistical analysis, the relationship between self-efficacy and behavioral capabilities is supported by Lubans et al. (2012) model of the SCT. Finding statistically significant inner relationships within the SCT works towards supporting the central concept of the theory: reciprocal determinism (Bandura, 1978 and 2004). Considering the relationship between situation and self-efficacy, this study supports the theory that as students' perception of their environment as being conducive to healthy eating increases, their self-efficacy to eat a healthy diet also increases. For example, a university campus makes changes to increase the availability of fresh fruits to students on campus. Students then take advantage of easily accessed fresh fruits and begin eating more fruits than is the norm for them. Following the increase in their fruit intake, students internally recognize their increased fruit consumptions and conceptualize this as an increased confidence in their ability to eat healthily. That is, realizing that they have already started making healthy dietary choices increases students' confidence that they can indeed eat healthily, thus positively impacting self-efficacy.

Furthermore, this study found a strong link between self-efficacy and intake of CFG food groups. Therefore, it can be further postulated that this internal increase in self-efficacy will work directly towards improving dietary outcomes. This described interplay between social-cognitive constructs and dietary outcomes exemplifies reciprocal determinism and promotes the notion of creating multi-faceted and well-rounded dietary interventions based on the SCT.

Thus far the focus of this discussion has been on the relationships between social-cognitive constructs and dietary intake of the four food groups from CFG; vegetables and fruit, grains products, milk and alternatives, and meat and alternatives. However, foods to limit was also included in this study, with the general postulation being that as the ranking for the various social-cognitive constructs increased, intake of foods to limit would decrease. The results of this study consistently indicated relationships in directions opposite to that expected. For example, there was a significant positive relationship between self-efficacy and intake of foods to limit, indicating that an increase in dietary self-efficacy was associated with an increase in consumption of “unhealthy” foods, such as pizza, candy and French fries. These unexpected findings are inconsistent with previous studies, such as those by Lubans et al. (2012) and Pearson, Ball and Crawford (2011), which were that self-efficacy was inversely associated with intake of energy-dense, nutrient-poor foods. These inconsistencies may be attributed to characteristic differences between the samples. Both Lubans et al. (2012) and Pearson et al. (2011) studied adolescents, while this study focused on university students. It can be assumed that the differences between how these population groups make decisions around their dietary behaviors may at least be partly responsible for the differences in results. This relates back to the initial purpose of this study, which was to refine the applicability of SCT constructs in predicting behaviors of university students in particular. Another possibility is that the food environment experienced by university students, often one where foods to limit are easily available (Horacek et al., 2012), nullifies or weakens the effects of a high dietary self-efficacy. Also of note is the possibility that the students included in the study did not perceive the items in the foods to limit grouping as unhealthy, thus skewing the results. However, the main implication here is that for the population of university students, interventions aiming to improve dietary behaviors may be more successful if the focus is on promoting foods low in calories, sodium, fat and sugar, and perhaps the removal of easily available high calorie, sodium, fat and sugary foods. That is, attempting to increase dietary self-efficacy of students in hopes of decreasing their intake of unhealthy food items may be unsuccessful, so the alternative may require reducing the prevalence of such foods on campus.

Overall, this study has shown that the SCT is an appropriate framework for understanding the dietary behaviors of university students explaining 48 to 68% in variance of dietary intake. The findings highlighted that certain social-cognitive constructs play a more important role than others, often differing based on the specific food group, distinguishing the final models as ones tailored for use among university students. While one refined model cannot be presented due to the variation of significant of constructs in relation to the different food groups, a generally strong composite model is presented in Figure 7.



**Figure 7. SCT Composite Model**

#### 4.7 Strengths and Limitations

The strengths of this study include its unique assessment and refinement of the SCT in explaining dietary behaviors of university students. This population represents one where health behaviors developed are often long-lasting and thus it is vital for dietary interventions to effectively promote development of lifelong health behaviors among university students. Despite this notion, to the researchers' knowledge this is the first study to assess the predictive ability of a conceptual model of Bandura's SCT (2004) in explaining dietary behaviors of university students, resulting in refined models specific to the university student population.

Secondly, this study examined the SCT in association with each food group within CFG, and foods to limit, rather than overall categories of “healthy” and “unhealthy” foods, in the effort to more narrowly refine the utility of the SCT. This approach represents a strength as it accommodates the possibility that the SCT may be able to explain and predict the consumption of individual food groups independently of each other, which the results did indicate, highlighting food groups for special attention.

A limitation of this study was the use of measures from a questionnaire tool not specifically designed to collect data on social-cognitive constructs. Some of the unique social-cognitive constructs could have been better gathered using a tool specifically informed by the SCT. Also, the sample for this study was drawn from two Atlantic Canadian universities, with the majority of the students being women in their first or second year of study. As a result of this skew, the findings may not be representative of all university students. Lastly, it should be noted that since an experimental design was not used in conducting this study, causal relationships between the variables could not be assessed.

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### 5. Conclusion

University students have been found to consume a diet low in vegetables and fruit, but excessive in high fat and snack foods (Brunt & Rhee, 2008; Ha & Caine-Bish, 2009; Morse & Driskell, 2009). These poor dietary habits can result in short and long-term negative health consequences. As such, dietary interventions are needed to improve the eating habits of university students. The SCT is a health behavior theory appropriate in guiding dietary interventions, however, its framework has been deemed as too broad to be applied to specific populations. Therefore, there is a need to test social-cognitive constructs within the framework of the SCT to explain/predict dietary behaviors of university students to develop a conceptual model of the theory refined specifically for application to this population.

This study supported the appropriateness of using the SCT framework for developing effective dietary interventions for university students: highlighting interventions that should primarily work towards improving self-efficacy and situation as pertaining to all food groups, and behavior skills as pertaining to vegetables and fruit and grains. That is, practical implications of this study focus on the development of nutrition intervention as guided by the SCT that simultaneously enhance students’ self-efficacy for healthy eating, increase their access to healthy food, while decreasing availability of foods to limit, and enhancing their behavioral skills for preparing items from specific food groups. The concurrent promotion and interplay of these constructs is highlighted as a means for self-perpetuating the outcomes of increasing or decreasing consumption of items from different food groups, which in turn will work towards creating an overall “culture” of healthy eating among university students.

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**Table2. Summary of Social-cognitive Constructs**

Social-Cognitive Construct/Scale	Variables (Questionnaire Items) Comprising Construct/Scale <sup>a</sup>	Number of Responses	Mean ( $\pm$ SD)	Factor Loadings	Cronbach's Alpha
Situation - refers to students' perception of their physical environment as supportive/conducive to healthy eating	1) Level of satisfaction with "convenient location"	135	4.08 ( $\pm$ 0.76)	0.88	0.70
	2) Level of satisfaction with "ease of access to kitchen/dining"	135	3.92 ( $\pm$ 0.79)	0.83	
	3) Level of satisfaction with "hours of operation"	135	3.68 ( $\pm$ 0.97)	0.69	
Behavioral Capabilities - refers to self-management/behavioral techniques used by students to support healthy eating	1) Level of satisfaction with "meal preparation skills"	163	3.5 ( $\pm$ 1.2)	0.88	0.70
	2) Level of satisfaction with "grocery shopping skills"	163	5 ( $\pm$ 0.92)	.88	
Self-Efficacy - refers to students' confidence in their ability to adopt, maintain and overcome barriers to healthy eating	1) Level of confidence in "ability to eat a nutrition diet during the academic term"	166	3.2 ( $\pm$ 0.99)	0.85	0.76
	2) Level of confidence in "ability to eat a nutrition diet outside of the academic term"	166	3.9 ( $\pm$ 0.88)	0.79	
	3) "I currently eat a nutritious diet"	166	3.4 ( $\pm$ 0.96)	.83	
Outcome Expectancies -refers to the value that students place on their perceived outcomes of healthy eating	1)"Rate how important a nutrition diet is to you"	177	3.7 ( $\pm$ 0.88)	n/a	n/a

<sup>a</sup> Scale for Situation and Behavioral Capabilities: 1) very dissatisfied; 2) dissatisfied; 3) neutral; 4) satisfied; 5) very satisfied; and Scale for Self-efficacy and Outcome Expectancies: 1) very low; 2) low; 3) moderate; 4) high; 5) very high