The Use of General Marketing and Nudging of Fruits and Vegetables in Canadian Colleges and Universities: Food Service Manager Perspectives

by

Kiran Bains

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ABSTRACT

THE USE OF GENERAL MARKETING AND NUDGING OF FRUITS AND VEGETABLES IN CANADIAN COLLEGES AND UNIVERSITIES: FOOD SERVICE MANAGER PERSPECTIVES

Kiran Bains  
University of Guelph, 2019

Advisor:  
Dr. Paula Brauer

This thesis aimed to understand current marketing practices, knowledge, facilitators and barriers of nudge marketing of fruits and vegetables (FV) by food service (FS) management in post-secondary institutions. Nudging uses subtle marketing techniques to promote purchasing of products or behavior changes without coercing customers or forbidding options. Twelve participants from 10 institutions were recruited from the Canadian College and University Food Service Association for semi-structured phone interviews. Quantitative and qualitative data were analyzed via thematic and descriptive analyses. All institutions were marketing FV in various ways. Six out of 10 were implementing nudging for FV. Feasibility of nudging depended on the type of nudge. Nudges perceived as difficult were typically costly and required structural changes and/or communication with external departments. Nudges perceived as easy were least costly and required little coordination. The results provide needed information on the most acceptable and feasible FV nudge interventions for future testing.
COMMITTEE MEMBERS

Graduate Advisor: Paula Brauer, PhD, RD
   Associate Professor, Department of Family Relations & Applied Nutrition
   University of Guelph

Committee Member: Sunghwan Yi, PhD
   Associate Professor, Department of Marketing & Consumer Studies
   University of Guelph
It was summer of 2017. I had been praying that God would direct my next steps with my career.

One day in mid-August, I had a sudden urge to do my Master’s. I had contemplated it for two years before this but the real desire and commitment of going forward with the idea just sprung on me. I was sitting on my own and felt I needed to randomly open the Bible:

“She is a tree of life to those who take hold of her; those who hold her fast will be blessed.

By wisdom the Lord laid the earth’s foundations, by understanding he set the heavens in place;

by his knowledge the watery depths were divided, and the clouds let drop the dew.

My son, do not let wisdom and understanding out of your sight, preserve sound judgment and discretion;

they will be life for you, an ornament to grace your neck.

Then you will go on your way in safety, and your foot will not stumble.

When you lie down, you will not be afraid; when you lie down, your sleep will be sweet.

Have no fear of sudden disaster or of the ruin that overtakes the wicked,

for the Lord will be at your side and will keep your foot from being snared.

Do not withhold good from those to whom it is due, when it is in your power to act.”

Proverbs 3:18-27
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To our participants, thank you for your time, enthusiasm and dedication to growing research. This study could not have been done without you.

I am so thankful to Dr. Tyler Zemlak, another mentor I had from the Gordon S. Lang School of Business and Economics. You supported my goals and gave me opportunities to diversify my skills and knowledge while being a Masters student. Thank you for seeing my potential and mentoring me through the development of an award-winning social enterprise and for the continued cheering on the sidelines as I finished my thesis. Furthermore, thank you to my dear secondary researcher, Natalie Demarco who acted as a second pair of eyes to enhance coding reliability. Every hour of your time and your attention to detail was greatly appreciated. I had a lot of fun working with you and am excited to welcome you into the world of dietetics as a fellow dietitian soon!

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LIST OF ABBREVIATIONS

BMI = Body mass index
CCUFSA = Canadian Colleges and University Food Service Association
CRD = Chronic respiratory disease
CVD = Cardiovascular disease
FV = Fruits and vegetables
FS = Food service
I.T = Information Technology
Kcal/d = Kilocalories per day
KT = Knowledge translation
POS = Point of sale
Res = Residence
SCT = Social Cognitive Theory
TPB = Theory of Planned Behavior
WHO = World Health Organization
1 RATIONALE FOR STUDY

Young adults face challenges when it comes to healthful eating. About 86% of Canadian university students have reported consuming less than half the recommended servings of fruit and vegetables (FV) per day for their age (American College Health Association, 2013). Consuming five or more servings of FV per day helps meet the recommended dietary intakes of several vitamins and minerals, can promote satiation, plays a key role in the prevention of chronic disease, overweight, and obesity (Boeing et al., 2012; Matthews, Doerr, & Dworatzek, 2016).

Barriers to meeting nutrient requirements in post-secondary settings may include the cost of nutrient-dense options, taste preferences, easy access to convenience foods, lack of time, persuasive marketing, and the change in student’s living environment (Garcia, Sykes, Matthews, Martin, & Leipert, 2010).

Various food-system and population-based interventions may be effective in helping change our food intake practices in Canada. Many types of health promotion interventions have been implemented in post-secondary settings, often by way of education on nutrient recommendations. Nudging has been proposed as another strategy that does not involve educating and addresses the environment individuals make consumption choices within. Most work to date has been oriented to pilot testing interventions with retail consumers, elementary schools, or work place settings. There have been minimal studies in post-secondary settings. There is also a gap in understanding the perspectives of FS managers regarding the acceptability and feasibility of implementing such changes as they are responsible for implementing environmental alterations.

Understanding the acceptability of nudges will add to the research of whether nudging is feasible in post-secondary institutions. This study seeks to address the knowledge, facilitators and barriers of the use of nudge marketing interventions to alter post-secondary school FS environments to make consumption of FVs the easier choice.

1.1 Objectives

The objectives of this study are to determine the perspectives of a convenience sample of Canadian post-secondary FS managers on the following:

1. Describe current and recent marketing practices for fruits and vegetables and fruit and vegetable-rich meals by food service management in post-secondary institutions.
2. Assess the awareness of nudge marketing techniques amongst food service managers in post-secondary institutions.
3. Identify the facilitators and barriers to using nudge marketing of fruits and vegetables in post-secondary institutions.

1.2 Specific Research Questions

Question 1: How do food service operators in Canadian post-secondary institutions currently market fruits, vegetables and fruit and vegetable-rich meals?

Question 2: Are food service staff aware of nudge interventions as a marketing technique?

Question 3: If familiar, do food service operators currently use nudge-based marketing interventions to increase fruit, vegetable and fruit and vegetable-rich meal purchasing by customers?*

(*When using the word purchasing, it is assumed that consumption is also involved).
Question 4: What are food service manager’s perceptions regarding the feasibility of using nudge interventions in food service outlets?

Question 5: What are the facilitators and barriers to implementing nudge-based strategies in post-secondary institutions?

1.3 Methods

This study used a cross-sectional convenience sample of 10 semi-structured interviews with 12 participants recruited from the CCUFSA (Canadian College and University Food Service Association) Conference and the email list serve. Interviews were transcribed verbatim and coded using interpretive and descriptive analyses against two frameworks: Taxonomy of Choice Architecture (Münscher et al., 2016) and the Ottawa Model of Research Use (I. D. Graham & J Logan, 2004).
2 LITERATURE REVIEW

2.1 Chronic Illness in Canada

In Canada, almost a third of Canadian adults live with at least one chronic disease: cardiovascular disease (CVD); cancer; chronic respiratory disease (CRD); diabetes; mood and/or anxiety disorders (Branchard et al., 2018). Fortunately, many Canadians have modifiable risk factors for chronic disease morbidity. The four main ones are: physical activity, diet, smoking and harmful use of alcohol. According to the Public Health Agency of Canada, 70% of Canadians 12 years of age and older identify as having a less than optimal diet for health (Branchard et al., 2018). The food supply and lifestyle of Canadians has changed over the past 50 years to include many more convenience and processed foods and greater likelihood that people eat away from home.

Fortunately, chronic diseases take many years to develop hence it is important for young adults and children to adopt sustained health-promoting behaviors from a young age.

2.2 Chronic Illness in Canada: Prevention through Fruit and Vegetable Intake

There are many dietary factors that influence chronic illness development, however for the purposes of this research, the focus will be FV intake. According to the World Health Organization (WHO), at least 400g or five portions of FV per day is recommended to reduce the risk of selected chronic disease (Broers, De Breucker, Van den Broucke, & Luminet, 2017; WHO, 2018). Recent evidence shows that when FV’s are consumed as part of a daily diet they can help reduce the risk of coronary heart disease, stroke, and cancer (WHO, 2018). The WHO recommends at least five portions or 400g of FVs per day, not including sweet potatoes, potatoes, cassava and other starchy root vegetables (WHO, 2018).

The consumption of five or more servings of FV helps meet recommendations for several vitamins and minerals and can promote satiation and reduce chronic disease risk. People eating a vegetable-rich diet tend to weigh less than those who do not hence eating a vegetable-rich diet can prevent an excess of weight gain (Schwingshackl et al., 2018).

An international review by the WHO IARC (World Health Organization: International Agency for Research on Cancer) discussed FV intake and cancer risk. The report concluded that 5-12% of all cancers may be preventable if fruit and vegetable intake was higher. It also showed that FV intake may lower the risk of some cancers, specifically those of the gastrointestinal tract and 20-30% of all upper gastrointestinal cancers were related directly to low FV intake (WHO, 2003).

A recent publication looked at surveys of Canadians from 2004 to 2015 (Tugault-Lafleur & Black, 2019). These surveys were collected through the Canadian Community Health Surveys. The results showed that in 2015 Canadians reported having more daily servings of orange vegetables, dairy products, dark green vegetables, legumes, nuts and seeds, and eggs compared to in 2004. Furthermore, in 2015 compared to 2004, they were having fewer servings of potatoes, other vegetables (zucchini, corn, celery and cucumbers), fruit juices, milk, and sugar-sweetened beverages. This study suggests that more focus is needed to improve the intake levels of Canadians for lower fat dairy products, vegetables, fruit, whole grains, and protein including legumes, nuts, and seeds (Tugault-Lafleur & Black, 2019).

It is important to promote the consumption of increased FV intake in our Canadian post-secondary student population to decrease the risk of chronic disease, overweight and obesity in our nation. Various
food-systems and population-based interventions may be effective in helping change our current food intake practices in Canada.

2.3 Young Adults in Post-Secondary Schools: Chronic Illness

2.3.1 Behavioral Risk Factors for Chronic Illness

Chronic diseases often take many years to develop. The four main chronic disease risk factors include: tobacco smoking, physical inactivity, poor diet patterns, and harmful use of alcohol. In Canada, 84.9% of the population reports having at least one of these four main chronic disease risk factors (Branchard et al., 2018). Students have expressed concern regarding the cost of perceived “healthy” food, and report preferring processed snacks as fresh produce spoils much faster and processed foods may generally be cheaper (Kelly, Mazzeo, & Bean, 2013). Furthermore, having limited access to “healthy” food options on campuses and limited peer support to promote “healthy” eating, may poorly influence students’ eating habits (Kelly et al., 2013). Stressors including ongoing academic challenges and stress related to food choices and food preparation are also experienced by young adults in post-secondary schools. Perceived stress can have a negative effect on eating habits as it is positively associated with consumption of calorically-dense, high fat food intake (Kelly et al., 2013). Alcohol consumption also increases in post-secondary school students and is associated with the consumption of certain foods such as pizza, fast food, and/or chips/sweets (Strong, Parks, Anderson, Winett, & Davy, 2008).

The above behavioral risks are all factors which can be altered or even prevented and are all factors relating to chronic illness. Therefore, it is plausible to target the post-secondary school student population for health promotion interventions to prevent poor dietary behaviors which will impact future chronic disease risk given what we know about the role of diet in chronic disease development and given our food supply and lifestyle.

2.3.2 Obesity as a Risk Factor for Chronic Illness

The prevalence of weight gain is higher among young adults compared to any other age group mostly due to the fact that weight-related behavioral patterns are subject to extensive change during the transition period between adolescence to young adulthood (Stok et al., 2018). Other factors include the increasing intake of snacking behavior, skipping breakfast often, and decreasing intake of FV (Stok et al., 2018).

Weight gain in this age group may be up to 6.7 times more compared to the general population (Kasparek, Corwin, Valois, Sargent, & Morris, 2008) with an average weight gain of about 4 to 9 pounds during the first year of post-secondary school without any evidence of weight loss thereafter (Strong et al., 2008). An increased BMI (body mass index) of greater than 2 over 15 years places students at increased risk for CVD compared to other students who may maintain a stable BMI or even a decreased BMI (Lloyd-Jones et al., 2007). Obesity is another risk factor for chronic disease illness. Appropriate interventions must be in place to prevent unhealthy weight gain in the post-secondary school population.

2.4 Why Target Young Adults in Post-Secondary Schools?

Post-secondary students emerging into young adulthood (18-25 years of age) are an important age group to target with health-related interventions for many reasons. Eating habits, while developed early in life, may shift during this phase of life and are carried through the rest of our lives (Garcia et al., 2010). Eating behaviors may also progressively become unhealthier through the transition from adolescence to young adulthood (Stok et al., 2018).
According to the American College Health Association (American College Health Association, 2013), 86.8% of Canadian college and university students report consuming less than 5 servings of FV per day. Eating less than 5 servings of FV per day can increase one’s risk of developing chronic diseases (Matthews et al., 2016).

2.5 Use of the Terms “Healthy” Eating and “Healthy” Foods

Throughout this paper, the terms “healthy” eating, “healthy” foods, “unhealthy” eating and “unhealthy” foods will be referred to often. These terms are used in research often with no specific definition as to what these two terms describe or what foods these entail. Due to the frequent use of these terms within referenced research these terms will continue to be used in this paper in quotations. Where possible, these terms will be expanded on where the research has done so. It is the hope that these terms will be discontinued from use in future research studies and that alternate, more detailed descriptions of this discouraged categorization of dietary choices would be used. At times, the term, “nutrient-dense meals/foods” is used as well as “fruit and vegetable-rich meals/foods”, to help describe the concept of “healthy” eating.

2.6 What are Students Eating?

Post-secondary education environments are transitional environments for young adults. A review of 15 post-secondary institution FS restaurants and dining venues on and around campuses in the United States showed medium-sized campuses had significantly more “healthful” side dish and salad bar options compared to smaller-sized campuses (Horacek et al., 2013). This study classified “healthful” side dishes as non-fried vegetables, no-sugar added fruit, vegetarian options (with no further explanation), baked chips, whole grain items, and healthy cereals (less than 7g of sugar and/or equal to or less than 4 gram of fiber). “Healthful” salad bar options included fresh fruits and vegetables, low-fat protein sources and low-fat or fat-free dressings. They also found that dining halls offered significantly higher amounts of “healthful” options compared to student unions or snack bars/café’s with respect to entrees, side dishes, salad bars and beverage offerings. One notable feature of dining halls is the feature of all-you-can-eat which poses a barrier to healthful eating. Results also found that snack bars had more healthful side dishes and fast food restaurants generally contained nutrition information which acts as a facilitator for healthful eating (Horacek et al., 2013). The study reviewed a sample of 175 restaurants and 68 dining locations on campuses and used a modified version of The Nutrition Environment Measures Survey for Restaurants (NEMS-R). Suggestions from this study were to implement point of purchase education to promote “healthful” choices within dining halls. Conclusions from the study suggested that there is limited support for healthful eating on campus food environments compared to commercial food marketplaces (Horacek et al., 2013). Another study also noted that students and staff may feel restricted to campus FS environments themselves, when eating on campus. They are therefore limited to only the choices surrounding them (Mikkelsen, 2011).

A study published by the American Dietetic Association with 43 post-secondary students (18.3+/- 0.1 years of age) looked at identifying health behavior change targets with relation to weight management (Strong et al., 2008). Students from first- and second-year programs other than human nutrition, foods, and exercise, were recruited. Part of the study looked at reviewing the dietary intake of these students. Food intake records were obtained for four days consecutively including one weekend and three weekdays. The records were analyzed using the Nutrient Data System for Research software. Any records that revealed a kilocalorie intake less than 1200kcal/d were excluded, due to suspected underreporting by the participants (Strong et al., 2008). The analysis found that students generally skip breakfast or they have something small they eat in their dorm room (cereal, granola bar). Sandwiches, salads, wraps and
fast food type meals were major items that came up as lunch meals. Dinner entrees were often items like pasta, meat and potatoes, salad, burgers, and sandwiches (most often). Chips, crackers and sweets kept in dorm rooms were most-commonly eaten as snacks. As beverage choices, water was the most common, juice was less common, and sweetened beverages were also very common. One to 3 times per week, students reported eating fast foods. Two out of 3 participants consumed alcoholic beverages and may drink 1 to 2 nights per week or more. At least 5 to 6 beverages per night were reported. Typical alcoholic beverages reported were beer and hard liquor (more often). Most students reported that they did not eat enough FV (Strong et al., 2008).

Students also pointed out that their respective campus environment promoted “unhealthful” foods as being more available compared to “healthful” foods. They also reported having a refrigerator in their dorm rooms but did not keep fresh FVs in their dorm rooms as they tend to spoil quicker than processed foods (Strong et al., 2008).

Another study (Kasparek et al., 2008) used a web-based pre/post survey method in fall 2002 and in spring 2003 to analyze weight change in relation to FV intake, physical activity and alcohol use over 6 months in 193 first year, post-secondary students. The study found 57% of participants gained an average weight of 2.5 pounds and FV intake decreased over the time period. (Kasparek et al., 2008).

Finally, another systematic review discussed below in detail, echoed the above results stating that post-secondary students’ diets are generally higher in fat, sugar, and sodium and are lower in necessary, more valuable nutrients (Kelly et al., 2013).

Overall, we know students are not meeting their FV recommendations and are aware of their poor dietary behaviors however they face barriers to perceived “healthful eating” such as taste, self-discipline, finances, time, convenience, academic demands, social and physical (C. K. Wilson, Matthews, Seabrook, & Dworatzek, 2017). These barriers will be explored in more detail next.

2.7 Reported Barriers to Healthful Eating in The Post-Secondary School Population

Several studies have documented the barriers of healthful eating in post-secondary institutions. In Europe, the first study looking at this issue came out of a Belgian university in 2014. Semi-structured interviews and 5 focus groups were conducted with a total of 14 males and 21 females. The average age was 20.6 +/- 1.7-year-old. The goal of this study was to gain a better understanding regarding the barriers students face when trying to eat “healthy” on campus. Unfortunately, the terms “healthy” and “unhealthy” were not defined in this study however the results of the focus groups with the students showed the perceptions of what students thought were “healthy” and “unhealthy” food items. “Healthy” items noted to be fruits and vegetables, home-made sandwiches, and non-fried foods. Examples noted by students of “unhealthy” foods were hamburgers, lasagna, pizza, fried foods, and cookies (Deliens, Clarys, De Bourdeaudhuij, & Deforche, 2014).

After a content analysis review of the focus groups, the researchers categorized barriers to “healthy” eating in post-secondary students into the following themes: individual factors (taste preferences, self-discipline, values, norms, beliefs, stress, body image, dietary knowledge, time and convenience including personal priorities and meal preparation time, daily structure, past eating habits, physical activity level, metabolism, and vitality), social environments (lack of parental control, home education, social support or lack there-of, and peer pressure), physical environment (availability and accessibility, appeal and prices of food products), and macro environments, (policy and legislation, socio-cultural norms and values, and
media and advertising) (Deliens et al., 2014). Some of the specific barriers will be expanded upon in further detail next.

**Individual Factors**

Taste preferences of students was a barrier to “healthy” food choices as some students may tend to choose options based mostly on taste preferences. This can lead to students often choosing options that are less “healthy”. Self-discipline may influence eating behavior because of a lack of self-control or inability to take care of one’s self, especially when students are transitioning from living at home with parents to living on their own for the first time. Values, norms and beliefs also had an impact on eating behavior as some students may hold values towards eating vegetarian/vegan due to their upbringing, for example. Another noted factor was high stress levels during the transition from secondary school to college or university. Students also noted that exam periods led to high stress levels and that food choices during this time tend to fluctuate either in a more healthful or less healthful way. Social stressors were also a factor in contributing to poor food choices. One example given from a participant included heart break, where they were more likely to choose poor options during a time of high social stress. Having a certain level of nutrition knowledge was also an important factor in contributing to food choices. For example, if a student didn’t like vegetables but knew they were good for them, they would eat them based on their nutrition knowledge. Time and convenience were also a frequently noted theme. Students explained that the least time they spent on meal preparation the better, so they could get back to studying or watch television. Finally, another notable theme listed under individual factors was vitality. Students noted that when you have less energy, one is more likely to eat more energy-dense foods however, a lack of energy could also trigger the sense of increased health awareness. For example, one student noted that they had felt very tired in their first year of university. As a result, they started to eat more vegetables and started feeling better (Deliens et al., 2014).

Another survey study conducted with post-secondary students investigated meal preferences, food purchases and factors influencing meal choices in restaurants as well as cafeterias on campus (Holligan, 2017). The study found that students noted having a lack of time to shop, plan, prepare and cook “healthful” foods.

**Physical Environment**

Students noted that since they had access to on-campus eating facilities, it was easier to be tempted to choose a less- “healthy” option more often as there were many other choices available. Vending machine access was also noted as a barrier to healthful eating due to the increased availability of these. What promoted more healthful eating was when “healthy” food was more available and of course, if it was free. In this specific student population, free fruit was offered in dining halls during exam periods and students noted an increase in fruit consumption amongst their own student population. A lack of cooking supplies in residence halls may also contribute to “unhealthful” intake or vice versa (if students are used to preparing their own fried foods, for example, because of lack of access to their own fryer). The survey study noted above also echoed this barrier (Holligan, 2017). Students felt that preparing, cooking and storing “healthy” foods were difficult to do because of the lack of facilities available for these activities on campus (Holligan, 2017).

Subsequently, cost was associated with specific food choices. If apples were cheaper than cookies, those students who were budget-sensitive would opt for the cheaper option. Students also mentioned that sometimes eating out was the cheaper option but the cheaper options on restaurant or fast-food menus were typically less nutrient-dense, higher processed options such as fried foods or pizza, for example
Holligan’s (2017) study also echoes the issue of students having easier access to “unhealthful” foods due to the fact that these foods are generally priced cheaper than “healthful” foods.

Another study using photovoice at Western University in London, Ontario, looked at perceived facilitators and barriers to “healthful” eating among 28 university students (Garcia et al., 2010). Students from a 2008 introduction to nutrition course participated in this study. Most students (n=21) were in the age range of 18-25. The remainder (n=7) were ages 26-50. Two photographs were to be taken and discussed in a focus group moderated by a graduate student using a semi-structured facilitation guide. The six major themes which arose from this study were: environment, nutrition knowledge, convenience food, time, media influence, and the cost of food. Environment is of particular interest as it relates to this current proposed research study (Garcia et al., 2010).

Some of the major topics that emerged within the category of environment included: a change in living environment as a barrier, easy access to “unhealthy” foods, a lack of transportation for grocery shopping, and peer pressure at social gatherings towards un-“healthy” eating (Garcia et al., 2010). Other barriers such as a lack of time, money, cooking skills, and nutrition knowledge also emerged but were less often noted (Garcia et al., 2010).

**Macro Environment**

One of the most notable themes within this category that fits the scope of this study is the presence of policies and/or legislations. For example, students mentioned that the law against drinking and driving promoted them to drink less when going out and having to drive back home at the end of the night. Media and advertising also affect eating behavior. Students mentioned if they see food on the television, they’re triggered to want to get up and get something to eat (Deliens et al., 2014).

**Post-Secondary Lifestyle and University Characteristics**

Students noted that students who lived in residence were more likely to eat “unhealthily”. The student environment and university lifestyle can have an impact on eating behavior. For example, one student mentioned that after living in residence for a year, she had gained 10 kilograms because of eating out too much and drinking more than before. This concept was mentioned by multiple students in this study. The environment itself could also have a potentially positive effect on “healthy” eating. Students mentioned that if they lived together in a student residence, they would sometimes cook with their peers which led to them taking more time to meal prep which therefore enlarged their chances of making healthier meals. Student societies and clubs also influenced poor food intake since many club activities would involve outings that involved drinking (Deliens et al., 2014).

Some suggestions for interventions to promote better eating habits came from students themselves, including strategies such as one-on-one communication with students regarding “healthy” eating, or giving students feedback on their personal health status (Deliens et al., 2014). Posters displaying what “healthy” eating should look like including the “healthy” eating pyramid, was a suggestion. Students subsequently suggested being able to attend “healthy” eating classes on campus, the use of social media and internet for the campus to give advice to students. Environmental suggestions included more “healthy” menus, not always offering fried foods, reduction in prices of “healthy” items, higher taxes for “unhealthful” food, displaying calories on menus, and including more “healthy” options in vending machines around campus (Deliens et al., 2014).
An American study conducted at the University of Hawaii used open-ended questions in focus groups with a total of 38 student participants to discuss barriers to “healthful” eating and exercise in their post-secondary school environment (Martinez, Harmon, Nigg, Bantum, & Strayhorn, 2016). For purposes of this review, we will only discuss the noted barriers to “healthful” eating. Lack of time was the most common barrier to cooking “healthy” meals between being in school and also potentially working at the same time (n=19). As a result, students noted turning to fast food options instead of cooking or taking the time to find “healthier” ready-made options to purchase on campus. Other barriers included low personal budget and high cost of “healthy” foods, knowing how to cook but not feeling motivated enough to do so, coupled with a lack of food skills related to storing and preserving food, and lack of skills related to cooking vegetables (Martinez et al., 2016).

It is evident that post-secondary school students encounter numerous barriers towards consuming a “healthy” diet on campuses, including meeting the recommended servings for FV. Students often report the foodscape/environment of university and college campuses as a common barrier to “healthy” eating including the ease of access and availability of many non-nutrient-dense options. Interventions that target the food-specific environments need to be considered when developing health promoting programming or policies to alter poor dietary habits and promote the consumption of more FVs.

2.8 Health Promotion Approaches to Promote Health Behavior Change

Typical public health strategies to promote health behavior change including increasing FV consumption have focused on improving knowledge to help individuals make better choices through interventions such as nutrition education, enhancing self-regulation (self-monitoring and goal setting), and nutrition labelling (Capacci et al., 2012; Deliens et al., 2016; Kelly et al., 2013). These types of interventions attempt to affect individuals’ motivations and intentions. Specific psychological theories underpin general health promotion strategies which include but are not limited to, Social Cognitive Theory, the Transtheoretical Model, Process Motivation, the Behavior Image Model, Theory of Reasoned Action, and the Theory of Planned Behavior (Deliens et al., 2016; Holligan, 2017; Kelly et al., 2013).

The next section will review some of the most common explanatory theories used to inform health promotion interventions. Newer ideas on dual process theory will subsequently be reviewed.

2.9 Theoretical Models of Health Behavior Change

Over the past few years, health promotion interventions have been implemented at the post-secondary school level to change health-related behaviors such as increasing the consumption of FV or more broadly, to promote “healthful” eating. Theories and models have helped to develop various interventions achieve behavior change. There is not one single theory that is all encompassing hence many health behavior interventions have been informed by multiple theories and models. There are different levels of theories that address various factors at the individual level, the population level and the patient and treatment-delivery level. For public health interventions looking at behavior change, interventions developed will depend on a comprehensive mix of these theories and models used at many different levels (Riekert, Ockene, & Pbert, 2014). The models/theories often used in health promotion interventions are referred to as explanatory models of health behavior because they explain reasons why people make the choices they do.

The following models and theories have often been used to help develop health education interventions: Theory of Planned Behavior (TPB), Social Cognitive Theory (SCT), and the Transtheoretical Model
The common theme between these theories is that much of the focus is on the individual instead of the external environment.

### 2.9.1 Theory of Planned Behavior

Three types of beliefs determine one’s intention to conduct a certain behavior: attitude toward that behavior, one’s perception of how others perform that behavior (subjective norm), and one’s perception of control over the behavior. In sum, if one’s attitude and subjective norms are positive, and one’s perceived control is high then there is a strong likelihood that the desired behavior will be performed (Riekert et al., 2014). Again, this model does not take into account one’s behavior based on environmental/external factors.

This theory is less often used in intervention development compared to the others. A recent systematic review of 20 studies looking at dietary interventions in post-secondary students made no mention of using this theory (Deliens et al., 2016). A second systematic review conducted only 3 years before the latter showed no use of TPB after a review of 14 studies (Kelly et al., 2013).

### 2.9.2 Social Cognitive Theory

Social Cognitive Theory is one of the more common theories used in health behavior interventions. For example, in a recent systematic review of dietary interventions in college students, 7/14 of the studies used SCT to aid in the development of health education interventions for randomized control trials and quasi experiments (Kelly et al., 2013). SCT explains how behavior change depends on a mixture of environmental, personal, and behavioral factors and assumes that despite environmental influences being strong, people have the capability of self-regulating their behaviors (Bandura, 2004; Robinson, 2014). SCT specifies a set of determinants which are the basis for translating knowledge into health behaviors (Bandura, 2004). These core determinants are: knowledge of health risks and benefits of other health behaviors, perceived self-efficacy that one has control over their own behaviors, outcome expectations with regards to the expected loss or gain of participating in various behaviors, health goals that an individual sets for themselves, and the perceived facilitators as well as barriers to the changes they are hoping to make (Bandura, 2004).

According to the review by Kelly et al. (2013), the interventions that used SCT each had different outcome measures. Two out of seven studies that used SCT theories had follow up results and both studies showed no change or no maintained change in outcome expectations at follow up. The remainder of the studies using SCT showed mixed results with some outcome measures being met and others not.

One specific study of 80 college students (Ha & Caine-Bish, 2009) used a college-level nutrition education course to promote increased intake of FV and a 3-day food log to measure intake as the outcome measure. The class activities focused on various constructs of SCT including knowledge/skills of participants to perform behaviors (students select fiber-rich/low-fat food from a pretend menu), external perceived environmental factors (students were asked to bring food labels to class), perceptions of barriers/facilitators that would prevent participants from making changes (students shared opinions about adding more whole grains to their diet), expectations of positive outcomes if a certain behavior is modeled (eating more whole grains may make you feel better), self-control/self-efficacy over one’s own behavior (listing 3 good things they do for their body), and outcome expectations/reinforcements (students were asked to try a new vegetable-containing dish and write a report).
Before the study, 72% of participants were consuming 1 or less cup of total vegetables per day. By the end of the investigation, 65% of participants were consuming 1 cup or more of vegetables per day (p < 0.001). Fruit consumption also increased. Before the study, 92% of participants reported consuming 2 cups or less of fruit per day. After the semester, 22% of participants reported consuming more than 2 cups of fruit per day. This is a general increase of about 0.4 (fruit) and 0.7 (vegetable) servings/day, respectively. They also found a reduction in French fry intake by 0.07 servings/day but no changes in canned fruit or juice intake (Ha & Caine-Bish, 2009). Unfortunately, the long-term effect of the study was not included in the study design hence, as with many other SCT studies, the duration of maintenance of these new dietary behaviors is unknown.

The use of SCT to inform health behavior interventions has shown some promising short-term results, however SCT focuses heavily on an individual’s intentions and inner motivations for conducting behaviors. Many researchers question the practicality of continuing to use SCT to inform eating behavior interventions. Eating behavior is not solely something individuals do out of habit, rather it is also driven by environmental and salient cues that promote specific decision-making, as well as an individual’s knowledge base and skills to make decisions (Fishbein, 2009; Holligan, 2017).

2.9.3 Transtheoretical Model

The TM, also known as the Stages of Change, states that behavior change occurs throughout a process of six stages: precontemplation, contemplation, preparation, action, maintenance, and termination (Prochaska & Velicer, 1997). In a systematic review of 14 studies looking at dietary interventions in post-secondary school students, the TM was used twice to inform interventions (Kelly et al., 2013).

Like SCT, TM bases behavior change on the individual and their own knowledge, skills, and readiness to change which are all factors that operate through conscious decisions. Focusing on these factors disregards unconscious decision-making as an additional factor of human behavior. It assumes that behaviors are rational, conscious decisions, and makes no mention of unconscious decision-making or the effect the external environment plays on individual behaviors.

2.9.4 Summary of Health Behavior Models

Many public health interventions to change dietary behaviors, as noted in previous sections of this study, have not focused on altering the food industry (A. L. Wilson, Buckley, Buckley, & Bogomolova, 2016). There have been a variety of combined efforts by governments and health promotion establishments to help promote healthier nutrition habits however most of these efforts have focused on the provision of general dietary education programs that aim to improve attitudes, self-efficacy and intentions around developing healthier dietary behaviors. The unfortunate reality is that these types of interventions show limited behavior change results and have only modest (at maximum) effects on behavioral outcomes.

It is thought that the reason for the limited success of these interventions are due to the underlying use of health behavior change theories which are based on the idea that eating behavior and individual choices are made rationally and consciously. However, it is becoming more recognized that dietary behaviors are mostly habitual and often occur without conscious effort (A. L. Wilson et al., 2016). Habits may be hard to change however behaviors may be triggered by external environmental cues which do not involve conscious awareness.

Being aware of the importance and power that the external environment plays on individual behaviors, establishes ground for the use of interventions that alter the environment where dietary choices occur to
increase effectiveness of dietary behavior changes (A. L. Wilson et al., 2016). In the context of promoting FV intake in the post-secondary student population, this may include ideas such as, but not limited to, concepts such as altering existing layouts of food outlets and cafeterias to make FV easily accessible, placing FV at eye level to make them noticeable, and/or increasing the amount of FV being offered so that there are more FV options versus non-FV options.

2.10 Rationale for the Use of Dual Process Theory

The classic behavior models assume that humans are able to make rational decisions with their current knowledge base after evaluating the circumstances and potential consequences of their decisions (Carins, Rundle-Thiele, & Parkinson, 2017). Many interventions using these theories, often aim to alter individual factors such as self-efficacy, knowledge, attitudes, skills, perceptions, and intentions. More recently, research has indicated that some of these factors (namely, intentions) do not always result in the desired behavior (Carins et al., 2017; Holdershaw, Gendall, & Wright, 2011).

According to Holdershaw, Gendall & Wright (2011), the use of cognitive behavior models, more specifically TPB, is less effective at predicting behavior than it is at predicting intentions. Their study of predicting blood donation behavior based on intentions of blood donation showed poor efficacy in the use of predicting actual behavior based on behavioral intentions. They suggested against the use of TPB to predict donation behavior and proposed that actual behavior of an individual should be used as the dependent variable in future studies (Holdershaw et al., 2011).

More recently, scholars are supporting looking at behavior change with a wider focus, going beyond the individual and extending into the social and environmental setting the individual interacts within (Carins et al., 2017; Duane, Domegan, McHugh, & Devaney, 2016; Gordon, 2012; Hoek & Jones, 2011; Wymer, 2011). This approach is causing a direction away from interventions that are based on typical theoretical behavioral models towards alternate theoretical perspectives including dual process models of behavior that involve both conscious and automatic decision making (Carins et al., 2017).

Dual process theory has been widely used in the behavioral sciences and describes both conscious and automatic decision-making processes (Carins et al., 2017; Evans, 2008). Parallel to the cognitive behavior/explanatory theories, dual process theory explains that the act of decision making is based on information processing, cognitive processing, social judgement, and decision making (Wymer, 2011). All of these various ideas are split into two sets of processing: intuitive processing (system 1) and cognitive processing (system 2) (Evans, 2008). System 1 is considered “independent of general intelligence.” It may also be described as heuristic processes which otherwise can be described as practical approaches to problem solving including common sense gut feelings, choices made habitually, or ease of access, for example (Evans, 2008). System 2 includes mental processing that is more systematic or analytic (Evans, 2008). The difference between the two types of systems is “…heuristic processes are fast, automatic, and belief based, whereas analytic reasoning is slow, sequential, and can make an effort at deduction.” (Evans, 2008) p.263.

Another way to contrast the two systems of information processing is the idea that “heuristic responses can control behavior directly unless analytic reasoning intervenes. In other words, heuristics provide default responses that may or may not be inhibited and altered by analytic reasoning. Analytic system interventions may be cued by strong deductive reasoning instructions and may be more likely to occur when individuals have high cognitive ability or a disposition to think reflectively or critically” (Evans, 2008)(p.263).
Overall, dual processing theory helps explain the relationship between individuals and their external environment, acknowledging that individuals may not always have complete cognitive control of their decisions. Instead, individuals may have impulsive, automatic or stimulus-driven behavior which behavior change theories do not take into account (Carins et al., 2017; Evans, 2008; A. L. Wilson et al., 2016; Wymer, 2011). Most dietary behaviors are decisions that are made without conscious effort and are hence, habitual (Köster, 2009; A. L. Wilson et al., 2016). In fact, up to 90% of eating behavior can be considered automatic where it is both uncontrollable and unconscious (Carins et al., 2017; Cohen & Farley, 2008). It is influenced by the features of the environment thus it is suggested that changing the immediate micro-environment may promote desired behavior change(s) (Carins et al., 2017; R. H. Thaler & Sunstein, 2008; Wansink, 2004). Habits can be hard to change and are also influenced by environmental cues which are processed outside an individual’s conscious awareness (A. L. Wilson et al., 2016). This suggests that public health interventions should focus on changing ones’ environment in which they make choices, to help them make better or more health-promoting choices (R. H. Thaler, 2018). Some examples of this may include increasing the availability of FV in post-secondary FS environments while perhaps reducing the amount of non-nutrient dense options, making FV more accessible and easier to choose by putting them in more visible locations such as by the check-out counter, or closer to the front of other display areas where food choices are being made.

2.11 The Use of Nudging as an Approach Towards Environmental Change

When social marketing practices are influenced by dual process theory, it is proposed that interventions are likely to have a greater influence on human behavior because of the focus on environmental influencers (Wansink, 2004). The environment can be altered through “nudging” (R. H. Thaler & Sunstein, 2008). The concept of nudging involves altering the environment where people make choices (choice architecture) to promote them to make wiser choices without restricting their options (Münscher et al., 2016; R. H. Thaler, 2018). Thaler and Sunstein defined it as “…any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not” (R. H. Thaler & Sunstein, 2008)(p.8).

Nudging proposes that environmental changes such as changing layouts, or making “healthy” options the easier option, increases the chance that the healthier options will be selected (Milosavljevic, Navalpakkam, Koch, & Rangel, 2012). This means that both those individuals who are motivated and those who are not motivated would be affected by the alterations in their environment, thereby making it easier for those already motivated to choose the “healthy” option, and for those not motivated to still have easier access to the healthier option (R. H. Thaler & Sunstein, 2008). Recent research is proposing environmental alterations be included in the development of social marketing and/or public health programming to affect positive dietary behavior changes (Carins et al., 2017; Hoek & Jones, 2011). Just as was done with the tobacco industry, where many environmental interventions were implemented (reducing the visibility of tobacco products in convenience stores and removing mass-media promotions of tobacco companies, for example), it is suggested that micro-environmental changes could be implemented as a start to promote overall dietary behavior changes and increased FV consumption. Examples could include reducing visibility of non-nutrient dense items by placing them behind nutrient-dense options or increasing the availability FV options. These ideas need to be tested empirically to see if they have an effect on behavior change.
2.12 Marketing vs Nudging: What’s the Difference?

It may seem there is cross-over between traditional marketing and nudging however the newer concept of nudge marketing aims to benefit the health of the consumer at large, by focusing on options that are best for the consumer while still giving them the option to choose the alternate option. In contrast, traditional marketing generally aims to benefit the seller to maximize profit where the focus is on what needs to be sold instead of what is best for the consumer.

Another concept to note about nudge approaches is that in contrast to traditional marketing, nudge approaches rely on behavioral experts to work from a public policy mandate whereas traditional marketing generally focuses on increasing profit for a company. Marketing and nudging may use many of the same strategies but goals may differ. It is more likely that nudge approaches can be translated into public health policy whereas traditional marketing is less likely to be used in a public policy setting.

2.13 Frameworks for Nudging

The field of nudging is still quite new and evolving. As a result, there are many frameworks (Blumenthal-Barby & Burroughs, 2012; Cadario & Chandon, 2018; Münscher et al., 2016) noted in the literature that help classify categories of various nudge interventions. The next section will cover three of the main nudge frameworks noted in the literature and will conclude with a discussion of which framework will be used in this study.

2.13.1 Taxonomy of Choice Architecture (Münscher et al., 2016)

Münscher et al. (2016) describes three categories of choice architecture. Choice architecture “helps people improve their ability to map and hence to select options that will make them better off.” (R.H. Thaler, Sunstein, & Balz, 2010) An adaptation of this proposed framework for nudging is included below in Table 1.

Table 1: Summary of Choice Architecture Categories and Techniques (Münscher et al., 2016)

<table>
<thead>
<tr>
<th>Category</th>
<th>Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Making information simple or reframing the description</td>
</tr>
<tr>
<td></td>
<td>A2. “Make information visible”</td>
</tr>
<tr>
<td></td>
<td>Making information in the external environment more visible or making own individual behavior visible</td>
</tr>
<tr>
<td></td>
<td>A3. “Provide social reference point”</td>
</tr>
<tr>
<td></td>
<td>Being influenced by social norms or by external influencers including opinion leaders or respected individuals</td>
</tr>
<tr>
<td>B. “Decision structure”</td>
<td>B1. “Change choice defaults”</td>
</tr>
<tr>
<td></td>
<td>Changing the default option or prompting a specific choice</td>
</tr>
<tr>
<td></td>
<td>B2. “Change option-related effort”</td>
</tr>
<tr>
<td></td>
<td>Altering the effort involved in choosing an option so that it is easier or more difficult</td>
</tr>
<tr>
<td></td>
<td>B3. “Change range or composition of options”</td>
</tr>
<tr>
<td></td>
<td>Changing the composition of options so that it is more or less attractive</td>
</tr>
<tr>
<td></td>
<td>B4. “Change option consequences”</td>
</tr>
<tr>
<td></td>
<td>Including “micro-incentives” as a benefit or small cost that alters the</td>
</tr>
</tbody>
</table>
Category A, “decision information”, is based on the premise that consumers can be nudged to choose a target alternative by altering certain aspects of the information about the alternative or decision. Category A consists of three sub-categories or techniques. First, “translate information” technique refers to reframing or simplifying information. For example, this may include writing a descriptive menu name for a FV-rich item like, “honey-glazed carrots”. Second, “make information visible” refers to making one’s own behavior visible and making external information visible. In the case of nudging for FV an example of this may include placing FV menu items at the beginning or end of a menu so that they are more visible. Third, “provide social reference point” refers to using opinion leaders or respected individuals to endorse items. An example of this may include using Registered Dietitians to endorse FV consumption.

Category B, “decision structure”, is based on the premise that consumers can be nudged through rearranging options and the “decision making format”. Category B consists of four sub-categories or techniques. First, “change choice defaults” includes changing default options to prompt a specific choice over another. An example of this may be changing the default combo option for a hamburger to a F/V instead of fries, for example. Second, “change option-related effort” refers to increasing or decreasing the effort it takes a consumer to choose something either financially or physically. For example, this may include altering the placement of a salad bar so that it’s centrally-located and easier for consumers to see. Third, “change range or composition of options” refers to changing categories or changing the way options are grouped. This may include adding more FV options to a salad bar to increase the options available for consumer. Fourth, “change option consequences” refers to connecting decisions made by consumers to a benefit or a cost or changing the social consequences associated with a decision. An example of this may be using an express checkout line for people purchasing FV-dense meals so that they are able to purchase things faster and skip large lineups.

Category C, “decision assistance”, is based on providing assistance to consumers to help them make the “better” decision. Category C consists of two sub-categories or techniques. First, “provide reminders” refers to providing reminders that increase the salience or prominence of the specific option being nudged. An example of this could include sending text messages about the available FV-rich meals to students on campus. Second, “facilitate commitment” refers to making individuals more likely to purchase certain items or to conduct a certain behavior. The main idea is to help counter any issues relating to a lack of self-control. An example of this may be earmarking a certain percent of a student’s meal plan towards the purchasing of FV’s. The nudge interventions noted in this framework appear to align mostly with the concepts of system 1 of the dual process theory which states that decisions are made without conscious effort and are automatic and unconscious (Carins et al., 2017; Evans, 2008; Köster, 2009; A. L. Wilson et al., 2016). As of late, researchers are noting that eating behavior is mostly automatic and that it is mostly environmental features that influence eating behavior (Carins et al., 2017; Cohen & Farley, 2008; Wansink, 2004).

2.13.2 Nudge Framework by Blumenthal-Barby & Burroughs (2012)

Another framework suggested by Blumenthal-Barby and Burroughs (2012), adapted from the framework by Dolan (2012) for nudging, is an ethical framework to implement nudge techniques for health care
providers and policymakers. The framework classifies nudges based on six categories. The first, priming nudges, involves verbal, physical, or sensational cues. An example of this may be text messaging to consumers on new, available FV-rich dishes in a student cafeteria. The second is salience nudges which involves new, personal, or vivid examples to increase attention to a certain choice. An example of this may be enhancing the quality of food photography to help make options look more appealing. The third is default nudges. These make the “healthier” choice the default choice. An example of this could be changing the default fry option in a combo, to a fruit or vegetable instead. The fourth category is incentive nudges. Incentive nudges reinforce a good choice. An example of this is the use of loyalty cards where consumers receive a 10th fruit free after they buy 9. The fifth category is commitment/ego nudges where consumers commit or promise the public or themselves to make a choice such as eating more FV. The last, or sixth category is norms/messenger nudges. These use other people to set a norm and influence consumers to make a healthier choice. This may include using a well-respected individual or celebrity to endorse the consumption of increased FV intake (Blumenthal-Barby & Burroughs, 2012).

2.13.3 Nudge Framework by Cadario & Chandon (2018)

Another, more recent review broadly categorizes nudges based on three categories (Cadario & Chandon, 2018) and attempts to incorporate previous frameworks for classifying different types of nudges. Rather than focus on the actual intervention, the decision process or the effects on individuals, these authors classified nudging interventions into 3 major categories: cognitive nudges (knowing), affective nudges (feeling), and behavioral nudges (doing). This review used a three-level meta-analysis of 286 effect sizes, 82 articles and 88 field studies of “healthy” food nudge interventions. The studies reviewed look at both field and lab settings where “healthy” eating nudges were used. These categories of interventions are explained further below:

Cognitive Nudging

According to the authors, cognitive nudges are described as nudges that inform consumers. They identified three types of cognitive interventions. These include “descriptive nutrition labelling”, such as providing calorie counts or information on other nutrients. The second is, “evaluative nutrition labeling” which includes adding special symbols like heart-healthy icons or green lights for healthy items and red lights for unhealthy items. The third is “salience enhancement” which involves increasing visibility of healthier options on market shelves or placing healthier options at eye level (Cadario & Chandon, 2018).

Affective Nudging

Affective nudges attempt to change how customers feel without changing what they know. According to Cadario and Chandon (2018) there are two types of affective nudges. The first is termed, “hedonic or sensory cues”. This may include using vivid descriptions to explain a menu item or attractive, unique displays such as fruit pyramids, for example. The second is called, “healthy eating prods”. These include messaging that promotes healthier eating or deters unhealthy eating. An example would be a message that is placed near healthier options that says something such as, “Fresh, crisp, and easy to eat if you’re on the run!” Or, to deter individuals from unhealthy choices, messaging may say something such as, “Aim for a balanced meal. Take half a portion of fries!”

Behavioral Nudging

Behavioral nudging attempts to alter individual’s motor behaviors without altering what they know or how they feel. Often, individuals are not even aware of the existence of these types of nudges. There are
two types of interventions within this category. The first is “convenience enhancements”. These make it
easier for individuals to choose healthier options and may include things like making the healthier options
the default option in a combo, for example. Other examples may include simply making it more difficult
for individuals to select an unhealthy option such as a deep-fried meal option. An example may be putting
the fries at the end of the cafeteria line once an individual’s tray is likely already filled. The second type
of behavioral intervention is called “plate and portion size changes”. This type of nudge involves
changing the size of the pre-plated portions or increasing or decreasing the amount of “healthy” or
“unhealthy” food they contain (Cadario & Chandon, 2018).

One thing to note about this classification system is that cognitive nudges are described as “evaluative
nutrition labeling” (adding special symbols like heart-healthy icons) and “descriptive nutrition labeling”
(providing calorie counts) which involve the use of system 2 of the dual process theory where decisions
are made based on problem solving. It could be argued that these two types of nudges may not in fact be
classified as nudging as they don’t involve the use of system 1 in the dual process theory.

2.13.4 Framework of Choice for this Paper

The Taxonomy of Choice Architecture (Münscher et al., 2016) will continue to be referred to throughout
this paper as thus far, it provides one of the most organized taxonomies for defining various nudge
interventions. It was also one of the most recent nudge frameworks at the time of beginning this study.
Furthermore, we believe the use of nudge interventions on behaviors plays into system 1 of the dual
process theory. The Taxonomy of Choice Architecture aligns completely with the concepts of system 1 of
the dual process theory.

2.14 Does Nudging for “Healthy Eating” Work?

There have been numerous intervention-based studies looking at nudging for improving intake of
healthier food options. This next section will cover the most recent studies that review the effectiveness of
nudging for “healthy” eating. It appears there are generally mixed results with regards to nudging
effectiveness however given the newness of the concept, studies often conclude that more, quality-based
studies need to be conducted (Bucher et al., 2016; Vecchio & Cavallo, 2019).

The most recent systematic review looking at nudging for “healthy” food choices shows the lack of nudge
intervention studies being conducted in post-secondary environments. It also states that many of the
nudge studies are concentrated in select few countries including parts of Europe and the United States.
These studies are often conducted in specific, somewhat controlled environments including elementary or
middle school settings leading to a lack of generalizability to other settings (Vecchio & Cavallo, 2019).
Some nudge intervention studies also fail to report a sample size and have varying outcome measures.
This makes it hard to compare studies to each other and to gain an understanding of the magnitude of the
effect nudging has. Overall, this systematic review looked at a total of 36 articles between 2016 to 2018.
Two specific types of articles were reviewed: Reviews (n=10) and empirical studies (n=26). Vecchio and
Cavallo found that over 80% (21/26) of the empirical studies showed positive nudge outcomes. This
study discusses the challenges of the lack of a clear definition of nudging between various studies due to
the newness of the concept as well as the variety in use of various taxonomies to describe nudging. Due to
this, some articles that perhaps could have been included in this study, may have been excluded (Vecchio
& Cavallo, 2019).

In 2014 the Swedish Environmental Protection Agency put out a report looking at how nudging can be
used to promote sustainable behavior. The report stated that nudging for food consumption in real world
settings has shown limited success. “While laboratory experiments and interventions both point towards considerable potential of nudging in food consumption, real-life success of nudging interventions has so far been limited. Best results can be found where nudging can be applied without the counteracting effect of marketing.” (Mont, Lehner, & Heiskaenen, 2014). This report then suggests that nudge interventions would be best used in controlled environments where there are few forces to counteract the nudges and where only one authority can implement the nudge intervention.

At the time this report was published (Mont et al., 2014), nudging was still quite a new idea hence over the past few years, there have been a plethora of more intervention studies. One of the more recent systematic reviews by Bucher et al., published in 2016 looked at one specific type of nudge intervention in the context of “healthy” eating: altering food placement or food position/ordering/accessibility. The review found 15 articles with a total of 18 studies that met the inclusion criteria for the specific nudge intervention. What is interesting is that 10 of these articles were conducted in university-settings, one on children, five on hospital cafeteria customers, one study in an army research center and one with attendees of a health conference. The foods involved in this study included water, fruit, vegetables, cereal bars, chocolate, candy and/or crackers. Sixteen out of the eighteen studies reviewed noted a positive effect on food choice where participants were successfully nudged towards a “healthier” option (Bucher et al., 2016). The other two studies where there was no impact on food choice, had only a very minor degree of manipulation of positioning and all of the available food options were still within reach. This finding suggests that the effect of nudge interventions may depend on the kind of positional manipulation (order versus distance) and the degree of change (how far away the food choice is placed). Some limitations to this systematic review were the inability to directly compare effect sizes of various interventions due to the variability in study designs and the lack of long-term follow up to understand whether effects are sustained or not (Bucher et al., 2016).

In the meta-analysis by Cadario and Chandon (2018), three categories of nudging were used to explain the various nudge interventions “healthy eating” (cognitive, affective, and behavioral nudges as explained above). Of all the three categories, behavioral-based nudges proved to be the most effective at promoting “healthy eating” (Cadario & Chandon, 2018). Examples of these behavioral nudges included convenience enhancements such as making utensils more convenient to access, changing the default choice, “grab and go” line for FV-rich meals, placing foods earlier in the cafeteria line, pre-sliced, and pre-portioned or preserved “healthy food items”. The other type of behavioral intervention noted was using larger plates for healthier options (Cadario & Chandon, 2018).

A systematic review of 13 articles reviewed various nudge interventions and their effect on “healthy” food intake (A. L. Wilson et al., 2016). The authors aimed to understand whether or not nudging strategies influenced adult food and beverage choices using the framework and classification of nudge interventions developed by Blumenthal-Barby and Burroughs (2012). Studies using nudge and choice architecture principles can influence healthier food and beverage choices however, the outcomes noted are not always consistent in all studies (A. L. Wilson et al., 2016). This study also concluded that priming and salience type nudges when combined, were generally effective in promoting desired behaviors. Priming nudges are subconscious cues that may be physical, verbal or sensory and are altered to nudge a specific choice (Blumenthal-Barby & Burroughs, 2012; A. L. Wilson et al., 2016). Salience nudges are new, vivid examples and explanations of items that help draw attention to that specific choice. The aim is that the reactions elicited from these types of nudges are primarily emotional responses to the specific nudge (Blumenthal-Barby & Burroughs, 2012; A. L. Wilson et al., 2016). All of the studies using these two types of nudges proved to be effective for influencing “healthier” choices (A. L. Wilson et al., 2016). The various types of mixed nudging (salience and priming) included interventions increasing visibility, accessibility and availability combined with “traffic-light labels” where red would cue an “unhealthy”
option; yellow, a less “healthy” option; and green, a “healthy” option. This would be used in combination with altered visibility, prepackaging and altered placement of options (A. L. Wilson et al., 2016).

Another recent meta-analysis attempting to answer whether nudge theory is effective at promoting better dietary behaviors looked at reviewing the percent change in behavior when using nudge interventions for “healthy” eating (Arno & Thomas, 2016). This study included 42 intervention studies in a population age range of 18-65-year-old adults and included studies that aimed at influencing food consumption behaviors. Any studies focusing solely on beverages or alcohol consumption were not included. The analysis found an overall 15.3% increase in “healthy” food choices when using nudge-based interventions. Unfortunately, this study cannot be easily compared to the previous studies noted as this study did not refer to any specific nudge-related frameworks to categorize their findings and also only focused on reviewing the percent behavior change of all the studies. Thus, there were no overarching conclusions as to which specific nudge interventions work best. Some of the specific nudge interventions included in the meta-analysis involved changes to the environment like changing the size of a food unit in a cafeteria to reduce the non-nutrient dense options available; changes in perception of serving size such as using smaller serving utensils; changes in availability of non-nutrient dense food items; and knowledge-based changes such as adding more nutrition-specific labelling to items to explain the nutritional content of food [95% CI=7.58-23.0]. (Arno & Thomas, 2016).

2.14.1 Addressing the Lack of High-Quality Nudge Intervention Studies for “Healthy Eating”

To address the lack of high-quality evidence in estimating effect sizes of nudging (Vecchio & Cavallo, 2019), a recent proposed study stresses the importance of setting appropriate outcome measures (Velema, Vyth, & Steenhuis, 2017). This recent proposed randomized controlled trial intervention study of 19 nudges to promote nutrient-dense eating in 34 workplace cafeterias suggests that setting similar primary and secondary outcome measures for understanding the effectiveness of nudging may help improve the quality of future nudge studies. They also propose that developing interventions with input from workers within the environmental setting of the nudge and in cooperation with nutrition experts and food suppliers, nudging may have better long-term viability. Velema et al.’s (2017) proposed intervention study involved a variety of 19 different nudges covering all categories of the Taxonomy of Choice Architecture framework (Münscher et al., 2016). The suggested primary outcome measure was sales data of nutrient-dense items and the suggested secondary outcome was the satisfaction of customers with the environment of the cafeteria or setting. This study particularly aimed to describe the study design of measuring the effect of multiple nudge strategies implemented simultaneously. If future nudge studies continue to mimic similar outcome measures, perhaps estimated the magnitude of nudging effects may become more feasible (Vecchio & Cavallo, 2019; Velema et al., 2017).

2.15 Does Nudging to Promote FV Intake Work?

The previous section looked at nudging interventions used to promote general “healthy” eating however there have been fewer studies conducted reviewing the use of nudge interventions for FV intake. The following section reviews the most recent systematic review, meta-analysis review and a more recent intervention study on nudging for FV intake.

One of the first and most recent meta analyses reviewing the effectiveness of nudge strategies to promote FV consumption showed that nudging can be considered a potentially effective way to promote “healthy” behaviors. Broers et al. (2017) found that empirical evidence around the effectiveness of nudge interventions to promote FV intake has been mixed thus far. The 14 studies analyzed in this review found
sufficient statistical information to calculate effect sizes. The results of the review showed an overall significant effect ($P<0.001$) and a medium effect size ($d=0.30$ [95% CI = 0.178-0.430]) for nudging for FV consumption (Broers et al., 2017). The review showed that of the different types of nudging considered in these studies (altering properties, altering placement and altering properties and placement), only altering placement ($d=0.39$) and combining altering properties and placement ($d=0.28$) had a significant effect on food choices and a medium effect size.

Altering properties of objects may include interventions such as altering aesthetic or atmospheres of the surrounding environment (increasing the size of a salad bar), labelling of information such as adding fiber totals on products at point of purchase, altering sensory aspects or visual designs of products through presentation displays (adding more lighting around FV-rich meals), and changing sizing or quantity of products (making bigger plates easily accessible in areas where there are high amounts of FV). Altering placement involves interventions such as adding more FV options within a given environment, and changing the proximity of objects to make choices easier or more difficult to choose. Finally, combining the alteration of properties and placement translates into two main intervention types called priming and prompting. Priming involves placing cues to influence a non-conscious behavioral response (placing FV rich items at the beginning of a menu board so they’re easier to notice) and prompting involves using non-personalized information to help raise awareness or promote a specific behavior (adding nutritional analysis information on the front of packaging to make consumers easily aware of the good-for-you nutrients) (Hollands et al., 2013).

When the review used a sub group analysis, the results showed that nudging had a significant but small effect on fruit ($d=0.10$) and vegetables ($d=0.10$) separately. 52% of the studies mentioned in this review were conducted in elementary and high schools which could mean that the results may be more applicable to the school setting themselves where there is more ability for control of interventions. The authors suggest that more studies should be conducted with older participants, however there is limited research on nudge interventions for increasing FV consumption in older than elementary school-aged populations (Broers et al., 2017). Overall, based on results to date, we can conclude that nudging of FVs is promising and sales or intake and altering placement and combined nudges seem to be the most effective ways to apply nudging interventions for health behavior change (Broers et al., 2017).

Another systematic review looking specifically at nudging of vegetables showed promising results when using salience nudges. Specifically, the study looked at changes made to the way vegetables were served, allowing for more varieties and allowing for more availability of vegetables (Nornberg, Houlby, Skov, & Perez-Cueto, 2016). These salience nudge interventions were associated with higher consumption of vegetables in general however, what the studies were measuring as outcome variables ranged greatly from measuring caloric intake of vegetables to having participants draw how much and the composition of their meal on 9 inch and 11 inch plates (looking at intentions versus actual behavior) (Nornberg et al., 2016). The general results of the studies they reviewed were mostly inconclusive and/or the methodologies were weak or of moderate quality (Nornberg et al., 2016). It should be noted that this review looked at 12 articles; 6 of which the authors of the systematic review claim to be weak, 5 as moderate and 1 as strong (Nornberg et al., 2016). Finally, these studies looked at an age group range of 11-19 years of age and included students in elementary, primary school, high school, college and university settings. Only 2 of the 12 studies looked at students in a university setting (Nornberg et al., 2016).

Since this review was written, more nudge studies have been published. One notable study with newer insight into nudge effectiveness was conducted in a university setting. This intervention study reviewing the conditions needed for effective nudging looked at nudging for vegetable choices (Broers, Van den Broucke, Taverne, & Luminet, 2019). The aim was to increase the choice for prebiotic vegetables at a hot

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table consisting of various vegetables within a restaurant in a university setting. The prebiotic vegetables used were salsify, artichoke, and Jerusalem artichoke. A nonrandomized intervention study design was used with two interventions that lasted 5 weeks. Two nudges were used. The first nudge was the use of “cue-to-action” messaging placed on student’s trays and above the hot table. The second nudge was ensuring the placement of dishes with prebiotic vegetables were in a more accessible spot. Overall the “cue-to-action” intervention increased vegetables that tended to be more familiar to customers and decreased the purchasing of prebiotic vegetables. The placement of plates did not change the prebiotic vegetable choice. Conclusions from this study suggest that nudge effectiveness may depend on what nudged products consumers feel are most familiar to them (Broers et al., 2019).

The current literature that exists generally shows mixed results or the study methods themselves were not considered robust enough to draw strong conclusions of the effectiveness of nudge strategies. Overall some potential associations have been noted between specific nudge interventions and effectiveness of promoting behavior change; more specifically with increasing the variety of food item(s) offered (Nornberg et al., 2016).

There continues to be a general gap in nudge-based literature looking at the use of nudge interventions for health behavior change in post-secondary school settings. Nudging is still considered a new area of research and new studies are continuously being published around nudging towards health behavior changes. There appears to be more recognition of the need to target post-secondary school institutions for promoting “healthy” eating behaviors given the transitional stage of life that individuals experience in these environments, leaving them vulnerable to developing poor dietary habits if the environments themselves do not promote positive dietary behaviors. Furthermore, when nudge interventions are used in controlled settings, like post-secondary institutions, they are more likely to produce positive effects.

2.16 Dietary Nudge Interventions in Post-Secondary Schools

The previous section focused on looking at whether nudging for FV is effective or not. This next section will specifically focus on the use of nudging used in post-secondary institutions with a focus on general “healthy” eating nudges as well as FV nudges. There has been little research conducted on the use of nudging in the post-secondary context hence there are only a few studies noted in this section.

Current and previous interventions to prevent weight gain in the post-secondary school population have usually involved behavior change interventions given the vulnerability of this population and the barriers they face to maintaining a “healthy” weight. Nudge interventions, however, have been less-frequently documented for use within post-secondary school settings. The most recent systematic review, published in 2013, reviewing nudge based interventions for “healthy” eating in post-secondary schools found 14 randomized control trials or quasi-experimental interventions targeting dietary outcomes of various types of nutrition/dietary interventions including non-nudge-based interventions amongst college and university students (Kelly et al., 2013). They evaluated the effectiveness of the various interventions and found in general, in-person interventions (n=6) such as educational classes or interactive activities with students showed minimal changes. The researchers suggested that self-regulation, self-monitoring and goal setting components would likely maximize the effectiveness of nutrition/dietary outcomes.

Next, dietary outcomes due to online interventions (n=5) were less effective at changing eating habits and lastly, environmental changes/approaches (n=3) were promising in changing eating behavior. Each of the 3 environmental-change-based studies involved using point of purchase (POP) strategies to increase purchasing of healthier food items such as FVs (Kelly et al., 2013). This support the use of nudging.
One of the earlier nudge-based intervention studies conducted in 2001 (Buscher, Martin, & Crocker, 2001) used POP interventions including bright cartoon characters, large POP messages at the entrance of a university dining hall and smaller POPs next to targeted food items like yogurt, pretzels and whole FVs to increase sales over a 2-week intervention period. Though this study did not make mention that the strategies used were nudges, they could be classified as nudges. For example, some of the POP messaging used around the items being nudged included: “Revitalize yourself by snacking on a fresh basket of crisp red peppers, juicy tomatoes and crunchy carrots. Easy to eat on the run!” and “Boost yourself with fresh pineapple, oranges, grapes, and melon! Pick up a fruit basket—it’s fast and budget-friendly.” These could be classified as C1 in The Taxonomy of Choice Architecture (Münscher et al., 2016): Decision assistance, providing reminders. As hypothesized by the authors, pretzels, yogurt, and whole fruit sales increased however the sales of FV baskets did not change significantly compared to the individual sale of FV (Buscher et al., 2001).

Overall, the conclusions of the systematic review noted earlier, (Kelly et al., 2013) suggest that the most effective interventions will likely be those that use a combination of face to face, online, and environmental factors/nudges or visual cues to increase “healthy” food sales. More research is needed to compare the effectiveness of the various types of approaches (Kelly et al., 2013). It was also suggested in an earlier section of this study that the use of nudging in a post-secondary setting may favor specific choices that customers are already familiar with (Broers et al., 2019).

2.17 Feasibility of Moving Nudge Evidence into the FS System

Although the concept of nudging is becoming more well-known and widely used, the use of nudging for FV in the post-secondary institution setting has been minimally researched. There are minimal studies looking at the link between FS operations and the design of the environment with limited scopes of analysis. Furthermore, nudge intervention studies have not generally been implemented long term and the perceptions of FS management regarding the feasibility of implementing a nudge has not often been studied. Understanding what makes nudging feasible in an environment can help ensure the longevity and efficacy of the nudge(s) (Velema et al., 2017).

Some studies propose that nudging may be considered easy for FS management to do considering the “simplicity” of some of the interventions. In a general review on the use of nudging for policy development, Lehner, Mont & Heiskanen (2016) argue that the use of nudge-based interventions may be effective in facilitating consumer behaviors/choices in a FS context to promote the consumption of nutrient-dense foods and decrease consumption of foods not considered nutrient-dense such as deep-fried potato chips, for example. This review paper also points out that nudging relies on system 1 of the dual process theory and human behavior is not solely dependent on cognitive processing, but more so on automatic and intuitive behaviors. A publication by Saulais (2015) aimed to provide an overview of suggestions for FS to implement to improve the nutritional quality of meals served to customers. This paper suggested that nudging is a promising technique and may also be a simple and inexpensive option from a managerial perspective because nudge interventions may include simple, inexpensive changes to the environment such as a simple switch in the order of menu items, or changing the placement of a fruit basket, for example (Saulais, 2015).

A recent thesis study looking at the proposed use of nudging was published at the University of Guelph in 2017 (Holligan, 2017). This study did not examine the overall perceptions of FS management towards nudging. It did however involve an interview with the FS Director who was able to provide information on which nudges would be feasible or not in that specific setting (Holligan, 2017). Gaining the
perspectives from FS management of whether nudges are feasible or not in a given setting is an important factor in ensuring the longevity and feasibility of a nudge (Houghtaling et al., 2019; Velema et al., 2017).

Understanding the barriers FS managers face towards implementing nudging will help us understand the feasibility of specific nudges. Studies exploring FS manager perceptions of nudges are rare. One recent study explored restaurant manager’s perceptions (n=15) of changing menu design to favor “healthier” consumer choices (Filimonau & Krivcova, 2017). This study shows that restaurant managers were aware of their customer’s awareness around the consequences of their food choices on their health and the environment. Despite this, they were skeptical about altering menu design as a way to alter consumer’s choice for “healthier” options. Some of the barriers this study found for managers implementing altered menu designs were lack of internal resources to maintain and implement the menu changes (finances, labor/expertise, time), inconsistent demand from customers, operational and organizational barriers. Specifically, operational and organizational barriers included size, type and location of business, size of supply chain, the lack of support and commitment from management, frequent alterations of the menu, having to cook from scratch if “healthier” options were to be included and potential damage of a restaurant’s reputation (Filimonau & Krivcova, 2017).

For a nudge intervention to be successful Filimonau and Krivcova (2017) propose that the nudge has to meet two fundamental criteria: 1) Do not restrict options for consumers so that they can freely choose anything including the “unhealthy” options. This means options that are not nutrient-dense, such as deep-fried items, are still made available to customers. 2) Nudge interventions should not cause too much distraction so that the least amount of change to consumer behavior is made and no extra effort from the consumer is needed. This could include something as simple as moving FV closer to a checkout counter so they are more visible (Filimonau & Krivcova, 2017). These interventions should be easy to implement with minimal associated monetary costs for a FS operation (Saulais, 2015).

The most recent publication on understanding the willingness of FS managers to implement nudging was a recent publication by Houghtaling et al. (2019). This systematic review was conducted to better understand the ability and willingness of food store owners towards using nudging and marketing mix strategies to promote “healthy” purchases in the United States. This review looked at articles published between 2005-2017. Thirty-one articles met the inclusion criteria for this review with most of these studies being qualitative in nature. These studies were done in city-based food stores. There were many factors that this study found which influenced retailers’ decisions to using nudging.

The first factor was the concept of employee training. Some studies showed that employee trainings to enhance self-efficacy, knowledge, and customer service were not always helpful while other studies found that retail training was well-received amongst employees and caused improved retailer capacity for implementing nudging (Houghtaling et al., 2019).

A second factor mentioned by this review was the importance of trust between the retailer and the researcher or choice architect. It is recommended that a mutually-trusting relationship be formed to facilitate the success of nudge interventions (Houghtaling et al., 2019).

A second factor was the fact that these food environments were typically convenience stores where perceptions from store-owners of their own stores were conflicting with “healthy” food goals as business owners described their business model to favor quick-grab, “unhealthy” items instead of typical “grocery” products that may include FV, for example. Consumers of convenience stores were therefore reluctant to stop selling “unhealthy” items (Houghtaling et al., 2019).
Another interesting finding was where certain convenience stores were franchises, owners had less control over the type of items being stocked and the placement of these. This is similar to institutions who are under outsourced FS contracts and also institutions that have a number of franchises on the campus. In general there is a lack of control of what is supplied and where it is placed when the institution’s own FS management is not in control of those locations (Houghtaling et al., 2019).

A large barrier to implementing nudging was where convenience store management noted a lack of time for implementing new processes that were outside of their scope and immediate job requirements. The coordination of a business as a whole was considered to be costly and difficult and adding new processes would only increase the difficulty (Houghtaling et al., 2019).

Overall, the suggestions of this study show that businesses may benefit from research partnerships for positive public health outcomes and it is important to continue a positive and trusting relationship between the retailers, or in our, the FS managers of post-secondary institutions, and/or the choice architects themselves. In the case where a manager themselves is in fact the choice architect, then it is likely that they would continue to do what is easy and only implement interventions that are the least costly, involve the least amount of coordination, and benefit the community or customers they are serving by meeting their demands (Houghtaling et al., 2019).

Houghtaling et al. (2019) reinforce the lack of studies involving perceptions of food managers regarding the uptake of nudging. They also noted the lack of quality nudge intervention studies which has been noted by most authors of nudge intervention research.

In conclusion, ensuring FS management are consulted before implementing nudges will help ensure the efficacy of nudging. Understanding facilitators, barriers, and perceptions towards nudging can help ensure the longevity and efficacy of nudges. The next section expands upon this in relation to our study in more detail.

2.18 Why Interview FS Management?

Given the emergence of nudge research for food selection, a critical question is the degree to which such approaches are acceptable and feasible for different types of FS to implement. Small effect sizes suggest that such interventions will need to be broadly available to be able to impact the overall dietary intake of consumers. This research study involved interviews with FS management at various post-secondary schools throughout Canada. The reason for choosing this population is to better understand what facilitators and barriers exist or are perceived by them for implementing marketing and nudge interventions on campus to promote FV intake. The study also aimed to obtain information on participants’ familiarity with nudging and what they are currently doing that may be considered a nudge.

Since FS managers and directors generally control the marketing and environmental layouts/organization of their FS departments, we want to better understand whether they perceive nudging to be acceptable and feasible within their institutions so that they have a better chance of adopting these interventions. Furthermore, by understanding the facilitators and barriers of implementing nudge interventions, providing suggestions to promote the facilitation of nudging will be more feasible.
2.19 Methods for Looking at Uptake of New Innovations

2.19.1 Ottawa Model of Research Use

The uptake of nudging as a health promotion intervention into post-secondary institution FS would require some changes to the current FS environments of these institutions hence it is important to consider how this might be accomplished. One approach is to use a knowledge translation framework to help direct the uptake of new innovations especially in large organizations where change may be difficult.

The Ottawa Model of Research Use describes the necessity to assess the barriers and facilitators in one’s environment for the adoption of new innovations. The model involves the use of knowledge translation (KT) (also known as Diffusion of Innovation) and is done by creating knowledge from reviewing primary and secondary studies/reviews or other formal publications. It is then applied through adapting the knowledge gained to the specific context. It is proposed that the use of nudging for FV in post-secondary schools can be implemented based on the six steps outlined in the Ottawa Model of Research Use:

1) Set the Stage: identify individuals that have authority to make alterations within an environment and determine the available resources needed for implementation of the innovation.

2) Specify the Innovation: clearly describe what the innovation is and what implementation looks like.

3) Assess the Innovation, Potential Adopters and the Environment for Barriers and Facilitators: Conducting a situational assessment to determine current practice. Identify barriers and facilitators of the implementation of the innovation. Identify potential adopters and the specific environment that may adopt the innovation. Find ways to overcome any potential barriers to implementation and identify perceptions and attitudes of the potential individuals who may adopt the innovation. Finally, identify gaps between current and recommended changes.

4) Select and Monitor the Knowledge Translation Strategies: Select appropriate strategies as well as interventions to increase the awareness of innovations and understanding of the innovation. Provide training for the adopters to be able to implement the innovation. Conduct follow up interventions and evaluate the effectiveness of knowledge translation.

5) Monitor Innovation Adoption: Evaluate the adoption of the innovation and determine how far the innovation has spread throughout the environment or organization. Evaluate how practices have changed and assess if the knowledge translation strategies were sufficient for the adoption of the innovation.


This framework helps individuals create change at the organizational and systems level (I.D. Graham & J. Logan, 2004). The concept of KT states that it is a dynamic process between research development and the use of research itself; the consumer/client is the central point in which the entire process is designed around (because their health outcomes are the main focus) and finally, the process of KT assumes that processes are affected by external societal and health care environments (I.D. Graham & J. Logan, 2004).
2.20 Conclusions to Literature Review

This review shows evidence of the lack of quantity and quality research in the area of nudging for FV intake in post-secondary school settings. Though there have been a few recent review articles on nudging to promote “healthy” eating, there has been little research on the specific use of nudging for FV in post-secondary settings. The most recent systematic review on nudging for FV by Broers et al., (2017) outlines the need for increased studies on nudging for FV to perform stronger meta-analyses in the future.

Furthermore, in post-secondary school settings nudging may prove to be rather effective because of the controlled environment. There is also a need for greater health behavior interventions within this demographic given the many barriers they face to “healthful eating” when entering this new environment as well as preventing them from developing poor dietary habits during adolescence. (Arno & Thomas, 2016; Broers et al., 2017; Cadario & Chandon, 2018; Hollands et al., 2013; A. L. Wilson et al., 2016).

This study reviews current and recent marketing practices for FVs in 10 post-secondary institutions across Canada, assesses FS management’s awareness of nudge marketing techniques and identifies the perceived facilitators and barriers to using nudging for FV by FS management. The study proposes uses semi-structured interviews with FS staff in post-secondary schools throughout Canada. This research can inform policy-makers, researchers of nudge, and the general FS sector, on the facilitators and barriers to implementing nudge interventions as we have seen that nudging has shown some success to altering consumer behavior for the betterment of consumers’ health (Kelly et al., 2013; Saulais, 2015).

2.21 Review of Objectives

This study aimed to fill the knowledge gap in understanding the use of traditional marketing and nudge-based marketing interventions across Canadian post-secondary institutions.

1. Describe current and recent marketing practices for fruits and vegetables and fruit and vegetable-rich meals by food service management in post-secondary institutions.
2. Assess the awareness of nudge marketing techniques amongst food service managers in post-secondary institutions.
3. Identify the facilitators and barriers to using nudge marketing of fruits and vegetables in post-secondary institutions.

2.22 Review of Specific Research Questions

Question 1: How do food service operators in Canadian post-secondary institutions currently market fruits, vegetables and fruit and vegetable-rich meals?

Question 2: Are food service staff aware of nudge interventions as a marketing technique?

Question 3: If familiar, do food service operators currently use nudge-based marketing interventions to increase fruit, vegetable and fruit and vegetable-rich meal purchasing by customers?*

(*When using the word purchasing, it is assumed that consumption is also involved).

Question 4: What are food service manager’s perceptions regarding the feasibility of using nudge interventions in food service outlets?

Question 5: What are the facilitators and barriers to implementing nudge-based strategies in post-secondary institutions?
3 METHODS

3.1 Study Design

A cross-sectional semi-structured interview study was conducted where a mixture of both quantitative and qualitative data was obtained. Semi-structured interviews provided a rich source of data and provided more insight into the concept of implementing nudge interventions at the post-secondary school level. This design was chosen because we aimed to obtain rich data regarding the current uses of nudge and general marketing interventions as well as facilitators and barriers of using nudging in post-secondary schools. These interviews also allowed the researcher to use probing and follow up questions to obtain rich data for in-depth analysis.

3.2 Interview Guide Development

The key informant interview questions were developed after conducting the literature search including the following terms: “Nudging”, “food service”, “post-secondary”, “students”, “marketing”, as described in the Literature Review. Informal interviews were also conducted with 5 Canadian university FS management staff at 3 different universities in the Southwestern Ontario region. The preliminary questions were non-structured, open-ended questions relating to current marketing practices including nudging practices, marketing priorities, perceived values/wants/needs of their respective student populations, and facilitators and barriers to using nudge-based marketing strategies in their institutions (See Appendix A: Key Informant Questions). These informal interviews helped to develop the final proposed interview guide.

The list of nudges noted in the interview guide were taken from the literature and were organized according to the Taxonomy of Choice Architecture Framework (Münscher et al., 2016). The various types of nudge interventions were listed in the interview to gauge whether participants have used them or not in their own practices. Actual example nudges were taken from the discussed intervention studies. The final list of nudges that were used in the interview guide are listed below. Furthermore, nudges that fit within the technique category of C2: Facilitating Commitment, were not used in this interview as the applicability of these interventions (supporting self-commitment or public commitment) were not well used to our knowledge in nudge research for FV promotion.

Nudge Interventions Listed in the Interview Guide:

- Increased size of salad bar
- Move salad bar or FV rich foods close to entrance of a FS location
- Move a station featuring FV-rich foods in the center of the food service locations
- Placing big plates in front and small/medium plates in the back for use at salad or any other vegetable-rich foods
- Placing FV-rich foods in front or closer to customers in display areas
- Writing FV-rich food options at the beginning or end of the menu boards (vs. in the middle) so that they catch more attention
- Placing FV-rich items near the check-out counter so that everyone would see them while checking out
- Creating an express check-out line for people buying FV-rich items/meals
- Improve the lighting for FV-rich dishes or stations (e.g., putting them under spotlights)
• Loyalty cards for providing small incentives for frequent purchase of FV-rich foods (e.g., one free fruit after 9 FV purchases)
• Changing the default combo option to a F/V
• Text-messaging students about FV-rich dishes
• Having celebrities or respected or popular individuals endorse frequent consumption of FV-rich foods
• Having residence students earmark a certain percentage of their meal plan deposit into FV-rich foods so that students can overcome temptation to eat burgers and fries too frequently.

The Ottawa Model of Research Use guided the researchers towards ensuring the interview questions would obtain a good understanding of the facilitators and barriers towards nudge marketing interventions, perceptions, and attitudes of FS managers. These topics are part of stage 3 of the Ottawa Model of Research Use. Obtaining these key points helped the researchers assess the ability of the institutions for implementing nudge interventions (Logan, 2014).

The draft questions in the interview guide were reviewed by the thesis committee members and revised. The researcher then completed a pilot test of the interview questions with one of the thesis committee members to ensure questions made sense, were asking what they intended to ask, and to ensure the audio recording was audible. Questions were modified based on feedback from the final pilot test with the thesis committee and the final interview guide was developed (See Appendix H: Interview Guide).

3.3 Target Population

The target population was FS staff in Canadian post-secondary school settings specifically the FS managers/directors, chefs, and dietitians, who are involved in the decision-making process for what foods are offered. FS in colleges and universities in Canada are of 2 main types: those run by large companies and those run independently by the hired staff of the institution itself. There are several national organizations for FS contracting including ARAMARK, Gordon Food Service, and SYSCO, to name a few.

3.3.1 Sampling Frame

The sampling frame of members of the Canadian College and University FS Association (CCUFSA) was chosen because CCUFSA members operate the majority of FS at Canadian colleges and universities. CCUFSA hosts a national conference each year and has an email distribution list. The Executive Director of the organization is a collaborator of the research team on campus.

3.4 Participants

3.4.1 Inclusion Criteria

FS managers, directors, dietitians, marketing personnel in FS and chefs of mostly independent, some outsourced FS outlets, and people they designated to participate at Canadian colleges and universities.

3.4.2 Exclusion Criteria

Employees not managing some or all of the FS department in the organization. Employees not at all involved in marketing interventions within a FS department.
It should be noted that this study’s original exclusion criteria were also exclusive of institutions with outsourced FS due to the perception of their lack of control to alter their environments. Despite the exclusion criteria, a small number of participants with mixed and outsourced FS volunteered to participate. Their association with external contractors was not discovered until partway through the interviews and the researcher continued on with the interviews hence this specific exclusion criteria was omitted going forward.

3.4.3 Sample Size

A total of 10 interviews were conducted with 12 participants at 10 institutions in keeping with typical sample sizes needed to achieve theoretical saturation for qualitative interviews. Theoretical saturation is reached when no new concepts emerge from data analysis (Green & Thorogood, 2009. P 119).

3.5 Data Collection

3.5.1 Recruitment Methods

Two recruitment approaches were conducted: in-person solicitation at a conference and a recruitment email. The main recruitment for this study occurred at the Canadian Colleges and University FS Association (CCUFSA) conference in June 2018. The CCUFSA is a voluntary association for any universities and colleges that want to belong. This conference is attended by staff members of FS establishments at post-secondary institutions across Canada. The thesis committee members, researcher, and a volunteer undergraduate student (assistant) attended the trade show to help with participant recruitment. During the trade show, a roll up banner was used to advertise the study to the trade show portion of the conference. Post cards and an information sheet (See Appendix C: Recruitment Ads) was available and distributed to interested passers-by. A record of interested people was kept by obtaining business cards and/or contact information. This information was kept in a notebook and was only privy to the researcher, volunteer student and committee members. Anyone who agreed to participate and left contact information with the team, was contacted one to two weeks after the conference to book a date to conduct the interview (See Appendix D: Follow Up Email). If there had been no response within one week of sending the email, it was followed up with another follow-up email (See Appendix E: Second Follow Up Email).

Finally, to help reach more members of the CCUFSA and those who perhaps did not stop at the booth, the researcher also sent out a mass recruitment email via the CCUFSA email list (See Appendix F: Cold Recruitment Email).

3.5.2 Personnel Involved

Besides the graduate student, a research assistant from a senior year in the Applied Human Nutrition undergraduate program was hired to assist in the qualitative coding of the interviews and thematic development.

3.5.3 Method: Semi-Structured Interviews

Before the telephone interviews, verbal or written consent was obtained (See Appendix G: Consent Document). Interviews took approximately 60 minutes each and the digital recordings were uploaded immediately to a secure passworded computer (See Appendix H: Interview Guide).
3.6 Data Management

After each interview was conducted, the recorded file was saved as a number based on the sequence in which the interviews were conducted. Shortly after the recording was uploaded the primary researcher wrote a summary briefing on the ideas and thoughts that were discussed throughout the interview. This reflection journal helped to remind the researcher of overarching themes and solidified the final thematic analysis.

Interviews were transcribed verbatim, manually by the primary researcher into a Microsoft Word document. During transcription any time the participant mentioned his/her name or the identifying post-secondary school, the words, “name”, or “Uni/College x” was used in replacement. Participants who requested to see their transcribed data received a copy of their transcripts for confirmation that what they said was reflected properly in the transcription. After this process, the researcher began analyzing the interviews via coding and thematizing with help from a secondary research student. NVivo 12 (https://www.qsrinternational.com/nvivo/nvivo-products) was used after the first review of manual coding to house both descriptive and interpretive data.

3.7 Data Analysis

3.7.1 Statistics

Basic descriptive statistics were used to describe the population demographics of participants. Categories within the interview guide that were analyzed via basic quantitative statistics included: General Questions, FS Environment, Meal Items Rich in FV available for purchase, General Marketing, and various parts of the nudge section that asked yes or no questions like, “Have you heard of the term nudging before?” The remainder of the nudge section was analyzed via qualitative analysis methods where a coding manual was developed and then transferred into NVivo for further refinement of codes and to organize the quotes associated with these codes (See Appendix I: Code Manual for Nudging).

3.7.2 Qualitative Analysis & Coding

A mix of deductive and inductive analysis was used to derive codes for themes by hand from the interviews after transcription. Framework analysis was referred to when deductively deriving codes based on the Ottawa Model for Health (I.D. Graham & J. Logan, 2004) and the Taxonomy of Choice Architecture (Münscher et al., 2016). The researcher was careful to look out for facilitators and barriers to the implementation of nudge interventions (based on the Ottawa Model for Health Research) and the use of various nudge interventions (based on the Taxonomy of Choice Architecture). More specifically, the framework of the Taxonomy of Choice Architecture was used to help organize the responses from participants regarding the facilitators and barriers of each nudge intervention listed in the interview guide (Münscher et al., 2016). Nudges were organized into the specific categories based on which nudge description fit each category best. Table 2 shows how each nudge intervention was categorized in the Taxonomy of Choice Architecture framework.
Table 2: Organization of Nudge Interventions Based on Taxonomy of Choice Architecture (Münscher et al., 2016)

<table>
<thead>
<tr>
<th>Taxonomy of Choice Architecture Category (Münscher et al., 2016)</th>
<th>Technique</th>
<th>Nudge Intervention</th>
<th>Explanation of Nudge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Decision Information</strong></td>
<td>A1 Translate information</td>
<td>Developing creative menu item names *</td>
<td>Developing interesting, more explanatory and creative recipe names to make them sound more appealing.</td>
</tr>
<tr>
<td></td>
<td>A2 Make information visible</td>
<td>Writing FV-rich food options at the beginning or end of the menu boards (vs. in the middle) so that they catch more attention</td>
<td>It is thought that placing options at the beginning or end of a menu board makes the item more noticeable.</td>
</tr>
<tr>
<td></td>
<td>A3 Provide social reference point</td>
<td>Having celebrities or respected or popular individuals endorse frequent consumption of FV-rich foods</td>
<td>The use of respected individuals or celebrities to endorse the consumption of FV.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Displaying Dietitian’s favorite picks on Instagram with curated pictures (not noted in interview guide but noted as a nudge some participants were doing)</td>
<td>Developing aesthetically-pleasing food photos of menu offerings around campus so students ask for these options.</td>
</tr>
<tr>
<td><strong>B. Decision Structure</strong></td>
<td>B1 change choice defaults</td>
<td>Changing the default combo option to a FV</td>
<td>An example of this would be having a burger combo with the default side being a side salad instead of fries.</td>
</tr>
<tr>
<td></td>
<td>B2 Change option-related effort</td>
<td>Move a station featuring FV-rich foods in the center of the FS locations</td>
<td>Moving a salad bar to a central location may help make the salad bar more visible to customers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Placing FV-rich foods in front or closer to customers in display areas</td>
<td>An example of this could be moving FV-rich items closer to the front of a hot table to make them more visible to customers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Move salad bar or FV rich foods close to entrance of a FS location</td>
<td>Relocating or placing FV-dense displays or salad bars close to the entrance of a FS location.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Placing big plates in front and small/medium plates in the back for use at salad or any other vegetable-rich foods</td>
<td>The idea behind this is that the bigger plates will more likely be used for customers to take larger portions of FV.</td>
</tr>
<tr>
<td>Taxonomy of Choice Architecture Category (Münscher et al., 2016)</td>
<td>Technique</td>
<td>Nudge Intervention</td>
<td>Explanation of Nudge</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>B3 Change range or composition of options</strong></td>
<td>Placing FV-rich items near the check-out counter so that everyone would see them while checking out</td>
<td>Placing FV rich items closer to a check out may increase purchases.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increase availability or range of offerings of FV</td>
<td>Increasing the variety or amount of FV being offered. This could include adding more vegetables to the pre-existing pasta recipes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased size of salad bar</td>
<td>Increasing the size of a salad bar means increasing the variety/amounts of FV being offered. It may also make the salad bar more attractive, the bigger it is.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Add more vegetables to sandwiches and place stickers showing the higher vegetable content *</td>
<td>This nudge is the same nudge as increasing the availability of FV.</td>
<td></td>
</tr>
<tr>
<td><strong>B4 Change option consequences</strong></td>
<td>Loyalty cards for providing small incentives for frequent purchase of FV-rich foods (e.g., one free fruit after 9 FV purchases)</td>
<td>An example of this could be having cards for the purchase of 9 fruits and/or vegetables and receiving the 10th free.</td>
<td></td>
</tr>
</tbody>
</table>


(Note: The concept of providing an incentive being classified as a nudge is subject to the size of the incentive. Interventions that include micro incentives can be considered a nudge (Münscher et al., 2016). For purposes of this study, FV loyalty cards have a rather small incentive considering most of these interventions involved purchasing at least 9 F/V’s or FV-rich meals and getting only one free.)
### Taxonomy of Choice Architecture Category (Münscher et al., 2016)

<table>
<thead>
<tr>
<th>Technique</th>
<th>Nudge Intervention</th>
<th>Explanation of Nudge</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4 Change option consequences</td>
<td>Creating an express check-out line for people buying FV-rich items/meals (could also be considered B2)</td>
<td>An example of this could be having a segregated checkout line for meals that contain more than 30% FV, for example.</td>
</tr>
</tbody>
</table>

#### C. Decision Assistance

<table>
<thead>
<tr>
<th>Technique</th>
<th>Nudge Intervention</th>
<th>Explanation of Nudge</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 Provide reminders</td>
<td>Text-messaging students about FV-rich dishes</td>
<td>FS texting students to remind them of various offerings on campus that are high in FV.</td>
</tr>
<tr>
<td></td>
<td>Improve the lighting for FV-rich dishes or stations (e.g., putting them under spotlights)</td>
<td>An example of this could be putting spot lights over the salad bar in a location.</td>
</tr>
<tr>
<td>C2 Facilitate Commitment</td>
<td>Having residence students earmark a certain percentage of their meal plan deposit into FV-rich foods so that students can overcome temptation to eat burgers and fries too frequently.</td>
<td>An example of this could be segregating the student meal plans so that 15% of all of their purchases were set aside only for FV purchases.</td>
</tr>
</tbody>
</table>

* These interventions were not in original interview guide but noted by a participant as a nudge they were currently doing.

Codes were sorted into major topic areas as seen in framework analysis. Codes were also derived based on the questions listed in the interview guide. Appendix I shows the interpretive analysis in the format of a code manual for nudging themes specifically.

Two types of analysis were referred to when beginning the analysis step: Framework analysis, and phenomenology. Framework analysis is described by the National Centre for Social Research as, “a content analysis method which involves summarizing and classifying data within a thematic framework…” (Green & Thorogood, 2009). It is a type of deductive thematic analysis and is chosen for this study because the study itself is based on pre-existing frameworks including the Taxonomy of Choice Architecture and the Ottawa Model of Research Use (I.D. Graham & J. Logan, 2004). More specifically, the Ottawa Model of Research use was referred to when analyzing the facilitators and barriers to the uptake and use of nudging. The Ottawa Model points out that assessing barriers and “supports” are crucial to understanding and finding out who the potential early adopters of a new intervention would be. Understanding and identifying the potential adopters of the new proposed intervention would include assessing awareness of the new idea, attitudes, knowledge, skills, concerns and current practices involving the new intervention. The interview guide (Appendix H) was set up with these ideas in mind to better understand the current environment of the participants and to identify whether the adoption of nudge approaches is feasible in most schools or not.

Phenomenology as a method of analysis was used to analyze the experiences and ideas around nudging and general marketing practices of the participants. Research methods for phenomenological studies quite
often involve open-ended interview questions like this studies’ interview guide. This allowed participants to give more detailed data for analysis of new ideas/concepts/approaches. Finally, the goal of analysis with phenomenology was to identify themes that help paint a picture and describe the stories/experiences of the participants. This was most important when analyzing the participant’s perceptions around implementation of nudge approaches, and ideas/perceptions of their student’s wants/needs/demands relating to FV. Phenomenology usually involves a range of 5 to 25 interviews until a level of saturation within the data occurs (Creswell & Poth, 2018). The primary researcher felt a level of saturation had been reached after 10 interviews when recurring themes were continuing to appear. Thereafter, no new interviews were conducted.

The process of analysis begins with familiarization of the data. Both researchers and one committee member began the coding process by coding one interview separately. After the fourth interview was coded, both researchers continued the coding process without the committee member. Codes were derived based on the topics of the interview questions and aforementioned frameworks. Codes were then compared and the researchers ensured the codes aligned and made sense based on what participants were saying in the transcripts. From this, a coding manual was developed. In framework analysis this process of coding is called “indexing” (Green & Thorogood, 2009, P 209). The coding manual was transferred to NVivo where quotes from participants were organized along with the codes. See Appendix I for the Coding Manual for Nudging.

Aside from building the code manual, the code frequencies were also inserted into the code manual and was used to determine help explain the descriptive data such as how many times a specific marketing practice had been implemented across all institutions. The frequencies helped determine which themes and ideas were more common and which were less common (Saldana, 2013, P. 86).

3.7.3 Thematizing the Data

After coding was complete, themes were identified based on major themes within the compiled codes. This was done with the organizational structure provided through NVivo 12 Plus. The major themes relating to nudging are reported in various tables in the Results section. The use of NVivo 12 Plus also helped quantify the number of institutions with specific responses that fit into the various theme categories. These numbers were used to develop word clouds via www.wordcloud.com (Zygomatic, 2003) based on most-often noted themes. These word clouds are displayed within the Results section as figures to help visually explain the major themes discovered. Larger-sized words mean that specific theme was noted more often by institutions.

3.8 Rigor of Analysis

In order to increase reliability and validity in the analysis there are a few methods that were used. To begin, when interviews were conducted, participants were given the option to receive a copy of their transcripts once transcription was complete. Participants were given the chance to review and confirm the dialogue to ensure any concepts they wanted to get across were appropriately represented. If they wanted to make changes or take out any content, they were given the option to do this. Only two participants did this. This also helped to ensure confirmability within the data before coding and thematizing.

Furthermore, direct quotes from participants are noted within the Results section to provide evidence from the raw data for the interpretations made by the researcher. Secondly, any ideas that seem to be outliers from the general data, or ideas that deviate from the general data, were further backed up by
participant quotes allowing for the reader to derive their own interpretation of the data so as to not be overly biased from the researcher’s perspective.

For the coding analysis, a volunteer secondary coding analyst helped strengthen validity of the codes and themes determined. A legend of codes was derived based on the input from both researchers and a committee member. Interpretations of the data were discussed between both researchers and committee member.

Finally, researcher bias was accounted for through the analysis narrative via reflections on personal beliefs and epistemology of the Master’s student researcher (Green & Thorogood, 2009 p.219).

3.9 Ethics

This project was reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants (REB#: 18-05-031) (See Appendix B).
4 RESULTS

4.1 Participants and General Institutional Details

A total of 12 participants (n=12) from 10 different institutions were recruited for one-on-one interviews that lasted between 45 to 90 minutes in total. (Note: The results of this study are discussed in relation to the total number of institutions and not individual participants thus any numbers out of 10 refer to the total institution number.)

Table 3 presents an overview of the various job titles of each participant (n=12) as well as a review of their job duties. Four out of 10 of the participants were registered dietitians, 3 were executive chefs or a chef, 2 were either an executive director or assistant director of FS, one was a marketing and communications coordinator, and one was a nutrition manager. These particular participants were chosen by the institutions to participate in this study. Not all post-secondary institutions have similar management structures within their FS departments nor do they hire for similar positions throughout. For example, some of the institutions did not have a Dietitian or “Nutrition Manager” on the team. In another institution, the Executive Chef acted as the Director of FS after losing their director over 10 years ago and not replacing this position. Table 4 outlines the various roles that are responsible for implementing FS marketing interventions. This table shows that for most institutions, the implementation of marketing techniques involved the whole team.

Table 5 presents the characteristics of participants’ institutions as well as their specific FS environments. Though both university and college FS management participants were recruited, most were from university institutions (9/10).
<table>
<thead>
<tr>
<th>Participant</th>
<th>Job Title of Interviewee</th>
<th>Duties Involved*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Assistant Director of FS</td>
<td>Management of outsourced company contract, meal plan sales management, dealing with dietary restrictions, implementation of food marketing, meal plan review, menu review.</td>
</tr>
<tr>
<td>2</td>
<td>Registered Dietitian</td>
<td>Menu development with culinary team, allergy management with students, one on one nutrition counselling with students, diet related issue counselling, health promotion activities, marketing of FS in residence dining halls, work with FS marketing team.</td>
</tr>
<tr>
<td>3 (2 participants participated)</td>
<td>FS General Manager and Executive Chef</td>
<td>FS General Manager: Catering management, vending contracts, management of all FS operations, marketing. Executive Chef: Food procurement, menu development, food prep for all locations, marketing.</td>
</tr>
<tr>
<td>4</td>
<td>Registered Dietitian and Chef</td>
<td>RD: One on one nutrition counselling with students, menu reviews, food product reviews with culinary team, nutritional analysis of menu items, labelling of ingredients, help students navigate meal plans with dietary restrictions and allergies, spokesperson for FS, lead cooking classes, FS pop up events, keeping menu offerings on trend. Chef: Did not ask chef for list of duties. This participant helped answer questions about the retail FS environment which the RD was unable to answer. These interviews were conducted at separate times.</td>
</tr>
<tr>
<td>5</td>
<td>Registered Dietitian</td>
<td>Allergy training to staff, allergy management with students, menu reviews, nutritional analysis of menu items, health promotion activities, one on one nutrition counselling with students, meet with students at beginning of year to help navigate campus food.</td>
</tr>
<tr>
<td>Participant</td>
<td>Job Title of Interviewee</td>
<td>Duties Involved*</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td>Nutrition Manager, non-RD</td>
<td>sustainability committee chair, food allergies, food allergy staff training, student consultations for dietary needs, menu development, menu rotation, nutritionals, nutrient-dense meal flagging, workplace wellness, nutrition education.</td>
</tr>
<tr>
<td>7</td>
<td>Executive Chef</td>
<td>Acts as FS director as this institution no longer has FS director. Manages FS staff.</td>
</tr>
<tr>
<td>8</td>
<td>Registered Dietitian</td>
<td>Allergy and diet restriction management with students, menu development (with chef), new station concept development, one on one nutrition counselling with students, health promotion activities.</td>
</tr>
<tr>
<td>9</td>
<td>Executive Director of Hospitality Services</td>
<td>Management of bookstore, retail FS, mail services, residence dining halls, academic buildings.</td>
</tr>
<tr>
<td>10</td>
<td>Marketing and Communications Coordinator</td>
<td>Marketing for retail and dining halls, residence event coordination, following food trends, social media management (Facebook, Twitter, Instagram), campus-wide event planning, FS advisory board committee with students, large construction job oversight for FS.</td>
</tr>
</tbody>
</table>

* Note that the list of duties involved is solely based on what the participants stated in the interviews. This list may not be an exhaustive list of the entirety of the roles and responsibilities of each participant.
Table 4: Role Responsible for Implementation of Marketing or Nudging

<table>
<thead>
<tr>
<th>Institution</th>
<th>Who Implements Marketing or Nudging</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FS Director and External Company</td>
</tr>
<tr>
<td>2</td>
<td>Mix of all FS staff</td>
</tr>
<tr>
<td>3</td>
<td>Mix of all FS staff</td>
</tr>
<tr>
<td>4</td>
<td>Mix of all FS staff</td>
</tr>
<tr>
<td>5</td>
<td>Mix of all FS staff</td>
</tr>
<tr>
<td>6</td>
<td>FS Director</td>
</tr>
<tr>
<td>7</td>
<td>Mix of all FS staff</td>
</tr>
<tr>
<td>8</td>
<td>Mix of all FS staff</td>
</tr>
<tr>
<td>9</td>
<td>FS Director</td>
</tr>
<tr>
<td>10</td>
<td>Mix of all FS staff</td>
</tr>
</tbody>
</table>

Table 3 describes the type of institution by university or college, the approximate enrollment numbers and the FS management types of each institution. Organizationally, each institution was set up differently. Sometimes FS departments were housed under a department called hospitality services included waste management and catering services, for example.

FS departments may be contracted (outsourced) to an external FS provider who supplies, manages, and usually markets all of the food-related operations over the entire campus. These outsourced providers have the ability to manage entire FS departments of various organizations including hospitals, workplace cafeterias, post-secondary institutions, and more. They are often national or international companies. Alternatively, FS departments may be managed internally (independently) by the intuition’s own staff.

One out of 10 of the institutions outsourced their FS to an external FS contractor. Two institutions had a “mixed” model where both the university’s own FS staff and an external contractor shared various job duties within the FS department and the remaining 7 were independently-operated by the host institution. Some campuses were affiliated with other campuses. Smaller affiliate campuses often had outsourced FS operations.
**Table 5: Participant’s Institution Characteristics**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Institution Type</th>
<th>Enrollment Number*</th>
<th>Campus Affiliation(s)</th>
<th>FS Management Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University</td>
<td>14,885</td>
<td>Satellite campus of the main university</td>
<td>Mixed model. Partnership with outsourced company. Outsourced company does FS marketing, and all other FS duties. University does meal plan sales.</td>
</tr>
<tr>
<td>2</td>
<td>University</td>
<td>45,200</td>
<td>1 other affiliate campus. Participant was not involved in their operations.</td>
<td>Independent</td>
</tr>
<tr>
<td>3</td>
<td>Trade College</td>
<td>20,000</td>
<td>Chef and general manager responsible for the main, largest campus. Two other affiliate campuses. Second campus managed by own internal FS staff. Third campus managed by outsourced FS company due to smaller enrollment number.</td>
<td>Independent</td>
</tr>
<tr>
<td>4</td>
<td>University</td>
<td>22,000</td>
<td>1 other small affiliated campus which houses one department in different location with no FS services.</td>
<td>Independent</td>
</tr>
<tr>
<td>5</td>
<td>University</td>
<td>23,065</td>
<td>1 other affiliate international campus. FS not associated with it.</td>
<td>Outsourced. Participant was hired by outsourced company but worked on campus premises. Outsourced company manages all residence dining halls. Some retail locations managed by local businesses.</td>
</tr>
<tr>
<td>6</td>
<td>University</td>
<td>35,000</td>
<td>3 affiliate colleges all with outsourced FS.</td>
<td>Independent</td>
</tr>
<tr>
<td>7</td>
<td>University</td>
<td>35,000</td>
<td>1 affiliate campus. FS not associated with it.</td>
<td>Mixed model. FS company runs all dining halls and various franchises. One dietitian hired through FS</td>
</tr>
<tr>
<td>Institution</td>
<td>Institution Type</td>
<td>Enrollment Number*</td>
<td>Campus Affiliation(s)</td>
<td>FS Management Type</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------</td>
<td>--------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>company and two hired through university FS. University helps manage some locally-owned franchises and does university-wide FS marketing.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>University</td>
<td>34,000</td>
<td>1 affiliate campus. Unsure if FS is associated (Researcher did not ask).</td>
<td>Independent</td>
</tr>
<tr>
<td>9</td>
<td>University</td>
<td>28,000</td>
<td>1 affiliate small campus outsourced to external FS company.</td>
<td>Independent</td>
</tr>
<tr>
<td>10</td>
<td>University</td>
<td>38,000</td>
<td>“Other” affiliated campuses with this university but FS only responsible for main campus. (Participant was unsure of how many affiliate campuses)</td>
<td>Independent</td>
</tr>
</tbody>
</table>

* Enrollment numbers were often rounded estimates given by participants as enrollment numbers often fluctuate year-to-year
4.2 FS Environment Details

4.2.1 FS in Retail Locations and Residence Dining

FS environments serve two main areas on campuses: Retail and residence dining halls. For FS departments, typically the most important focus area are *residence dining halls* where students that live on campus in residence buildings usually eat most of their meals. It is almost always mandatory that students in first year that live in residence buildings buy a meal plan. This gives students a dedicated amount of money to spend on on-campus food. Sometimes meal plan dollars are able to be spent at various off-campus establishments where the post-secondary institution may have developed a partnership. Table 6 shows how many residence dining halls exist in each institution, the number of students living in residence buildings and the total amount of meal plans sold annually. The environment of a residence dining hall varies based on the institution however it is most common that dining halls house non-franchise establishments and are set up either to be an all-you-can-eat dining experience or an a-la-carte setting where each individual item is paid for separately. Quite often, combo options are not available in dining hall settings. These settings are also open to serve students breakfast, lunch and dinner and tend to run on four-week cycle menus where menu options repeat every 4 weeks. Table 7 shows a breakdown of the various menu cycles and who is responsible for making the menus. Residence buildings that house students generally have dining halls built into their buildings. If some residence buildings do not have dining halls built-in then students usually have one or more communal dining halls that is/are shared between many other residence buildings.

*Table 6: Residence Dining Halls and Meal Plans*

<table>
<thead>
<tr>
<th>Institution</th>
<th>Residence dining halls</th>
<th>Students in Residence*</th>
<th>Meal Plans Sold Annually</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1,600</td>
<td>1,500</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>12,000-13,000k</td>
<td>4,500</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1,000</td>
<td>750-800</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>3,000</td>
<td>2,200</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>3,500</td>
<td>3,500</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>3,000-4,000</td>
<td>3,000-4,000</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>5,000</td>
<td>3,900</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

*This number is an approximation based on participant’s knowledge

n/a response boxes exist because the researcher did not ask this question to the participant
## Table 7: Menu Details

<table>
<thead>
<tr>
<th>Institution</th>
<th>Cycle Menu</th>
<th>Responsible for Menu Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4-week</td>
<td>FS contractor. University reviews the menu.</td>
</tr>
<tr>
<td>2</td>
<td>Used to be 3-4-week cycle menu. Now menu is static for 2 months. Was unable to use leftovers with cycle menu causing food waste. Static menu helps increase quality of food and reduction of food waste.</td>
<td>Chefs and RD</td>
</tr>
<tr>
<td>3</td>
<td>8-week cycle menu in all locations. Smaller locations areas do not have cycle menu</td>
<td>Chefs</td>
</tr>
<tr>
<td>4</td>
<td>3-week in main residence dining hall. All else is mostly static.</td>
<td>n/a</td>
</tr>
<tr>
<td>5</td>
<td>5-week in residence. Retail is static other than soup: 5-week cycle.</td>
<td>Chefs</td>
</tr>
<tr>
<td>6</td>
<td>6-week in residence. Static in retail.</td>
<td>n/a</td>
</tr>
<tr>
<td>7</td>
<td>4-week cycle in residence.</td>
<td>n/a</td>
</tr>
<tr>
<td>8</td>
<td>Some static. Some rotate.</td>
<td>n/a</td>
</tr>
<tr>
<td>9</td>
<td>Some static. Some rotate.</td>
<td>Chefs and RD</td>
</tr>
<tr>
<td>10</td>
<td>4-week cycle in residence.</td>
<td>Chefs. Individual chefs of individual residence make their own menus.</td>
</tr>
</tbody>
</table>
The second area of focus for FS departments are retail locations. These locations may have a mix of both food franchises or campus-owned locations where the branding is completely designed by the post-secondary institution. The list of available franchises throughout all of the institutions interviewed is listed in Table 8. Retail environments are often designed in a food court-type style where meals are sold either in combos or a-la-carte. Students can eat their meals in the buildings that house the retail locations or take them to go. These areas are targeted toward the general student population who do not live on campus however these locations are also available to students living in residence buildings and their meal plan dollars are also able to be spent in these locations. Retail locations are most often found in high-traffic campus buildings such as central student centers, or departmental buildings with a large student enrollment number (general science buildings, engineering buildings, etc.).

Table 8: Franchises Available on Campuses

<table>
<thead>
<tr>
<th>Franchise Name</th>
<th>Number of Institutions that Have This Available on all Campuses Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booster Juice</td>
<td>10</td>
</tr>
<tr>
<td>Tim Hortons’s</td>
<td>9</td>
</tr>
<tr>
<td>Starbuck’s</td>
<td>8</td>
</tr>
<tr>
<td>Subway</td>
<td>6</td>
</tr>
<tr>
<td>Teriyaki Experience</td>
<td>4</td>
</tr>
<tr>
<td>Paramount</td>
<td>4</td>
</tr>
<tr>
<td>Pizza Pizza</td>
<td>4</td>
</tr>
<tr>
<td>Second Cup</td>
<td>3</td>
</tr>
<tr>
<td>Quesada</td>
<td>3</td>
</tr>
<tr>
<td>Bento Sushi</td>
<td>3</td>
</tr>
<tr>
<td>William’s Coffee Pub</td>
<td>2</td>
</tr>
<tr>
<td>Pita Pit</td>
<td>2</td>
</tr>
<tr>
<td>Aso Sushi</td>
<td>1</td>
</tr>
<tr>
<td>teaBOT</td>
<td>1</td>
</tr>
<tr>
<td>Triple O</td>
<td>1</td>
</tr>
<tr>
<td>Pacific Poke</td>
<td>1</td>
</tr>
<tr>
<td>Manchu Wok</td>
<td>1</td>
</tr>
<tr>
<td>Mucho Burrito</td>
<td>1</td>
</tr>
<tr>
<td>Made in Japan</td>
<td>1</td>
</tr>
<tr>
<td>Fire Roasted Coffee</td>
<td>1</td>
</tr>
<tr>
<td>Doi Chang Coffee Co</td>
<td>1</td>
</tr>
<tr>
<td>Country Style</td>
<td>1</td>
</tr>
</tbody>
</table>

Overall, campus environments provide a mixture of location types for students to eat at. Table 9 gives a general idea of the types of locations available with a specific focus on the presence of FV-rich outlets and locations of these. To clarify, grocery stores were locations that were either run by a student union or an external franchise company. In these grocery stores, students were able to buy bulk amounts of whole FV as well as other popular grocery items such as cartons of milk, canned goods, bread, and other food item staples. Convenience stores were typically noted to stock less nutrient-dense convenience items such as candy bars, pop, and chips. To further help paint a picture of the FV offerings on campuses, Table 10 provides an overview of the available FV-rich meals on campuses.
**Table 9: FS Outlet Details**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Convenience Stores on Campus</th>
<th>Dedicated Vegetarian Stations</th>
<th>Dedicated Vegan Stations</th>
<th>FS Outlets Have Vegetarian/Vegan Options</th>
<th>General Salad Bar Locations</th>
<th>Main Retail Food Court(s)</th>
<th>Grocery Store(s)</th>
<th>Restaurants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 student-run 1 FS-run</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes, all</td>
<td>Central in all locations.</td>
<td>1</td>
<td>n/a</td>
<td>1 (Student-run)</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>n/a</td>
<td>n/a</td>
<td>Yes, all</td>
<td>Central in all dining hall locations. Unsure about retail.</td>
<td>n/a</td>
<td>1 (Student-run)</td>
<td>n/a</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>n/a</td>
<td>Central in all locations except one.</td>
<td>1</td>
<td>0</td>
<td>1 (Student-run)</td>
</tr>
<tr>
<td>4</td>
<td>n/a</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes, some</td>
<td>On perimeter in main retail food court. No center stations in general.</td>
<td>1</td>
<td>1 (In residence dining hall)</td>
<td>1 (In retail area)</td>
</tr>
<tr>
<td>5</td>
<td>n/a</td>
<td>n/a</td>
<td>Yes</td>
<td>n/a</td>
<td>Central in 2 residence dining halls. Central in retail food court.</td>
<td>1</td>
<td>1 (Run by external franchise)</td>
<td>2 (FS-run)</td>
</tr>
<tr>
<td>Institution</td>
<td>Convenience Stores on Campus</td>
<td>Dedicated Vegetarian Stations</td>
<td>Dedicated Vegan Stations</td>
<td>FS Outlets Have Vegetarian/Vegan Options</td>
<td>General Salad Bar Locations</td>
<td>Main Retail Food Court(s)</td>
<td>Grocery Store(s)</td>
<td>Restaurants</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------</td>
<td>------------------------------</td>
<td>--------------------------</td>
<td>------------------------------------------</td>
<td>----------------------------</td>
<td>--------------------------</td>
<td>-----------------</td>
<td>------------</td>
</tr>
<tr>
<td>6</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>Central in all residence dining halls.</td>
<td>n/a</td>
<td>1 (Run by external franchise)</td>
<td>3 (Student-run)</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>Central in all.</td>
<td>0</td>
<td>0</td>
<td>1 (Student-run)</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>Yes</td>
<td>Yes</td>
<td>n/a</td>
<td>1 main campus food court.</td>
<td>4 larger retail locations (but not considered food court).</td>
<td>0</td>
<td>1 (Student-run)</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes, some</td>
<td>Central in all.</td>
<td>1</td>
<td>0</td>
<td>2 (Student-run)</td>
</tr>
<tr>
<td>10</td>
<td>n/a</td>
<td>No</td>
<td>Yes</td>
<td>Yes, some</td>
<td>Central in all.</td>
<td>1</td>
<td>0</td>
<td>1 (FS-run)</td>
</tr>
</tbody>
</table>
Table 10: Meal Items Rich in FV Available on Campuses

<table>
<thead>
<tr>
<th>FV Item</th>
<th>Number of Institutions (Total of 10) that Offered This</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salad bar</td>
<td>10</td>
</tr>
<tr>
<td>Whole fruits</td>
<td>10</td>
</tr>
<tr>
<td>Fruit cups (plastic cups/containers for fruit pieces)</td>
<td>10</td>
</tr>
<tr>
<td>Veggie containers (plastic cups/containers for veggies and dips)</td>
<td>10</td>
</tr>
<tr>
<td>Pre-packaged salad (plastic containers for salad and salad dressing)</td>
<td>10</td>
</tr>
<tr>
<td>Deli sandwich/wraps/pitas with option to customize vegetables (add, change)</td>
<td>9</td>
</tr>
<tr>
<td>Hot entrees with sides, one of which is steamed or cooked veggies</td>
<td>10</td>
</tr>
<tr>
<td>Stir fry meals offering a range of veggie ingredients</td>
<td>9</td>
</tr>
<tr>
<td>Veggie sides available for burger or other grill-type of fast foods</td>
<td>10</td>
</tr>
</tbody>
</table>

4.3 Methods for Gaining Feedback from Students

Institutions had FS advisory committees consisting of students, chefs/executive chefs, the assistant or executive director of FS, and/or the Dietitian (if there was one). Another method was the use of volunteer student groups that conducted in-person surveys in residence dining halls. Direct emails to a FS feedback email account or directly to the FS dietitian(s), nutrition manager, or chefs were other common methods of gaining feedback. A particular university noted the use of a formal online survey managed by the National Association of College and University Food Service (NACUFS) which they distribute online and have NACUFS evaluate and report the survey data to the institution upon completion. Participants also often noted that students are rather vocal, and will let front-line FS staff know their preferences regarding food items. For example, one participant stated,

“But I think students are for the most part, vocal, and they will let us know what they want and they will let us know if they’re not finding what they need.”

One particular institution had a very unique way of obtaining feedback. A structured committee with various subgroups including a research group, social media (students tracking regular eating habits on campus), environmental promotion (promotion of the eco-container use), Traveling Tummy (visit other post secondary institutions to compare their FS to their own FS), Mystery Shoppers (evaluate their own FS services on friendliness, cleanliness, $100 honorarium given, $30/shopping event given). Finally, the least costly method of understanding student demands came from participants analyzing FS sales data to adjust menu offerings.

4.4 Perceived Health Consciousness of Students

When participants were asked how health conscious, they thought their students were it was generally noted that students had become more health-conscious in recent years. For example, one participant noted:
“I do believe that making healthier food choices on campus has increased over the past 2 years. I perceive that those that make those decisions are very umm… very focused on it and … very consistent with it. Umm it’s hard to say. It is very variable.”

Another participant reinforced the idea that the level of health consciousness is increasing in the student population based on the generation of students,

“I would say it’s increasing and people are more aware, you know… millennials and post millennials.”

A subsequent participant noted more detail about what specific types of foods students were looking for, reflecting on newer fads and trends:

“Some are very health conscious and some are not. I think over the years I’ve seen more of an approach to wellness and healthy eating. I don’t see quite so much emphasis on weight loss diets, although definitely paleo is big right now and the keto diet is really big right now. I think people are taking more of a holistic approach. They’re looking for clean eating, looking for foods with fewer ingredients, fewer additives, more scratch cooking, so more of a common sense, healthy approach to eating?”

In general, most participants stated they thought the level of health consciousness was variable amongst their student population and based on the individual:

“I believe the ones that are health conscious are very focused on it. There’s a trend on an increasing basis, yes. It’s hard to state how health conscious our students are because it’s reflected on each individual.”

Another participant reinforced the variability of student’s diet choices through discussing some of the most popular food items:

“Well they like having healthy options available but they don’t necessarily choose the items. For example, fresh fruit is our top 10 [Nutrient-dense menu-flagging program name] sellers but our chicken fingers and fries is our number one retail choice.”

The variability of health consciousness based on the time of year was also discussed:

“I think it’s very variable. I think it depends on the time of the year. We had that dining committee release a survey and that was one of the questions that they asked. I don’t remember the results. I think it varies very greatly. I think that you have some students that they don’t really care… they kind of go with the flow of what they want to eat that day and then there’s the other side of the spectrum of students that are very health conscious and want to make sure that they’re getting what they need or what they feel is appropriate. And I find it fluctuates throughout the year and I think by second semester we start to see the increase in the ask for health conscious so that’s when I have to do a lot of work towards directing them in terms of available options because they just miss them.”

Finally, a participant also pointed out the fact that though there are “healthy” options available, students don’t always choose them because they’re not aware of them. This participant stated that students want to be reminded to eat “healthy” which exemplifies their desire to want to choose to live a “healthy” lifestyle:
“...They want healthy options. But you know something that has come in our research which is extremely telling is that they have lack of awareness that is happening even though it’s happening right in front of them. They want healthy options and they’ve also stated they need nudging and reminding to do these things so I think it’s just the stage in life... they’re leaving home but they want healthy food.”

4.5 Perceived Satisfaction of Students with Current FV Offerings

Participants were asked to rate what their perceived student satisfaction level (out of 5) was with the FV offerings on their campuses. The average rating was 3.5 (range 1.5-5). Most participants felt they offered a good range and quantity of FV offerings but felt their student populations were not aware of the FV offerings. Some participants also thought students felt differently about the residence locations compared to the retail locations and often gave the residence locations higher ratings compared to retail settings as residence settings house students all-year round hence should have more variety so students do not get bored of the same options. The remainder of this section will review various quotes from participants to justify the ratings given.

Some institutions had conducted research on the satisfaction level of their students with FV offerings. After one participant gave a rating of 1.5, they noted:

“Because we’ve done that research before and it always equals no they didn’t know, no, we would like more of this and we do have that. And like I just said in the res, it’s the first thing you see. Like how much more FV do you want? There’s like 8 pans of cut up melon, strawberries, pineapples, grapes that are all right there, washed and cut and prepped for you. One of the hardest things we run into is ignorance or lack of knowledge of what we’re doing. One thing we’re going to be rolling out at the beginning of next term is bringing awareness to all of the awesome things we are doing because they aren’t aware of it so it’s going to be right in their faces for them to remember to pick up.”

The same theme of students needing to be made aware of what’s available was reinforced by another participant:

“Hmm I think maybe we’re at a 3 or 4, I think? Once I explain to students what’s available to them, they’re kind of like towards the 4 category which is why my marketing approach is like, “Look at what we have!”.”

Another participant noted the use of surveys to obtain student satisfaction feedback and noted that generally, students were satisfied with the FV offerings:

“I’d say 4 or 5. Yeah. So, we also do research as you know on campus so we get their feedback and tell us if they’re doing a good job.”

(Researcher asked how this was done.)

“Yeah so through our surveys but also through the research with professor X and Y. Through their information that they’re getting for us. And we’re also pretty unique so I think that uniqueness is helpful right?”
Residence dining halls compared to retail cafeteria settings also were noted to have different FV offerings according to one participant. This participant noted that they believed the students would rate the residence halls as having more FV offerings and the retail locations as having less:

“Umm it’s probably like 4 in res and 3 in retail… We just don’t have the same amount of … if you want salad bars or … I guess in the dining halls we actually have whole cases of FVs in every one of their fridges so the access is easier but in retail the only thing that is being sent over in general, is things that are being prepared for them… I just think the overall offer is much bigger in the dining halls and that’s why you see a lot more of it.”

A different participant reiterated the theme that residence dining halls have more FV offerings than the retail locations, specifically because residence dining halls are considered the homes of the students year-round so more variety are needed:

“I would say about 3.75. Closer to 4, but you know what, there’s still room for improvement especially on the campus side… you know the residences are set up totally different… they’re the homes for our students for most of the year and our menu is set up more homestyle cooking and the presence of franchises on campus, you know, well, you know… almost… many franchises, don’t count too many veggie or salad options… they may have a few but on the campus side there are franchises and there are not franchises in the residences and I think there are more veg options in the res operations than on campus.”

4.6 Barriers to Student FV Intake

Throughout the process of conducting interviews, participants discussed some of the barriers to student FV intake. Table 9 describes each of the barriers noted beginning from the most commonly-noted barrier to least-noted barrier.
Table 11: FS Management’s Perceived Barriers to Student FV Intake

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Description</th>
<th>Quote</th>
</tr>
</thead>
</table>
| Students are unaware of the FV offerings available | The most commonly-noted perceived barrier to student FV intake amongst this group of participants was that students are not aware of the FV offerings available to them but FS management believe there are adequate FV offerings available. | When we do have vegetarian students that say they can’t find something to eat and you actually walk through the food area and see what’s available they don’t realize that there’s so much stuff there.  
- I think by second semester we start to see the increase in the ask for health conscious so that’s when I have to do a lot of work towards directing them in terms of available options because they just miss them.  
- Umm students always will ask for healthier options on campus to be honest but then we will say okay well where are you going because there is such an abundance of healthy options that they’re usually speaking from a little bit of ignorance and just lack of knowledge and then they realize oh okay.  
- We also get a lot of you know… we would like to see more vegan on campus. Again, it comes from a place of them not being aware how much vegan is on campus because we got so many of… we want this and this and this but then did you check our website?  
- Because we’ve done that research before and it always equals no they didn’t know, no, we would like more of this and we do have that. And like I just said in the res, it’s the first thing you see. Like how much more FV do you want? There’s like 8 pans of cut up melon, strawberries, pineapples, grapes that are all right there, washed and cut and prepped for you. One of the hardest things we run into is ignorance or lack of knowledge of what we’re doing. One thing we’re going to be rolling out at the beginning of next term is bringing awareness to all of the |
<table>
<thead>
<tr>
<th>Barrier</th>
<th>Description</th>
<th>Quote</th>
<th>Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of FV for students</td>
<td>The cost of food for students was often mentioned by participants stating that the FV’s are generally not the cheaper option and that meal plan dollars typically run out towards the end of the year, forcing students to make alternative choices.</td>
<td>awesome things we are doing because they aren’t aware of it so it’s going to be right in their faces for them to remember to pick up.</td>
<td>The two concerns I brought forth earlier with vegetarian, they’re not loud/constant complaints… we’re not being bothered constantly with those complaints. I think the main concern not necessarily is the FV items being offered but it’s the price sometimes around them. And I know I think you have later on… or in your previous questions… the labor associated…. sometimes the healthier option is not necessarily the cheaper option so that’s where I think the frustration lies. Later on [in the school year] maybe meal plan dollars, they’re maybe more budget conscious... You know it’s like a debit card that mom and dad have uploaded “x” amount of dollars on it… it seems like an endless pot of money for them but as the year progresses and um, they have maybe fewer meal plan dollars they are making different selections.</td>
</tr>
<tr>
<td>Eating patterns change throughout the school year</td>
<td>Though the quotes accompanying this barrier do not specifically mention FV, there was a general trend with participants noting that student eating behaviors generally do change throughout the year depending on the events occurring such as exam period or the start of the New Year. One participant did note the trend towards vegan-eating during exam time but did not note the assumption as to why this trend occurred.</td>
<td>Students eating patterns change throughout the year, from Sept to April they change drastically from one week to another. Sometimes for better or worse. I think it’s because of a new year’s resolution, maybe they went home over the winter break, they ate a home for like a month, they get back to school and they’re kind of sick of okay yeah…. Sick of eating chicken fingers and fries every day… I find it fluctuates throughout the year and I think by second semester we start to see the increase in the ask for health conscious so that’s when I have to do a lot of work towards directing them in terms of available options because they just miss them. Like especially during exam time or mid terms. It goes more towards vegan rather than health conscious.</td>
<td></td>
</tr>
<tr>
<td>Barrier</td>
<td>Description</td>
<td>Quote</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td><strong>Cost of FV for FS to purchase due to seasonality leading to a reduction in variety</strong></td>
<td>One participant noted the seasonality of obtaining produce causes increased costs for FS to purchase FV and prevents them from being able to supply certain types or more variety of FV especially in winter months. Winter months also cover much of the school year.</td>
<td>We do hear sometimes that the stir fries … that there’s not enough veg on the stir fry and I agree with that for sure. And those are the main ones… you know the fruit… maybe we don’t have as much as variety as people may like. But we’re kind of limited in terms of the cost. It’s hard to have berries and you know that kind of thing, fresh. We have the typical orange, banana, avocado, kiwi, and then cut up melon. That kind of stuff but yeah.</td>
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<tr>
<td><strong>Short hours of FS service</strong></td>
<td>One participant noted that students are requesting the vegan and vegetarian outlets to stay open longer so they can choose these options later in the day.</td>
<td>Some of the challenges we’ve heard [from students] is that the veg/vegan option/outlet needs to do a better job of promoting that and so what will happen is that they don’t promote it enough and they don’t get enough business so it closes a lot sooner then it should and it causes a downward spiral because at the end of the day there are times of the day where you’re not servicing who your target is.</td>
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<tr>
<td><strong>Lack of variety</strong></td>
<td>One participant noted that students that eat vegan diets are generally not finding enough variety to suit their diet-needs. The participant noted that it is challenging for FS to provide enough variety for vegan-diets.</td>
<td>Variety is always an issue on campus when speaking to vegan individuals 3 times a day, sometimes 7 days a week. Variety is always a challenge.</td>
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<td><strong>Bored</strong></td>
<td>One participant noted that students tell FS that they believe there’s a lack of FV despite FS believing they offer enough. This participant mentioned that perhaps this dissatisfaction comes from students getting bored of the current FV offerings such as the salad bar and hot vegetables.</td>
<td>I definitely hear from the students that there’s a lack of FVs even though we do get a … we have all those things available but we definitely still hear from students that there’s a bit of a lack. So, you know. I guess maybe they just kind of get bored of the salad bar. And the hot veg is problematic when you’re making food for that many people and holding it on a hot line it doesn’t always seem as appealing.</td>
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</table>
4.7 FV-Related Student’s Demands of FS

Themes around the perceived demands and preferences of students relating to FV are displayed in the word cloud in Figure 1 and are explained in further detail below. The text size indicates relative frequency that the concept was discussed.

![Word Cloud with FV-related demands]

Figure 1: Demands of Students of FS

**Vegan and Vegetarian**

All of the participants noted that an increase in desire from students for vegan or vegetarian options. These two diet-types were often noted together. Also, when participants mentioned vegan, sometimes they would also mention plant-based diets.

“We definitely have higher numbers… always increasing numbers of students classifying as vegan/wanting plant-based options.”

Due to the perceived demand for vegan and vegetarian diets, many institutions had made changes or additions to their locations to meet this demand by adding vegan and/or vegetarian outlets as noted earlier.

**Local Produce**

The second most commonly mentioned demand was for local produce.

“They try to steer us more towards local products and it’s hard to get fresh FV here.”

Many participants had noted that they were responding to this demand:

“You know what, we don’t get a huge demand because on the local part we’re doing a very good job, more than what most people could expect so there doesn’t seem to be a push for more than that. Where when I first came in there was a big push for exactly that umm I mean we responded in a big way to that part.”
Plant-Based Protein

The third most common demand was the specific request for plant-based protein options:

“Well this university has noted that there is a movement towards vegan options for more protein… plant-based protein options across the board that needs to be addressed.” Another participant that was under an outsourced FS contractor noted that meeting the demand for plant-based protein options was a challenge:

“That’s a challenge because [FS company name] tends to just give tofu and lentils and they don’t really vary from that. So, they need to do a better job with that.”

Students Want Choice

Participants also noted that students want to have choice when it comes to choosing FV-dense options versus other options that may not be considered FV-dense:

“People don’t like to be told that they should or have to eat or do, for that matter.”

“We try to make the late-night options healthier because it was mostly deep fried so we added some healthy stuff. We took away the mozza sticks and had a revolution on campus with page long heart felt emails about how much the mozza sticks meant to them! And they did a petition so we had to bring the mozza sticks back. It made the news here too!”

“So, they like having the options there but they don’t always choose it.”

More FV Variety

A less-commonly noted demand was the desire for more FV variety:

“But we do hear sometimes that the stir fries … that there’s not enough veg on the stir fry and I agree with that for sure… maybe we don’t have as much as variety as people may like.”

Another participant noted that students are looking for more fruit variety:

“One thing we discussed is that students are looking for fresh berries, strawberries, raspberries, things like that… Like we have fruit cups with pineapple and melon but not a whole thing of strawberries because it depends on the season.”

Fresh FV

The desire for fresher FV was noted by a little less than half of the participants. Two participants noted that they do not buy products out of cans and also avoid buying frozen products over fresh products:

“We used to buy canned peach in the parfait bar and it would be in a simple syrup so what we moved towards is either using the frozen product with less sugar, or one in pear juice so it doesn’t
have the sugars in there… we also switched to fresh products over frozen products for as many as
we can. Same thing for our dishes umm…. Starches, potatoes, rice, all fresh ingredients…”

“Mainly freshness. Students love to see fresh quality. They don’t like to see anything out of a can
or container. All of our recipes are from scratch, we try to stay away from bought products.”

Gluten Free

Another demand that was noted by less than a quarter of the participants was for gluten free options.
Though it was surprising that not many participants noted this, it may have likely been due to the fact that
the focus of the interview was FV.

“Over the years I’ve noticed the gluten free increase as well so that’s why we have a gluten free
pantry now.”

“The allergens in sauces … we’re using gluten free soy sauce for people with gluten allergy. Stuff
like that. If we can do anything, we steer towards it.”

Other student demands noted by one participant was for cooked vegetables instead of raw vegetables. It
was noted that this demand typically stemmed from an international student population. One participant
also noted the demand for ketogenic diet foods however this participant said FS would not meet the
demand for these types of foods. Students were thought to prefer the use of the salad bar vs buying
prepackaged side salads, and one participant noted that students wondered why the price of FV was not
comparable to the price of FV in the grocery stores. This particular participant stated that students had
asked for the price of whole fruits to be dropped.

4.8 Current General Marketing Practices for FV Promotion

The most common general marketing methods mentioned for FV were digital marketing (7/10), having
respected individuals endorse FV (usually the RD) (5/10), placing discounts on FV (5/10), educational
classes (3/10), and Meatless Monday’s (3/10). Aside from the practice of increasing local awareness and
availability of FV (2/10) all other marketing techniques were only mentioned by 1 participant. Figure 2 is
organized based on the frequency of times one of the following marketing techniques was being used in
an institution. The use of print marketing (3/10) and attractive displays for FV was less-often noted (1/10)
however this is a very common marketing technique but perhaps due to how relatively “old” or common
this technique is, participants were least likely to discuss it during the interviews.
Digital marketing was popularly noted (7/10) as being a method that participants were either already doing or desired to grow their expertise and presence in. Specific platforms noted included Instagram, Facebook, and twitter with Instagram being one of the most popular platforms of use. Within this category of general marketing, the use of apps was also commonly noted with some participants stating they were using their own app or an app or an app called, “Hangry”.

More specifically, Instagram had been noted as the most-used type of digital marketing strategy. This often came up when participants were asked whether they text their student population to nudge them regarding FV offerings on campus. Instead of text messaging, it was often noted that participants were using or planned to use a specific platform on social media. Instagram was the most commonly-referred to platform:

“We don’t text message students at all but we do Instagram. And our Instagram … one of the topics is usually one of my favorite picks or my lunch that I brought from home or something like that because it’s my lunch, then it’s going to be FV rich. Or like choosing my favorite meal on campus like choosing the vegan chilli. Veggies, plants, plant-based protein. I’ll highlight that as my favorite meal.”
Another participant mentioned their plans regarding social media content for Instagram including getting students involved in content development:

“Umm I’m hoping to do like a video series this year and an Instagram take over with students on healthier eating and cooking skills and what to do with certain vegetables and things like that.”

A subsequent participant noted the use of Facebook, Twitter and Instagram as the third social media choice:

“Mostly FB and Twitter and then probably third Instagram but we’re not as accessible on Instagram”

(Researcher asked what kind of things are posted on social media.)

“So, yea we do food fact Friday…. So that’s just different types of information on food so we like to talk about where we buy our food and the partnership with our 75 different farmers… what we purchase from our own research station so a little bit of education on where their food comes from and thirdly is again just we have the *name of volunteer nutrition group* volunteers going out to all the halls so all their hall meetings so a couple things… Like the value-added veggie cards which they use and also where to find food and where to eat. There are lots of healthy options so choose wisely. I guess? And that’s in person and social media. So *name of volunteer nutrition group* will have that on their social media and we have marketing do a lot of local food stuff and then just general food facts.”

Respected Individuals Endorse FV

Half of the institutions (5/10) had a respected individual endorse the purchasing and consumption of FV. For many institutions it was the dietitian who did educational classes or social media posts. The dietitian would share about the lunch they made or the lunch they chose from FS services. For example, one dietitian noted,

“And our Instagram … one of the topics is usually one of my favorite picks or my lunch that I brought from home or something like that because it’s my lunch, then it’s going to be FV rich. Or like choosing my favorite meal on campus like choosing the vegan chilli. Veggies, plants, plant-based protein. I’ll highlight that as my favorite meal… I guess that’s kind of like if I’m the campus celebrity which I’m certainly not but as the campus food dietitian I’m respected so we definitely promote that.”

Another participant who was a dietitian noted directing students to write nutrition-related articles on their behalf:

“Umm it’s one on one counselling… I will… I’ve tried to give ideas for like our social media posts… or just recently I had students write an article about the different healthy options on campus.”

Another institution noted bringing in local farmers to help tell the story of where the produce came from that was being supplied to the institution:
“Not necessarily in that version but we have local farmers and local producers come into campus and sample products to increase the knowledge and frequency hopefully of the students and we do have ppl come in and talk to our students and give out samples to try to make that connection with them.”

(Researcher asked if the promotions were specifically to promote FV.)

“Anything we consider a healthy alternative with a local connection.”

Where an institution had a higher budget to work with, they had brought in famous chefs. For example, one university noted doing this and making their own version of the television show, “Chopped”. Despite not focusing specifically on FV intake, this celebrity chef focused on building food literacy with students

“I would say… the thing that comes to mind is that we host a Chopped competition so we recruit students in res to participate in the competition and we run one in each of the residences and that can really promote food literacy and we had a guest judge, Vikram Vi, I think he’s from Chopped Canada. He’s a very well known east Indian chef. He was one of our guest judges and umm yeah… so we have but it’s costly and you know so we haven’t done it many times but we have hosted him to our campus the year before last… he has such a common-sense approach to food and he celebrates food and he talks about his umm… his history with food and how he grew up with food and he just has that … skill around healthy eating, celebration of food.”

The same participant also noted later, “I think we could probably grow the number of celebrities that we host.”

Placing Discounts on FV

To promote the intake of FV some participants (5/10) noted using some kind of discount structure on FV items. For example, one participant noted that they price the salad option cheaper than the fries for combos:

“We don’t have combos but I will say and this probably will come up in question 16 but it kind of relates to this… we price the add salad lower than the add fries, just last year …but I haven’t tracked to see if that made a difference. My guess is it didn’t because I heard salad didn’t go over… I think people want salad from the salad bar vs having a side salad.”

Another participant noted doing a campaign that involved giving out free salads on Monday’s:

“We did a free salad Monday campaign last year so if they bought an entrée, they got a free salad… And we did that purely to get people to eat more veggies.”

Other Less-Often-Noted Currently Used Marketing Methods

Other less-often noted marketing methods included educational classes (3/10), Meatless Monday’s (3/10), increasing local produce awareness (2/10), attractive FV displays (1/10), healthy eating campaigns (1/10), FV menu promotions (1/10) and flagging FV options on menu boards (1/10).

Increasing local produce awareness occurred through various methods such as bringing in local farmers, putting up signs stating where local produce came from, or simply talking to students about where the
produce came from. When a participant was asked what other marketing techniques they do after the list in the interview guide was discussed, the participant pointed out the emphasis they place on marketing their local foods by bring in local farmers to do taste-testing of the produce with the students and providing information to them on where it’s from:

“The big piece is bringing the farmers in. We do a lot of that and we do local FV within our locations.”

Educational classes were offered by dietitians that covered topics such as meal preparation or including more FV in your meals. A participant noted at their particular institution, the chefs themselves teach cooking classes:

“The chef’s go out and do… making our favorite options healthy. They walk them [the students] through how to make kale salad, mango salsa or something like that and they have menu cards that allow them to utilize those recipes at home.”

If an institution had noted they were doing Meatless Monday promotions they had usually already been doing this for a few years. Three participants noted doing this.

Participants that noted they used attractive FV displays also included some additional information about where the produce came from:

“Umm we got some fun looking boxes kind of and we put those out and we have like little chalk boards that we can write on that say where it’s from. It just looks really nice! But nothing with the lighting specifically.”

(Participant was asked about whether they had implemented spot lights to highlight FV in their locations hence the reference to lighting.)

Finally, a specific type of healthy eating campaign was noted by an institution who stated they did a “healthy” food promotion at the beginning of the exam period:

“We did do a promotion at the beginning of the exam push and we did, “Stay Calm and Eat healthy” where we do a push on healthy food options during stressful student times. They tend to go to comfort food or easy grab and go items that may or may not be healthier and we are focused on reminding them to choose the healthy choice.”

4.9 Measurement of General Marketing Effectiveness

A question to assess the measurement of marketing strategies asked, “If you have tried any of the above strategies, did you formally measure the effect of the strategies on sales?” Table 12 outlines the answers of the participants to this question. General FV marketing efforts were measured 30% of the time. Some participants noted that there was a lack of measurement technique, poor measurement design, or just no thought from FS staff to conduct measurement/analysis to understand effectiveness of their strategies before implementing them.
Table 12: Measurement of General Marketing Strategies

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<thead>
<tr>
<th>Measured Marketing Strategy</th>
<th>Frequency (10 total institutions)</th>
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<tr>
<td>Yes</td>
<td>3</td>
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<tr>
<td>No</td>
<td>6</td>
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<tr>
<td>N/A</td>
<td>1 (Participant was unsure)</td>
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Common methods of understanding demand or marketing success was from looking at sales numbers. Another example was for an institution that was implementing Meatless Monday’s. This institution noted being able to measure the amount of salad giveaways that were part of their promotion but had no baseline to compare their success to. Another university noted their plan to implement a new marketing campaign with a focus on FV which would include measurable goals for understanding efficiencies.

4.10 Innovative FS Events/Ideas

This section will discuss FS-specific innovations that were noted during the semi-structured interviews that did fall under general marketing of FV. Aside from the general marketing interventions, some participants had discussed newer ideas for promoting FV or nutrient-dense items. Some include innovations that specifically relate to improving efficiencies in FS departments such as having a vertical farm within a FS location to help reduce the cost of purchasing herbs and leafy greens. Many of these innovations came out of FS responding to student requests or demands over recent years. Innovations noted in this table include the use of an app, labelling items as [name of program], nutrient-dense food and nutrition programs, the use of wellness icons on specific food items, and displaying FV in unique ways. These concepts are included in this table as an innovation because the participant(s) perceived these to be newer ideas to them. Table 13 expands upon these innovations with explanations of each.
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<tr>
<th>Innovation</th>
<th>Description</th>
<th>Quotes</th>
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<td>App</td>
<td><em>Though this could be considered a general marketing technique, this is included as an “Innovation” as most participants that mentioned this perceived it as being an innovative technique.</em>&lt;br&gt;One participant noted the use of an app called, “Hangry” or other apps whose names were not noted, for use with their student populations. Some of the noted features of these apps included showing the FS menus, hours of operation for the FS locations, and rewards for prizes.&lt;br&gt;One participant noted the desire to want to switch their physical FV loyalty card to a digital one via the use of a custom-made app.</td>
<td>They can see the menus for the day… hours of operation. It’s a Hangry app. So, you can look into that. But they basically … the more they use the app; they get points towards prizes… It was implemented last year… Yeah, we had quite a few [students using it] actually. The numbers kept increasing.&lt;br&gt;(Researcher asked if items can be pre ordered on the app)&lt;br&gt;That’s our goal for this year!&lt;br&gt;-&lt;br&gt;So, we are desperately trying to work on an app to do push marketing but also reward frequent users. We have a frequent user card. We’d like to get rid of those and go to an app that tracks all that stuff for us.&lt;br&gt;-&lt;br&gt;We have an app as well that we use umm on our website so I’m also trying to work with different groups on campus this year to help promote what we do… The app came before I was here so I’m not certain [what the features are]. I don’t want to speak to the process cuz I don’t know… Our locations are on there. We have nutritional information on there… umm I think like hours of operation is on there.</td>
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<td>Vegan stations</td>
<td><em>It was rather common for institutions to note that they had a station specifically for vegan options. If they did not already have one, this</em></td>
<td>We’re offering a vegan station in September.&lt;br&gt;-&lt;br&gt;Although everything has vegetarian or vegan options. We have a specific veg/vegan station.</td>
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<td>Innovation</td>
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<td>On campus farm</td>
<td>An institution noted the luxury of having their own farm on campus where they obtained produce from in-season.</td>
<td>We buy from our organic garden on campus.</td>
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<td>Another institution noted having their own campus-farm close-by at 38 km away.</td>
<td>- We promote heavily the idea that umm much of our FV is being grown on campus. There’s a farm out in our second campus. Part of the agriculture department. And they are the biggest supplier of FV to us through August to October. So, we promote heavily that this watermelon you’re eating is grown on campus and it’s student labor that’s gone into. Only grown 38km away. We talk about how … it’s fresh and it’s picked and it’s brought to us the next day. So that’s one thing we do to promote FV.</td>
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<td>Nutrition labelling program</td>
<td>Labelling certain items in FS locations as [name of program] to help direct students towards “better” options such as a hamburger and a salad instead of the typical default of hamburger and fries, for example.</td>
<td>Umm so we haven’t labelled anything [name of program] yet but that’s something that we would like to get to but we’re not there yet but just as a RD… like, “did you know you could get grilled chicken and put a salad on the side?” That’s where I’m coming from.</td>
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<td>Produce bought from local auctions</td>
<td>A very small number of participants noted that they use a local produce auction to buy from local farmers. This means these institutions are going outside of their contract with FS companies to purchase local.</td>
<td>We buy from 75 local farmers; we use the [Name] Produce auction. We go there three times a week.</td>
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<td>- We purchase from local farmers. We go to auction to purchase from the farmers every week.</td>
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<td>Campus-wide cooking show</td>
<td>This happens twice a school-year at this particular institution. It involves having their own chefs.</td>
<td>Every fall and winter term we do a big campus wide cooking show so our catering and conference center and umm this year we chose to do all of the food … is going to be plant based so no meat protein… so what happens is our chef does two live cooking demos and then students go around and try different chef created menu items</td>
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<th>Innovation</th>
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<td>conduct cooking demos and allowing students to try the various dishes made by the various chefs at the show. The dishes cooked are menu items based on a particular theme. Students are also able to cook their own meals here.</td>
<td>based off our theme and then there’s interactive stations where they’re able to make their own. This time it was a stir fry so they’re able to choose all their own veggies and plant-based protein and they make it right there themselves in the frying pan so they get hands on experience doing it… But yeah, we didn’t tell them in any of the posters or advertising that it was going to be vegan because we thought it would hurt the show but when we were there talking to them, in no way did it hurt them, they did not avoid trying a different station. We said try all the stations, see what you think… so in some way it’s harder to get them on board with switching out a beef or plant-based option maybe a couple times a week but maybe doing in that way where we’re exposing them to more plant-based options through the cooking show or through having more vegan options at our hot table is the way we’re kind of nudging them that way but it is harder to get them to jump on board with that.</td>
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<td>earmarked percent of FS budget</td>
<td>One institution noted paying special attention to ensuring that 25% of the FS food purchasing budget was spent on produce alone. This ensures that all of the menus throughout campus have at least 25% produce content.</td>
<td>So basically, we are about 25% of our purchases …. So, 25% of food purchases [purchased by FS] would be local so that’s kind of how we do it. So, in season we are about 48% but we average that out at about 25% [over the entire year] … That’s local produce and we take into account all of our meats and stuff and that’s higher but that’s just produce that we’re tracking.</td>
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<td>fair-trade campus</td>
<td>One institution noted that they are a fair-trade campus. This is something an institution can apply for. This institution also noted that sometimes this poses difficulties, especially when the institution is tied to a FS contractor or has outsourced their FS services.</td>
<td>We’re a fair-trade campus so then you have to get fair-trade products. That’s a problem sometimes for them [FS contractor] because they don’t necessarily have arrangements with those suppliers and they don’t have the flexibility to order from them in a simple fashion. So, the challenge becomes that it is difficult to get those products on campus so they [FS contractor] are flexible with change but it is like jumping through hoops sometimes and it involves getting a different supplier than they currently use.</td>
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<td>farm stand in residence halls</td>
<td>One institution noted the use of a produce stand in the</td>
<td>And as soon as you walk in, we have a farm stand and that’s where you can buy all different types of fruit and veg that we got fresh from the auction as well so it’s not…</td>
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<tr>
<td>Innovation</td>
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<tr>
<td>Innovation</td>
<td>residence building where they sell full pieces of produce for students to take back to their rooms for self-prep.</td>
<td>like carrots already prepped in a cup for you. It would be buying full carrots or the head of broccoli, head of cauliflower… this is for you to bring back to your suite style or traditional style… prepping yourself.</td>
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<td>Food Gala</td>
<td>To train and update the chefs and other FS staff, an institution held a food gala for staff with a focus on veganism.</td>
<td>So, I did a vegan culinary training and we held a big gala and I hired a photographer.</td>
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<td>Free from top 8 allergens</td>
<td>The integration of a menu item that is always free of the top 8 allergens was recently introduced in one institution to meet the changing demands of students with increasing food allergies.</td>
<td>In residence yes, so the main cafeteria that we call [name of cafeteria] has a 3-week rotating menu with 2 entrees available at lunch and dinner… umm… last year we started a new program so the second entree is always free of the top 8 allergens. We left fish and mustard but it’s otherwise free of dairy and wheat, nuts and … soy, and things that people are trying to avoid. So yeah there are two entrees that change every lunch and every dinner. And then the vegetarian restaurant is on a 3-week cycle with one entree at lunch and dinner.</td>
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<td>In residence yes, so the main cafeteria that we call [name of cafeteria] has a 3-week rotating menu with 2 entrees available at lunch and dinner… umm… last year we started a new program so the second entree is always free of the top 8 allergens. We left fish and mustard but it’s otherwise free of dairy and wheat, nuts and … soy, and things that people are trying to avoid. So yeah there are two entrees that change every lunch and every dinner. And then the vegetarian restaurant is on a 3-week cycle with one entree at lunch and dinner.</td>
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<td>Nutrient-dense food and nutrition education program</td>
<td>This is a program that helps educate students on nutrient-dense eating while also aiming to increase food literacy through cooking classes with students on campus as well as other nutrition education activities. This program also includes a program to single out specific nutrient-dense menu items. This is a labelling.</td>
<td>Well our digital menu boards are split in half and on the right-hand side are our fresh approved options and the left are non fresh approved options. So, the vegetables are included in the fresh approved options.</td>
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<td>Innovation</td>
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<td>FS sub committees focus on FS improvement through social media, mystery dining, environmental promotions, and research</td>
<td>One institution noted the use of an organized volunteer committee filled with sub groups. One group did research to better understand the needs of students to better the FS operations, another committee focused on increasing a social media presence where students/influencers tracked their eating habits on campus. A third committee focused on environmental promotion to help raise awareness of the eco-container. A fourth subcommittee involved having students and a staff adviser visit another post-secondary institution to compare the various eateries. A fifth subcommittee conducts mystery shopping at various locations on campus.</td>
<td>That committee is focused on sub groups and researcher campaigns for us so right now they are working on… we have one sub committee that is social media influencers so they’re tracking their regular eating habits and posting it on social media. We have another committee that is environmental promotion so that’s getting our eco container out to more students or just promoting using the program. We have another sub committee that is called traveling tummy. They go to all the groups with a staff adviser… go to another college or university. So, this year they are going to [city] and will compare one of [city’s] eateries and compare it to one of our eateries on campus to look at what they are doing better than us and vice versa. It’s a comparison of a similar size eatery. Then another committee called mystery shoppers that’s where staff are advising them on which location to go to for lunch and just mystery shopping so evaluating on service friendliness, cleanliness… so then we have probably a group of 5 and they will go to different places on campus and then everyone does a final presentation…</td>
</tr>
<tr>
<td>FV Valentines cards</td>
<td>For Valentine’s Day one institution made FV valentine’s cards for students to give to each other.</td>
<td>We made veggie valentines… so at Valentines’ day our marketing person made free valentines. We set up a table so people could give a Valentine’s day gift to someone and it would say: “Peas be mine”, “Where have you bean all my life”, “Caul me maybe” (cauliflower), “You can’t be beet” and it’s a beet. And there would be candies</td>
</tr>
<tr>
<td>Innovation</td>
<td>Description</td>
<td>Quotes</td>
</tr>
<tr>
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</tr>
<tr>
<td>gluten free pantry</td>
<td>A gluten free pantry location was implemented by one university to meet the demand for more gluten-free products. This was set up as a unit within a FS location.</td>
<td>Over the years I’ve noticed the gluten free increase as well so that’s why we have a gluten free pantry now.</td>
</tr>
<tr>
<td>long term marketing campaign for</td>
<td>The demand and increase in supply of universities using local produce was evident through most of the interviews. One university noted a specific emphasis on an organized marketing campaign focused on the promotion of local produce.</td>
<td>What we’re doing next term which we’ve been working on the past year is our awareness campaign called [campaign name] which is about our local fresh FV from local farmers. All of that roles out in January… it is a long-term strategy that we’re developing so absolutely because I can’t give you specific examples yet. We have a lot done. The first phase will role out which will just be getting people used to what the new messaging is, what the campaign is, the new logo that accompanies the campaign, getting people familiar with the 5 key messages… that way! So … one of the key messages is offering nutrient-dense FV.</td>
</tr>
<tr>
<td>local produce</td>
<td></td>
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</tr>
<tr>
<td>wellness icons on food items</td>
<td>This is a specific program that was offered through a contracted FS company. This program involves the use of icons on menus to identify vegetarian and vegan options.</td>
<td>We have wellness icons so vegetarian, vegan… and a program called, [program name] which means the ingredients meet certain [nutritional] criteria.</td>
</tr>
<tr>
<td>peer nutrition groups</td>
<td>The use of a peer nutrition group was mentioned by a Dietitian participant. This participant noted that this student group acts as advocates on their behalf.</td>
<td>We have a peer student group who does nutrition. So, I work with them. Try to give them healthy options so they can advocate for me.</td>
</tr>
<tr>
<td>Innovation</td>
<td>Description</td>
<td>Quotes</td>
</tr>
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<td>--------------------------</td>
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<tr>
<td>Unique FV displays</td>
<td>The use of unique FV displays was noted by one university who was emphasizing the fact that their produce was sourced locally. The display involved explaining where the produce was from.</td>
<td>We did put some nice display boxes and some nice like chalk boards putting where the fruit was from and things like that.</td>
</tr>
<tr>
<td>Vegetable processing room</td>
<td>One intuition noted creating a processing room on campus just for vegetables. This helps hold the local produce over the winter months.</td>
<td>We put the veg processing room in 8 years ago so we tell that story pretty well... we buy from 75 local farmers.</td>
</tr>
<tr>
<td>Vertical farm</td>
<td>A vertical farm was newly implemented in an institution who noted the increasing demand for local produce and difficulty obtaining local all-year round.</td>
<td>We have a vertical farm. We just introduced this past year. So, we took away some convenient store space because it wasn’t as effective as we thought it would be so we’re using it for the vertical farm that supplies food to mostly the dining hall and supports some of the other locations during the school year and supports our conference meeting during the summer… Graduates of [University name] started this company so it’s kind of um… it’s a good story for us as well and the vertical farm also allows us to get the products we can’t typically get as well, throughout the school year…It’s mostly a lot of greens like kale and herbs so we’re trying to get the food items, the veg or food items… it’s mostly veg and herbs… that FS Company finds challenge with the supplier in terms of pricing and in terms of availability…we’re trying to get them that in a more cost effective way and in terms of availability of those products… We are looking at this vertical farm and trying to expand it. As you know Sept-April aren’t the best growing months in Canada for getting a variety of FV so we need to find a better way of getting diverse FV offerings on a regular basis inexpensively but it’s tough to do it locally so we’re trying to grow that. Yeah… local for sure. That’s one thing we constantly are trying to be better at.</td>
</tr>
<tr>
<td>Waste reduction</td>
<td>Avoiding all you can eat dining hall set-ups was said to less food waste.</td>
<td>Our system isn’t set up to have waste because we don’t do all you can eat. If you talk to some of the schools that do all you can eat programs… because food goes out and</td>
</tr>
<tr>
<td>Innovation</td>
<td>Description</td>
<td>Quotes</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>-</td>
<td>Furthermore, the use of a static menu vs cycle menu was also noted by one institution to create less food waste.</td>
<td>whether students eat and throw stuff in the garbage it’s that piece whereas here everyone pays for it so the system is set up to reduce waste.</td>
</tr>
<tr>
<td>-</td>
<td>We found cycle menus where they were on a 3- or 4-week cycle… it was just quantity of quality… so different recipes rotate… weren’t that well thought out or well executed. We weren’t able to use up leftovers or anything because the whole menu would change so there was more of a waste component there so we tried to keep our menus more static to have better quality items. That being said we still have a few rotations. We have some things that rotate a bit like maybe 7-8 days but we would never do a 3-week rotation. So, there are still some changes but it’s much more static than it used to be.</td>
<td></td>
</tr>
<tr>
<td>Workshop with Forward Food</td>
<td>Forward Food is a non-governmental organization (NGO) that offers FS companies free resources to add more plant-based foods to menus. They also have a toolkit just for university FS departments (Forward Food, n.d.).</td>
<td>We’ve introduced 35 different recipes. We had a workshop with Forward Food and we did a three-day training with all of our chefs. We had about 40 chefs go through it and just to be more familiar with plant-based diets and plant-based menus.</td>
</tr>
</tbody>
</table>
4.11 Nudging

4.11.1 Familiarity of FS Staff with Nudge Interventions as a Marketing Technique

As shown in Table 1, 7/10 of the participants were already aware of the term nudging. All of those who were aware of the term “nudging”, were also implementing nudging strategies. Only 3/10 of the participants were actively implementing and conducting formal research on the use of nudging for FV promotion.

Table 14: Familiarity with Nudging

<table>
<thead>
<tr>
<th>Familiarity with Nudging</th>
<th>Total (10 Total Institutions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware of term, researching and using nudge</td>
<td>3</td>
</tr>
<tr>
<td>Aware of term, using nudging</td>
<td>4</td>
</tr>
<tr>
<td>Not heard of term, using nudging</td>
<td>2</td>
</tr>
<tr>
<td>Not heard of term, not using nudging</td>
<td>1</td>
</tr>
<tr>
<td>Total of participants using nudging (Using nudging: not heard of term and familiar with term)</td>
<td>9</td>
</tr>
</tbody>
</table>

4.11.2 Current Use of Nudge-Based Marketing Interventions to Increase FV Purchasing by Customers

Table 15 shows which nudges were being implemented at the time of the interviews.

Table 15: The Frequency of Current use of Specific Nudge Interventions

<table>
<thead>
<tr>
<th>Nudge Intervention</th>
<th>Number of Institutions (Total of 10) Who Were Currently Implementing this Nudge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving a salad bar to the center of a location</td>
<td>6</td>
</tr>
<tr>
<td>FV at front in display areas</td>
<td>6</td>
</tr>
<tr>
<td>Loyalty cards for FV</td>
<td>6</td>
</tr>
<tr>
<td>Move FV to entrance</td>
<td>6</td>
</tr>
<tr>
<td>Place FV at checkout counter</td>
<td>5</td>
</tr>
<tr>
<td>Respected individual endorsement</td>
<td>5</td>
</tr>
<tr>
<td>Increase availability of FV</td>
<td>4</td>
</tr>
<tr>
<td>FV at beginning or end of menu</td>
<td>3</td>
</tr>
<tr>
<td>Big plates in front, small plates behind at a salad bar counter</td>
<td>2</td>
</tr>
<tr>
<td>Change recipes to include more FV</td>
<td>2</td>
</tr>
<tr>
<td>Make FV default option in a combo</td>
<td>1</td>
</tr>
<tr>
<td>Increase salad bar size (This nudge was currently being done by one participant because they were undergoing renovations in a cafeteria. 6 other participants had noted that this nudge had been done in the recent past)</td>
<td>1</td>
</tr>
<tr>
<td>Make creative menu names for recipes (Example: Steamed Vegetables vs Maple Glazed Vegetables)</td>
<td>1</td>
</tr>
</tbody>
</table>
4.11.3 Effectiveness of Implemented Nudges

Out of the 3 institutions that were implementing and researching nudge, none of them had completed their research at the time that the interviews were being conducted (Summer 2018) hence there was little data or feedback on how efficient the nudges were. Aside from the institutions conducting research on nudging, institutions that were just implementing and not researching nudging had noted measuring the effectiveness of nudges through counting redeemed FV loyalty cards, analyzing FS purchasing data (to see if purchasing of specific items such as produce increased) and customer sales. Due to the newness in concept of nudging, it appears that formal evaluation methods of nudge interventions still have not yet been determined by institutions implementing these.

Loyalty Cards

The most common nudge that was measured for effectiveness was the use of loyalty cards (3/10). Participants that measured the use of these counted the number of cards redeemed at the end of each year but noted there was no baseline to compare the numbers to understand how efficient the intervention had been:

“We did measure how many salads we gave out for free salad Monday’s but you know… I don’t know what we would have been comparing it to.”

Increasing the Size of a Salad Bar

One participant noted increasing the size of a salad bar in the past year. When asked whether they found an increase in sales of FV the participant stated:

“So… it’s different because we have the all you care to eat dining hall and we increased the salad bar in the dining hall. They did find they were purchasing more FV so our cost of FV increased so therefore more students were getting them.”

Like others, the above noted participant discussed the use of looking at FS purchasing data to understand whether there was an increase in demand and purchasing behaviors from their customers. This was echoed by a second participant after asking whether the increase in salad bar size was an effective nudge technique:

“So, we know based on facts; based on production, there’s increased sales. Based on customer demand, it has increased.”

Placing Stickers on Sandwiches with Higher Vegetable Content Compared to Others

One institution noted implementing a nudge that involved placing stickers on sandwiches that had higher vegetable content compared to others. This participant noted not having access to the data as they stated they did not implement the nudge themselves:

“I can’t get the data… I came on board after it was designed. So, the sandwiches that they chose to add the veggies to… they all get wrung in as one button on the till so we did the veggies on certain sandwiches but we don’t know if those sold more than the ones that didn’t… They were
trying to see if they increased based on the amount that the staff were ordering… Basically we didn’t see any change because staff are going to order the way they always order.”

When another participant was asked whether the nudge they had implemented was effective stated,

“We serve more than we’ve ever served before but I can’t be sure what the… what the success is that’s made it.”

4.11.4 Perceptions of Feasibility of Nudging in FS Post-Secondary Settings

Participants were asked what their general perceptions of nudging were. Figure 3 shows the overarching perceptions from FS management on their thoughts of using nudge interventions. The larger the text size, the more often this perception was mentioned by participants. Most participants found nudging interventions to generally be simple but stated it depended on the intervention.

![Figure 3: Overarching Perceptions of Using Nudge Interventions](image)

*Figure 3: Overarching Perceptions of Using Nudge Interventions*
4.11.5 Facilitators, Barriers and General Perceptions of Specific Nudge Interventions

Table 16 below describes the specific nudge interventions listed in the interview guide along with the general perceptions from participants regarding the specific nudge interventions noted as “General Themes”. The table further describes the facilitators and barriers for each nudge.

The easiest nudge in category A: Decision Information was using respected individuals to endorse FV. This was noted as the easiest to do because most of the time it was the campus FS Registered Dietitian who was doing this. Since they were already employed through FS it was more likely that this would happen.

Some of the most common nudges that participants were already doing seemed to fall under category B: Decision Structure. The nudges within this category that participants were generally already-doing were ones that involved altering the placement of items (B2: changing option related effort) and loyalty cards (B4: change option consequences). Category B2 involved altering the placement of salad bars and altering the placement of FVs to put them closer to customers in display areas or at checkout counters. These were nudges that participants noted less barriers towards unless they involved costly construction jobs. Thus, it is difficult to generalize whether nudges of category B2 are easy to implement or not due to the variability of costs associated with each of the types of nudges in this category. Category B4 involved the use of loyalty cards which 6/10 participant institutions were already doing. The remainder of the participant institutions said they would implement this because it’s easy and does not require a marketing plan.

Finally, category C: Decision Assistance, contained one of the least number of nudge interventions. This was surely a less-popular nudge intervention technique used for FV-promotion within post-secondary schools. The two nudges within C1: Providing reminders, were text messaging for FV promotions/reminders and spot lights over FV’s. These both proved to be difficult to implement. Participants noted text messaging wouldn’t be possible since FS does not have access to student’s phone numbers and using spot lights for FV promotion would be difficult due to the technicality and cost of installing the lights. For C2: facilitating commitment, the only nudge that fit within this category was earmarking a percent of the student’s meal plan for FV purchasing. The idea is to facilitate commitment towards students buying FVs however participants found this intervention to be forceful and would take away student’s ability to make their own choices. Many participants also noted that this nudge would be hard to organize due to the technology that would be involved in setting this up. Thus, it was certainly a less-popular nudge and one that FS noted many barriers towards.
Table 16: Perceptions, Facilitators and Barriers of Specific Nudge Interventions

<table>
<thead>
<tr>
<th>Technique Category</th>
<th>Nudge Intervention</th>
<th>General Theme</th>
<th>Facilitators</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 Translate</td>
<td>Developing creative menu item names*</td>
<td>One participant noted attempting this with their menus recently</td>
<td>None noted</td>
<td>None noted</td>
</tr>
<tr>
<td>information</td>
<td></td>
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<tr>
<td>A2 Make information visible</td>
<td>Writing FV-rich food options at the beginning or end of the menu boards (vs. in the middle) so that they catch more attention</td>
<td>Many participants noted that they don’t do this but said it could be something they would do only when re-writing the menu boards. They would not do this if they weren’t already taking down the menu boards</td>
<td>Operationally easy (1/10)</td>
<td>May not make sense based on the type of menu (1/10)</td>
</tr>
<tr>
<td>A3 Provide social reference point</td>
<td>Having celebrities or respected or popular individuals endorse frequent consumption of FV-rich foods</td>
<td>It was rare for a school to use celebrities to endorse FV consumption however one large institution did note the ability to do this and had done it in the past</td>
<td>Using the on-campus dietitian to post on social media (3/10)</td>
<td>Too small of an institution for a celebrity (1/10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Using the on-campus chefs to promote local FV’s on menus (1/10)</td>
<td>Costly to pay a celebrity (1/10)</td>
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<tr>
<td></td>
<td>Displaying Dietitian’s favorite picks on Instagram with curated pictures*</td>
<td>One participant noted paying special attention to the Instagram social media account and making an effort at taking better photographs of the food being offered on campus. This participant also mentioned hiring a graphic designer for this</td>
<td>In-house dietitian already working for FS (3/10)</td>
<td>None noted</td>
</tr>
<tr>
<td>Technique Category</td>
<td>Nudge Intervention</td>
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<td>Facilitators</td>
<td>Barriers</td>
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<tr>
<td>B1 change choice defaults</td>
<td>Changing the default combo option to a FV</td>
<td>Some participants noted the lack of ability to implement this nudge because they do not offer combos in their FS locations other than retail franchise locations. &lt;br&gt;This was a nudge of interest to most dietitians that were interviewed</td>
<td>None noted. It was common for institutions to serve a la carte-style hence the presence of combos in non-franchise locations was rare</td>
<td>POS system programmed just for fries (1/10)</td>
</tr>
<tr>
<td>B2 Change option-related effort</td>
<td>Move a station featuring FV-rich foods in the center of the FS locations</td>
<td>Doing this would be difficult unless the specific FS location was already undergoing renovations &lt;br&gt;Many participants had mentioned that they already had centrally-located salad bars &lt;br&gt;Many others also mentioned placing the salad bar centrally, was a priority when building new residence cafeterias or renovating pre-existing ones if the salad bar wasn’t already centrally-located</td>
<td>Easy to do when already renovating (3/10)</td>
<td>Cost (1/10)</td>
</tr>
<tr>
<td>B2 Change option-related effort</td>
<td>Placing FV-rich foods in front or closer to customers in display areas</td>
<td>Most participants were already doing this consciously</td>
<td>None. Most participants were already doing this</td>
<td>None noted</td>
</tr>
<tr>
<td>B2 Change option-related effort</td>
<td>Move salad bar or FV rich foods close to entrance of a FS location</td>
<td>Most participants already had their salad bars located centrally. Very few had them close to the entrance, however if they were close to entrances, they would typically also be centrally-located</td>
<td>None. This was generally noted as difficult to do</td>
<td>Cost (1/10) &lt;br&gt;Lack of space at entrance (1/10) &lt;br&gt;Lack of ability to refrigerate FV items at entrance (1/10)</td>
</tr>
<tr>
<td>Technique Category</td>
<td>Nudge Intervention</td>
<td>General Theme</td>
<td>Facilitators</td>
<td>Barriers</td>
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</tr>
<tr>
<td>B2 Change option-related effort</td>
<td>Placing big plates in front and small/medium plates in the back for use at salad or any other vegetable-rich foods</td>
<td>Some participants noted that this intervention would be easy to implement if not already done. If this intervention hadn’t been done or was not of interest, it was because there was only one plate size, they believed promoting smaller portions were better, or because FS believed it would be difficult to have their staff consistently set up the plates this way.</td>
<td>Operationally easy (2/10)</td>
<td>Only one plate size (2/10) Consistency of staff implementing this (1/10) Logistics (where the small vs large would go) (1/10) More than one plate doesn’t fit on dining hall trays hence small plates are readily available at salad bar for those wanting only a few pieces of fruit (1/10)</td>
</tr>
<tr>
<td></td>
<td>Placing FV-rich items near the check-out counter so that everyone would see them while checking out</td>
<td>This nudge was often noted as a doable intervention and had been done across many of the institutions. Only one participant noted this intervention would be difficult but did not state why.</td>
<td>None specific. This was generally noted as an easy-to-do nudge</td>
<td>Some FV need to be refrigerated. No space for this at checkout (1/10)</td>
</tr>
<tr>
<td>B3 Change range or</td>
<td>Increase availability or range of offerings of FV</td>
<td>Most participants had already done this in their locations</td>
<td>Easy for FS staff to be trained to do (1/10)</td>
<td>Lack of space to increase offerings (1/10)</td>
</tr>
<tr>
<td>Technique Category</td>
<td>Nudge Intervention</td>
<td>General Theme</td>
<td>Facilitators</td>
<td>Barriers</td>
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</tr>
<tr>
<td>composition of</td>
<td>Add more vegetables to sandwiches and place stickers showing the higher vegetable</td>
<td>The institution that did implement this said it was easy to implement but hard to monitor whether the intervention was effective at increasing purchasing due to the lack of the abilities of the POS system</td>
<td>Easy for FS staff to be</td>
<td>None noted</td>
</tr>
<tr>
<td>options</td>
<td>options (Not in original interview guide but noted by a participant as a nudge they were currently doing)</td>
<td></td>
<td>trained to do (1/10)</td>
<td></td>
</tr>
<tr>
<td>B3 Change range or</td>
<td>Increased size of salad bar</td>
<td>Many participants mentioned they would not increase the size of a salad bar unless they were already undergoing renovations but it was often-noted that when renovations were happening, this was an action many FS operators were doing. One participant also mentioned that they increased the size of the salad bar based on demand</td>
<td>Easy to do when already</td>
<td>Salad bar is implanted into the ground (1/10)</td>
</tr>
<tr>
<td>composition of</td>
<td></td>
<td></td>
<td>renovating (3/10)</td>
<td></td>
</tr>
<tr>
<td>options</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Technique Category</td>
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<td>Facilitators</td>
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</tbody>
</table>
| B4 Change option consequences | Loyalty cards for providing small incentives for frequent purchase of FV-rich foods (e.g., one free fruit after 9 FV purchases)  
(Note: The concept of providing an incentive being classified as a nudge is subject to the size of the incentive. Interventions that include micro incentives can be considered a nudge (Münscher et al., 2016). For purposes of this study, FV loyalty cards have a rather small incentive considering most of these interventions involved purchasing at least 9 F/V’s or FV-rich meals and getting only one free.) | Many participants had noted they were already doing this or wanted to do this if they weren’t already  
Many participants also noted how this intervention was a rather-easy intervention to implement and required minimal marketing or other campus groups to help  
One participant noted their desire to want to switch over from a physical loyalty card to a digital version by creating an app | Not much marketing promotion needed (1/10)  
Could be implemented by only one person (1/10) | None. This was generally noted as an easy-to-do nudge |
<table>
<thead>
<tr>
<th>Technique Category</th>
<th>Nudge Intervention</th>
<th>General Theme</th>
<th>Facilitators</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4 Change option consequences</td>
<td>Creating an express check-out line for people buying FV-rich items/meals (could also be considered B2)</td>
<td>Many participants thought that adding an express line would cause crowding or space issues. Many other participants also thought that having students prove that they bought a meal high in FV would be discriminatory. Setting this up would also be operationally difficult. No participants had implemented this and none noted that they would want to try this</td>
<td>None. This was generally noted as a difficult and not-popular idea</td>
<td>Lack of space to add extra checkout line (2/10) Students would complain (1/10) Don’t want to single out students by making them feel ashamed of their choices or that they need to prove they are eating FV-dense items (4/10) Operationally difficult to coordinate (3/10) (coordinating staff, making a list of what foods qualify</td>
</tr>
<tr>
<td>Technique Category</td>
<td>Nudge Intervention</td>
<td>General Theme</td>
<td>Facilitators</td>
<td>Barriers</td>
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</tbody>
</table>
| C1 Provide reminders| Text-messaging students about FV-rich dishes                                          | Many participants were not interested in doing this either because of privacy issues of having student’s phone numbers, or just not having access to student’s phone numbers.  
Instead, many participants mentioned they use various social media platforms to communicate with their students instead of text messaging. | Already have an app in place so it may be easier (1/10) | Lack of access to student’s numbers (4/10)  
Coordination (1/10)                                                                                      |
|                    | Improve the lighting for FV-rich dishes or stations (e.g., putting them under spotlights) | Most participants noted they would not bother implementing this because of the cost associated and the inconvenience of changing the pre-existing electrical configurations in their locations. Only one university noted having done this before. Another participant thought the idea was interesting. | None noted. This was generally noted as difficult to do | Cost (1/10)  
Structural (lack of access to electricity in specific areas) (2/10)  
Heat of spot lights on FV (1/10)  
Overall space already well-lit (1/10) |
<table>
<thead>
<tr>
<th>Technique Category</th>
<th>Nudge Intervention</th>
<th>General Theme</th>
<th>Facilitators</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2 Facilitate Commitment</td>
<td>Having residence students earmark a certain percentage of their meal plan deposit into FV-rich foods so that students can overcome temptation to eat burgers and fries too frequently. (Could also be considered C2)</td>
<td>Most participants said this would be one of the most difficult nudges from the list to implement. Many participants also noted that this would be forceful and that students should be able to choose what they want to eat regardless of its’ nutritional value. Participants also noted that implementing this would be technically difficult. Very few participants had noted it would be interesting.</td>
<td>None noted. This was generally noted as a difficult and unpopular idea.</td>
<td>Setting up the technology to do this (5/10) Students not supporting the dictation of where meal plan dollars are spent (2/10) Challenging to categorize what foods qualify (1/10)</td>
</tr>
</tbody>
</table>

* These interventions were not in original interview guide but noted by a participant as a nudge they were currently doing.
The remainder of this section expands on the commentary with direct quotes from participants regarding each nudge intervention.

A1: Translate Information

Developing creative menu item names

One participant noted doing this intervention. It was not noted in the interview guide as a nudge intervention.

“You know, we’re trying to tweak the menu so it’s not called (inaudible) blend… which means what? I don’t know! So we’ve been trying to get like maple roasted baby carrots instead of steamed carrots, or whatever or roasted buffalo cauliflower instead of just broccoli cauliflower fleurettes, or roasted… trying to put nice words… turmeric roasted cauliflower or umm stewed tomatillos, sautéed kale, honey mint peas, instead of just… kind of standard boring frozen…”

A2: Make Information Visible

Writing FV-rich food options at the beginning or end of the menu boards (vs. in the middle) so they catch more attention

This nudge was not a commonly-used nudge however it was noted to be an easier-to-implement intervention. This is exemplified by the following participant quotes:

When asked what major barriers you see to any of the listed nudge interventions:

“So, I’m just thinking it has to be easy operationally. Like looking at our menu boards when we’re reprinting them or looking at the placement of things. I think those things are fairly easy.”

“From a research perspective I think if it does [have a positive effect on increasing FV consumption] then I could talk to our marketing team about it if it’s impactful. It’s easy enough for them to do when they’re creating menu boards.”

Another participant noted that they had already segregated areas of the menu board for specific food items that were “fresh-approved” (a special nutrition program on campus that focused on promoting nutrient-dense intake):

“Well our digital menu boards are split in half and on the right-hand side are our fresh approved options and the left are non fresh approved options. So, the vegetables are included in the fresh approved options… and we list the entrées first and at the end would be the sides so the veg are included in the sides.”

Another participant noted they do not advertise FV-dense options in specific areas of the menu board. Instead they are incorporated within and written all over the boards:

I think they’re [FV options are] kind of all over… I wouldn’t say that we’ve intentionally written them somewhere else.
Finally, another participant noted that segregating menu options based on FV-dense items may not make sense as most people buy food based on what it looks like, and do not often read the menu boards.

“Well it’s not difficult but it may not make sense. I mean typically people look at an entrée and their sides and we list them. I’ll be honest. Most people go up to wherever and they look at the food and choose it that way. They sort of... In food court [name of food court] they don’t do it based on looking at menu boards. That’s usually how people buy.”

**A3: Provide Social Reference Point**

**Having celebrities or respected or popular individuals endorse frequent consumption of FV-rich foods**

"This nudge was commonly-implemented by institutions especially institutions that had a dietitian hired. Most-often it was the dietitian who was the “respected” individual who did promotions via social media or cooking classes. Sometimes, the chefs would also play a part. One institution did note bringing in celebrity chefs however this institution was a larger institution:

“We most likely wouldn’t have celebrities come and speak to our products based on the [small] size of our operation.”

(Registered Dietitian) “And our Instagram ... one of the topics is usually one of my favorite picks or my lunch that I brought from home or something like that because it’s my lunch, then it’s going to be FV rich. Or like choosing my favorite meal on campus like choosing the vegan chilli. Veggies, plants, plant-based protein. I'll highlight that as my favorite meal... I guess that's kind of like if I’m the campus celebrity which I’m certainly not but as the campus food dietitian I’m respected so we definitely promote that.”

“I would say... the thing that comes to mind is that we host a CHOPPED competition so we recruit students in res to participate in the competition and we run one in each of the residences and that can really promote food literacy and we had a guest judge, Vikram Vi, I think he’s the CHOPPED Canada, he’s a very well known east Indian chef. He was one of our guest judges and umm yeah... so we have but it’s costly and you know so we haven’t done it many times but we have hosted him to our campus the year before last.”

“We’re trying to put an emphasis on letting our students connect with chefs... letting them know that we’re going to auctions to purchase certain foods and letting them see the professional who is behind the dishes so no, they’re not notable people like to the public but it is a notable career and not just you know some random people thinking of it... we have an executive chef and then we have chefs in every unit.”

**Displaying Dietitian’s favorite picks on Instagram with curated pictures**

This specific nudge is very similar to the general nudge noted above however many participants specifically noted this as an important intervention they were doing as of late:
“… We all know Instagram… we want to make it as appealing as possible so people can ask for them. We’re trying to focus on the aesthetics of how we photograph our food. If we post a picture about a vegetarian option that we’re doing… working with the graphic designer to make it look really good.”

B1: Changing the Default Combo Option to a FV

Some participants noted that they did not offer combo options on their campuses. Quite often, a-la-carte service was the main type of purchasing structure hence implementing this nudge was not appropriate for those institutions. Combs were most-commonly used in franchises where FS did not have any control over the offerings. Another participant noted implementing this nudge would be difficult since the price of one fruit is cheaper than the price of a serving of fries.

“We don’t really do a lot of combos right now but the recipe guidelines are balanced and they already include a whole grain and a vegetable.”

“Yeah it is a-la-carte so they can choose to order [FV] if they want.

-Umm that’s a good idea and we have talked in the res about how you can get a salad… it’s only programmed for fries and it’s something we’re aware of and we have thought like okay can we have some kind of small tossed salad in the back or what do we do… but it never amounted to that as the final result. Or maybe you can get fries or an apple but really the cost is different. You know an apple is $1 and fries are $2 something. So maybe people would feel the combo should be cheaper or…”

When asked which nudges would most likely be implemented:

Definitely changing the default combo option is very high up there. In some places, maybe not all?

B2: Change Option-Related Effort (Increase/decrease physical/financial effort)

Move a station featuring FV-rich foods in the center of the FS locations

This nudge was noted to be difficult to implement because it involved extra costs and structural changes that were not able to be done unless renovating or building a new location. In some institutions, the salad bar was already centralized in their various FS locations:

“Our new residence umm dining hall. We are in the process of designing the kiosks and what the dining hall looks like so we pushed for a salad bar in the center, like a large salad bar; double sided access… because right now our salad bars are just one side access. So basically yes, we’re planning for it.”

“Again, the salad and fruit bars are in there so unless we’re doing a major reno we can’t necessarily move them so I’d have to say by virtue of that I’d have to say no to that question.”
“We have 6 of them so umm I would say most of them are very central.”

“Umm it’s difficult… uhh the reason it’s not high on the list of what I would do is just because of a big cost.”

(Researcher asked if this had been done recently)
“Nope. Not in the last year nope. Like places like residence have been designed that way but we haven’t re designed something in the last year.”

**Placing FV-rich foods in front or closer to customers in display areas**

Institutions had noted this was a common-practice already. If they weren’t already doing this, they noted this was something they were currently doing:

“Yea. We’ve been relocating a lot of our items within grab and go and the main walk ways.”

“Yeah absolutely we do that. We put them [FV] right in the very front for a number of reasons but the largest reason being the colorful aspect. It’s attractive.”

“We make a conscious effort on how we merchandise our hot veg so in the res[idence] operations, we double the number of vegetables we serve at lunch or dinner time so we make a conscious effort to make sure they are merchandised at the beginning of the line so students see it first and it’s not just an after thought so we’ve increase availability and quantity and we displayed them so that it’s umm…the first thing that students see.”

“Well we actually put vegan at the front of our hot table and we also have a big sign that says vegan so that is … that always has a pan of just roasted veg or steamed veg as well so yeah that’s kind of at the front which would be the menu I guess.”

**Move salad bar or FV rich foods close to entrance of a FS location**

Similar to moving a salad bar to the center of a location, many participants noted that this was not easy to do because of the costs associated, or because it would not fit at the entrance. Instead, most salad bars were located centrally:

“With one of them I know it to be right at the entrance when you come in but most of them are central.”

“I would say the new vegan station. That we’re putting right when you walk in.”

“I mean you know there are some things that we can’t do like move all the salad bars to the door. You know the space is the thing…”
“We can’t put refrigerated items at the entrance and if it were our baskets of fresh fruits, we put them at the cash so it’s more of a spontaneous buy instead of picking up a confectionary item.”

**Placing big plates in front and small/medium plates in the back for use at salad or any other vegetable-rich foods**

Generally, participants thought this was an easy nudge to implement however some participants did note that this would be logistically difficult since having employees put the plates in specific locations would be hard to dictate and keep consistent. Another participant noted only having one size of plate so this would not be feasible:

“I know we do that… moving the big plates to front and small to the back… I think that’s easy enough I think things that are easy like that to implement are important… and fine operationally.”

(Researcher asked if they had ever placed large plates in front and big plates behind.)

“Umm… I would say yes. Because we do technically have two prices for the salad bar and we’re probably promoting the higher price (laughs). I don’t know if it had the thought behind it that you might hope with nudging because it’s pricier. Well it works in the end! Mainly just for higher ring at the till but it benefits us and it’s a higher amount of veggies!”

“I would say they [small vs large plates] are equally visible. I think umm in reality you’ve got a certain location for umm bowls and plates… we rely on our porters to restock it and you know it’s just such a busy environment to dictate that, the small ones go here and the large ones go… in different locations, that would be a challenge logistically. They have certain areas designated that… to answer your question, no we don’t.”

“…We only have one size plate and we prompt them to use the plate over a take out container.”

“We do sometimes think we should have smaller plates for when people just want a smaller amount of fruit because two plates don’t actually fit on the tray very well so we have thought of having a smaller plate for the opposite reason you’re thinking. We think people should take a smaller plate to just have a few pieces of fruit on it.”

“We only have one size plate.”

**Placing FV-rich items near the check-out counter so that everyone would see them while checking out**

This nudge was already being implemented in a lot of institutions. Only one participant noted that this would be difficult to do but did not state why:

“They’ve been doing this before I even started. There’s a fresh fruit they can grab at the checkout.”
“I noticed that they do that in the umm campus eateries. They’ll display larger bowls of whole fruit at the check out area/cashier.”

“No, it would be a bit hard.”

**B3: Change Range or Composition of Options**

**Increase availability or range of offerings of FV**

This nudge was being done by a few institutions however it was not always noted whether the addition of FV to the already-available offerings was well-advertised or not. Another participant noted doing this nudge but not knowing whether it made a different in the increase in sales:

“Well the only one [nudge] we did was increasing the availability or range and I would say like the new school year is starting so we haven’t really had a chance to measure anything yet.”

“Increasing availability or range of FV offerings… Umm I think we already have a selection of them but the only thing that hinders the growth is the space available.”

“One example we did [was] the burger that’s 28% mushrooms.”

**Increased size of salad bar**

This nudge was mostly only feasible when a renovation was going on, or when a new location was being built. It appeared that participants had made it a priority when building new locations, to ensure that the salad bar was rather large in size compared to older salad bars in older residence dining halls:

“Well… our salad bars are already a decent size so I don’t think we’re going to touch those and it’s really expensive to bring in the new one. So those are fine… and again they’re implanted into the ground, built into the ground so we can’t really move them.”

“Yes. The [name of location] we did a full rebuild of our salad bar 2 years ago and we added a salad bar to the res operation at the same time.”

* (Researcher asked what the reason was for doing this.)

“It was demand.”

“We’ve increased [the size of the salad bar] in the past year.”

* (Researcher asked if they noticed a change in sales of FV after doing this.)

“So… it’s different because we have the all-you-care-to-eat dining hall and we increased the salad bar in the dining hall. They did find they were purchasing more FV so our cost of FV increased so therefore more students were getting them.”
“So, I can think of one place on campus only. So, the answer is yes, partially but. Yeah.”

*(Researcher asked if this was done in retail or a residence building.)*

“Residence...it was part of a renovation.”

**Add more vegetables to sandwiches and place stickers showing the higher vegetable content**

This nudge was not noted in the interview guide however one institution noted doing this and stated that it was not difficult for the staff to do. This participant also discussed the difficulty of measuring the effectiveness of this nudge:

“Like we did a nudge of adding more veggies to certain sandwiches and we put a sticker on them that said extra veggies and umm… which wasn’t challenging at all. It was no problem for the staff to add that on.”

*(Researcher asked if it increased sales)*

“Unfortunately, I can’t get the data. I didn’t design the nudge. I came on board after it was designed. So, the sandwiches that they chose to add the veggies to… they all get wrung in as one button on the till so we did the veggies on certain sandwiches but we don’t know if those sold more than the ones that didn’t... They were trying to see if they increased based on the amount that the staff were ordering but I don’t think that was really great data to be collecting because the ordering… basically we didn’t see any change because staff are going to order the way they always order. I would have suggested doing it a bit differently but…Yeah, it’s [the POS system] a barrier of how we basically umm… ring things in. So, we often like… just have one button for all of a certain type of thing so we can’t actually see the sales break down. We can’t pull that in quite the detail that we’d like… Yeah analyzing sales data is definitely a barrier and there’s nobody … I had to learn the system to be able to do that stuff because it was too hard to ask a clerk or our finance manager to pull the numbers to check.”

**B4: Change Option Consequences**

**Loyalty cards for providing small incentives for frequent purchase of FV-rich foods (e.g., one free fruit after 9 FV purchases)**

Loyalty cards were already being implemented by most of the institutions. If they weren’t already being implemented, participants noted that they thought this nudge would be one of the easier nudges to implement:

“Umm… one of the items that are interesting would be loyalty cards. That’s a piece that would be interesting to review and take a look at.”

*(Researcher asked if this would be easy to implement)*

“It would have to have a full marketing plan behind it so… it would be easier to implement than umm… than a meal plan.”

“So, for the purchase of every fruit, umm whole fruit, cut fruit, salad or dairy, students are given a stamp and once they receive 9 stamps, the 10th one is complementary.”
“Most likely [nudge intervention] to implement… would be … I think most likely would be the loyalty card? I can see that happening in the future.”

“I don’t think the loyalty cards would be super difficult either.”

“I think that the combo idea is a good idea. And possibly for fun the fruit loyalty card.”

(Researcher asked what would be included in the loyalty card)

“Well it would probably just be fruit because we don’t sell… then it would be like do we do a fruit cup or a veggie cup? I think it’s just easier to do a piece of fruit because they’re all a dollar and the prices don’t fluctuate whereas if you do a different type of veggie or fruit cup or grape cup it gets a little more confusing and then what’s the reward… do you get another piece of fruit or a veggie cup? We also have cups that have chips and hummus so would it be one of those? And in all of our units we don’t have just single pieces of vegetables.”

“But smaller things like the loyalty cards, I could just run that by like hey what do you guys think of this? And then it would be up to me to do the work for it.”

B4: Change Option Consequences

Creating an express check-out line for people buying FV-rich items/meals

None of the participants had noted implementing this and it was also one of the least-popular nudges that any of the participants stated they would implement in the future. Most participants noted the difficulty behind setting this up and the concept of students being singled out for their food choices which participants did not believe was socially acceptable:

“The express line… what type of items… depends on the take-out container… we don’t know what is in the container and doing a numbering system in some of our locations… we have an express line for people purchasing with meal plans. It helps people to purchase quickly and move on. But we aren’t going to ask everyone to prove that they’re item is high in FV… so I think although an express line is a nice idea… operationally… it’s much more difficult.”

“I think the separate line would be hard to implement. I think it would just create a setting of people operationally… who can and can’t be in the line… I mean we have a lot of long lines so a line for only that… people don’t qualify… maybe no one’s in that line, we have a sales attendant just sitting there… that just operationally seems hard.”

“Yes, whenever you’re singling someone out on what they’re eating… there’s an issue with that.”

“Express check out line… that would be a logistical nightmare for us.”
“Yeah, we just don’t agree [with the idea of an express check out line [for FV]. If you just buy a single coffee, we don’t prioritize you either. So, it’s just a belief. You got to wait in line.”

“Umm well you know what. No, we don’t have that. The res are so busy that you’d never be able to divide people up and most… I do think the most popular is our hot dish section and people are putting healthy choices in there so it would be impossible to divide them up and it’s really important that we don’t shame anyone if they decide to get a poutine so now they have to wait in a long line.”

C1: Provide Reminders

Text-messaging students about FV-rich dishes

Texting students proved to be a difficult nudge as well. Participants noted this would be breaching student’s privacy, they didn’t have their student’s phone number, or it would be difficult to do because of the high turn-over of students every year (graduating). When this intervention was noted, participants would often begin discussing their use of social media instead of text messaging:

“Texting students, I don’t know how we would go about getting their cell phone numbers.”

“And then the text messaging students… again I think it’s a little bit about the confidentiality of their numbers… like how can we contact them.”

“We don’t do that. We don’t do emails either. We rely on our social media and we focus on all sorts of foods on campus. But we don’t have any kind of master list of people’s numbers and it changes so often you know. Every four years … like every year it’s a different audience. So, it would be constantly trying to you know… some students come. Some students go. Some are on co op. you can’t be texting them when they’re not here anymore.”

“Not necessarily what FV options are available but our [campus nutrition program name] executive which has our VP of social media and [campus nutrition program name] is very active on Instagram posts so they are always offering evidence-based messaging through those platforms. So not really texting but social media…”

Improve the lighting for FV-rich dishes or stations (e.g., putting them under spotlights)

This nudge was a less-popular nudge to implement. It involves many structural changes and costs. Only one participant had implemented this nudge. Other participants noted this as being difficult to do and had not tried it or would only implement it if they were building a new location:

“The spotlight piece has to do with the issue of gaining electricity. We couldn’t have extension cords running through our FS location so there is a structural and technical piece to that. It sounds easy… umm but depending on where that electricity is and what the spot light is… some of the spot lights really do give out a lot of heat. So, there are technical things that you have to think of when you purchase a spot light.”
“The lights are a static part of the structure umm you know… I don’t know how we would go about installing or repositioning the lights or … able to … umm dictate the brightness in one area vs another area so it’s … the lighting is part of the structure, the facility so that’s not something that we normally umm have available to change or do change readily.”

“I like that one though. I would love to do that one! I’ve read research on that before… their results show positive.”

“That’s a good idea but that… I don’t think we would … we would keep that in mind for a new build or a renovation but it’s really hard to just you know adjust lighting or move things in an area that are already pre set.”

C2: Facilitate Commitment

Having residence students earmark a certain percentage of their meal plan deposit into FV-rich foods so that students can overcome temptation to eat burgers and fries too frequently.

Earmarking a percent of the student’s meal plan specifically for FV was not a popular nudge. Many participants noted that this would take away student’s choices or freedom and that this was not a socially-acceptable practice. Aside from this, it was also noted that it would be difficult to implement from the I.T perspective:

“Earmarking a percent of the meal plan. That would be technically very difficult. The actual programming of it.”

“Umm I feel like earmarking a certain percent uh… it’s challenging because it’s sort of like back end stuff that I don’t have a lot of control over and umm… it would be challenging to determine what foods are qualified. Categorizing things… it’s a little bit challenging.”

When asked which nudge would most likely not be implemented from the list:

“Probably having res students earmark a certain percent of their meal plan for FV…I think it’s all about choices…. I think we would get a lot of push back if we started dictating where the meal plan dollars were spent. I don’t think that’s a tactic in my opinion that would be successful. I don’t think we can force people into spending more on FV. I think there are softer ways of doing that. You know people can get umm yeah… it… something like that could potentially back fire. People don’t like to be told that they should or have to eat or do, for that matter.”

“Yeah I have a hard time seeing how that’s going to happen in the next few years or so. It’s a neat idea but from a technology point of view, how we would be able to do it.”
4.12  Major Theme: Overarching Themes of Barriers and Facilitators to Implementing Nudging in FS Post-Secondary Settings

Aside from the general perceptions of nudging the analysis of the transcripts identified major themes for barriers and facilitators of implementing nudging. These themes arose when participants were asked what their perception of implementing nudge interventions was overall. The major theme categories for both barriers and facilitators noted were structural, operational, financial, time, and perceived student demands. These themes are discussed in Table 16 and further explanations with quotes are noted below.

Table 17: Facilitators and Barriers of Implementing Nudging: Overarching Themes

<table>
<thead>
<tr>
<th>Factor Category</th>
<th>Barrier of Nudging FV</th>
<th>Facilitator for Nudging FV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural</td>
<td>Structural Barrier (9/10)</td>
<td>Ongoing Renovations (2/10)</td>
</tr>
<tr>
<td></td>
<td>(Nudges involving structural changes such as moving a salad bar, or adding an express checkout line in cafeterias that have already been built cannot be restructured for nudging, lack of space to add or maneuver things around, structural changes cannot be implemented quickly)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coordination (5/10)</td>
<td>Logistically easy (3/10)</td>
</tr>
<tr>
<td></td>
<td>(Nudges requiring more staff or departments are more time consuming and may face barriers to implementation because of more coordination required)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technicalities and logistics (5/10)</td>
<td>Less coordination (2/10)</td>
</tr>
<tr>
<td></td>
<td>(Changing placement of items or creating express checkout lines involved specific technical changes and process or logistic changes that were perceive as being difficult)</td>
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</tr>
<tr>
<td></td>
<td>Switching FS contractor (1/10)</td>
<td></td>
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<tr>
<td></td>
<td>(Unlikely to change items in the POS system if a new FS contractor is likely to take over)</td>
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<tr>
<td></td>
<td>Staffing (2/10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Training staff for creating new processes and whether the new processes would be consistently done,</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Rating</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>Costly (4/10)</td>
<td>Cheap (1/10)</td>
</tr>
<tr>
<td></td>
<td>(Nudges requiring structural changes and renovations would be costly.)</td>
<td>(Some nudges are less costly than others including changing placement of non-structurally fixated items such as plate placement.)</td>
</tr>
<tr>
<td>Time</td>
<td>Time consuming (1/10)</td>
<td>Quick to do (2/10)</td>
</tr>
<tr>
<td></td>
<td>(Involving more staff/other parties/departments.)</td>
<td>(Less time needed for coordinating staff for nudges requiring less staff involvement such as a dietitian implementing loyalty cards or changing the placement of items.)</td>
</tr>
<tr>
<td>Perceived student demands</td>
<td>Students want choice (4/10)</td>
<td>Students want to be prompted to eat “healthy” (1/10)</td>
</tr>
<tr>
<td></td>
<td>(Students want to be able to choose non FV-dense options when they want. Don’t want to be coerced or nudge towards FV all the time.)</td>
<td>(Students want more “in-your-face” marketing to be reminded to eat “healthy”)</td>
</tr>
<tr>
<td></td>
<td>Students want vegan/vegetarian options (10/10), plant-based protein (3/10), more FV (2/10), cooked veg (1/10)</td>
<td></td>
</tr>
</tbody>
</table>
4.12.1 Nudge Barriers

There were more barriers to implementing nudge interventions than facilitators. Figure 4 displays which barriers to implementing nudge interventions participants noted the most based on the larger size of the text.

Figure 4: Barriers to Implementing Nudging

Structural Barrier

The theme of structural barriers became quite common (9/10) when participants discussed common barriers to implementing nudges that involved moving larger objects within a cafeteria such as a salad bar, for example. It was noted quite often that moving a salad bar to make it more accessible or visible was difficult to do because changing the structure or layout within a cafeteria that had already been constructed would be costly to expand. The cost associated with changing the structure came up quite often. For example, one participant stated,

“Well… our salad bars are already a decent size so I don’t think we’re going to touch those and it’s really expensive to bring in the new one. So those are fine… and again they’re implanted into the ground, built into the ground so we can’t really move them.”

Another participant noted both cost and space capacity as being an issue when it came to implementing nudges that involved structural changes including improving the lighting around FV and increasing salad bar sizes:

“Umm it’s difficult… uh the reason it’s not high on the list of what I would do is just because of a big cost. So, there is cost to move or increase the size of something. And there’s also space capacity.”

(Participants perceived students wanting more of the above options or knew they wanted these options through formal feedback surveys. This may act as a prompt for participants to want to market these items more.)
Other participants mentioned that changing the size of a salad bar or moving it wasn’t on their list of priorities unless they were doing a major renovation. When asked if they would move a salad bar to the entrance or center of a cafeteria, one participant noted,

“Again, the salad and fruit bars are in there so unless we’re doing a major reno we can’t necessarily move them so I’d have to say by virtue of that I’d have to say no to that question.”

The current lack of available space in FS locations was also a barrier to increasing FV options. One participant highlighted,

“Increasing availability or range of FV offerings…Umm I think we already have a selection of them but the only thing that hinders the growth is the space available.”

Operational Barriers

A variety of operational barriers were commonly noted (6/10). Sub themes of operational barriers included coordination, technicalities and logistics, switching FS contractors, staffing, I.T, communicating to students, and tracking effectiveness of nudging. The two most common operational barriers were difficulty coordinating and I.T. More barriers existed under this theme in general than for operational facilitators. Operational facilitators included nudges being logistically easy and requiring less coordination. The more common of these two were logistically easy. These subthemes will be outline in more detail below.

*Operational Barrier: Difficult to Coordinate (5/10)*

The coordination of various nudges was noted to be difficult when it involved more than one department. When specifically talking about improving the lighting around FV’s or FV rich meals, one participant noted,

“Right…that would take work on multiple parties so we’d have to contact facilities, is it even possible to change the lighting for like one light bulb for one station? Umm so I think once we start breaking into other parties it gets a little trickier.”

When speaking in general to the efficacy of nudges, another participant stated,

“But the ones that are more difficult would be things that require cost or space changes, or bringing in different campus groups where it takes more coordination.”

*Operational Barrier: I.T (5/10)*

When discussing general barriers to implementing nudging, many participants brought up specific nudges that they thought would be difficult to implement because of the need to reprogram the point of sale (POS) operating system. Some of the specific nudge interventions that were brought up included earmarking a certain percent of a meal plan (the most common) and changing the default combo option to a FV as a less-noted nudge with an I.T barrier. The following statement shows the challenges associated with earmarking a certain percent of a meal plan:
“Hmm… I feel like earmarking a certain percent … it’s challenging because it’s sort of like back end stuff that I don’t have a lot of control over and umm… it would be challenging to determine what foods are qualified? Categorizing things… it’s a little bit challenging.”

Another participant noted the lack of ability to program the POS system for changing the default combo option to a FV,

“Umm that’s a good idea and we have talked in the res about how you can get a salad… it’s only programmed for fries and it’s something we’re aware of and we have thought like okay can we have some kind of small tossed salad in the back or what do we do… but it never amounted to that as the final result. Or maybe you can get fries or an apple but really the cost is different. You know an apple is $1 and fries are $2 something. So maybe people would feel the combo should be cheaper or…”

**Operational Barrier: Technicalities and Logistics (5/10)**

Technicalities and logistics of implementing specific nudges were also a very common operational barrier specifically when participants expanded upon these as being barriers to implementing the use of lighting to highlight FV and when creating an express check out line for students buying FV rich meals. Technical barriers more often were mentioned when participants discussed the use of planning out the technicalities of where certain objects would go and how manipulating the environment would feasibly work. For example, one participant noted when asked about what barriers they forsew when implementing nudges in general,

“The spot light piece has to do with the issue of gaining electricity. We couldn’t have extension cords running through our FS location so there is a structural and technical piece to that. It sounds easy… umm but depending on where that electricity is and what the spot light is... some of the spot lights really do give out a lot of heat. So, there are technical things that you have to think of when you purchase a spot light.”

Another participant suggested that nudges involving altering placement of non-static items such as plates would be a challenge logistically,

“Yes, I would say they [the plates] are equally visible. I think umm in reality you’ve got a certain location for umm bowls and plates… we rely on our porters to restock it and you know it’s just such a busy environment to dictate that, the small ones go here and the large ones go… in different locations, that would be a challenge logistically. They have certain areas designated that… to answer your question, no we don’t”

When asked which nudge intervention would be the most difficult to implement, a subsequent participant noted the logistics around setting up an express line as being the most difficult,

“Probably the express line… Because it would be a lot of logistics and customer service, people jumping in line…”

**Operational Barrier: Communicating to Students (5/10)**

A less commonly-noted operational barrier was the difficulty of campus administration or management communicating with the student population. For example, one participant stated,
“I know in our… this may not be same thing [with] all campuses but communicating with students: It’s challenging to get a message through when you’re the administration- when you represent the university side, and I don’t think text messaging on our campus would work. We’ve tried everything but we just have to find a better way.”

Many other participants noted the lack of access to student’s cell phone numbers hence the inability or difficulty in implementing a nudge that involves text messaging students:

“We’re certainly not going to text message students. We don’t have access to their phone numbers.”

“And then the text messaging students… again I think it’s a little bit about the confidentiality of their numbers… like how can we contact them.”

“No, we don’t text our students. We don’t have that data.”

“We don’t do that. We don’t do emails either. We rely on our social media and we focus on all sorts of foods on campus. But we don’t have any kind of master list of people’s numbers and it changes so often you know. Every four years … like every year it’s a different audience. So, it would be constantly trying to you know… some students come. Some students go. Some are on co op. you can’t be texting them when they’re not here anymore.”

**Operational Barrier: Staffing Issue (2/10)**

Staffing difficulties including FS management being unsure whether new processes including nudges would be implemented properly by staff or labor shortages were a few of the noted barriers within this sub theme. The following statement was from a participant who had implemented and researched nudge interventions in the past:

“When we did the full-on nudge study a couple years ago, nudge intervention… it was more challenging than we thought because of staff buy in. Or staff training is maybe more of what it was. So, if we were there writing the menu items everyday then there’s so many people you have to train to put the items first. To create a new process like that.”

Another participant who also implemented nudges in the past noted that the consistency of implementing the new process was a challenge:

“It [placing FV rich options at beginning or end of a menu] was a challenge. I haven’t seen the data on that but it was a challenge in terms of staff. Like implementing it with staff. You know, consistency across the board with writing it.”

Another participant made mention of their lack of belief in staff buy-in for new processes:

“Or I guess if it was a temporary thing, we could build new buttons on the till but then you have to train all the staff to use those buttons. We could have had a button on the till that was just extra veggies and it didn’t ring anything in but they would push that when they saw the sticker, for example. Again, would they do it? Hard to say!”
Operational Barrier: Switching FS Contractor (1/10)

The final and least commonly-noted barrier under the theme of operational barriers was the participants’ belief that they would not be maintaining a permanent relationship with their current outsourced FS provider. This was a less commonly-noted barrier as not many of the participant institutions were run by external FS providers. When asked which nudges would be less likely implemented, one participant noted,

“And I think you mentioned using an app but with us the app tied to the FS contractor is not ideal because if we don’t have the FS contractor on the next contract, we would have to switch the app. That’s why we wouldn’t go that route. That’s why those are the less likely.”

Financial Barrier

Costly (4/10)

The issue of some nudges being costly was another frequent barrier. More specifically, most participants brought up cost as a barrier when speaking about altering the location of a salad bar, bringing in a new one, or increasing the size of one, which involves costly construction work:

(Researcher asked which nudges they were least likely to implement.)

“Umm… well… our salad bars are already a decent size so I don’t think we’re going to touch those and it’s really expensive to bring in the new one. So those are fine… and again they’re implanted into the ground, built into the ground so we can’t really move them.”

When asked whether the participant had any comments for putting FV-rich stations closer to the entrance or in the center, the participant noted:

“Umm it’s difficult… uh the reason it’s not high on the list of what I would do is just because of a big cost. So, there is cost to move or increase the size of something.”

In general, nudges that require changing a space because of the cost of construction are considered more difficult to do. One participant summed this up well:

“But the ones that are more difficult would be things that require cost or space changes, or bringing in different campus groups where it takes more coordination.”

Perceived Student Demands-Barrier

Students want choice (4/10)

It was often noted that FS managers believe students want to have choices when it comes to food options regardless of whether they are considered FV-dense or not. The idea of implementing certain nudges would therefore restrict their choice. When the idea of an express check out line for FV-rich foods was discussed, many participants noted that they would not do this because they felt it would be shaming student’s choices if they weren’t buying something FV-rich. This is evident in the following statement from a participant:
(Researcher asked about creating an express check out line.)

“Umm well you know what. No, we don’t have that. The res is so busy that you’d never be able to divide people up and most… I do think the most popular is our hot dish section and people are putting healthy choices in there so it would be impossible to divide them up and it’s really important that we don’t shame anyone if they decide to get a poutine so now they have to wait in a long line.”

Another participant supported the idea that most students are purchasing something “healthy” on an average day and should not be judged for the days they do purchase something that would be considered unhealthy,

“Yeah because I do think in the residence generally majority of students on an average day are purchasing something that is healthy and who’s to judge and examine you know what the calorie count of what’s on their plate or if they have enough FV (inaudible) to go through a short line though!”

When another participant was asked about the idea of earmarking a percentage of the student’s meal plan for FV purchasing, this participant supported the fact that students shouldn’t feel forced into eating or spending their meal plan dollars a certain way,

“And I don’t think that’s a tactic in my opinion that would be successful. I don’t think we can force people into spending more on FV. I think there are softer ways of doing that. You know people can get umm yeah… it… something like that could potentially back fire. People don’t like to be told that they should or have to eat or do, for that matter.”

Time Barrier

Time consuming (1/10)

The notion of nudges being time consuming was one of the least often noted barriers. This barrier was noted when referring to earmarking a percentage of the student meal plan towards the purchase of FV. One participant noted this:

“I think just for the meal plan it’s just umm I think the process of changing the meal plan to anything is a little more arduous. Umm and time consuming from the other changes that we can make on our own? Like there are more parties involved.”

4.12.2 Nudge Facilitators

There were fewer facilitators to implementing nudge than there were barriers. Figure 5 demonstrates the five noted facilitators of implementing nudge interventions.
Operationally-Easy

Figure 5: Facilitators of Nudging

Operational Facilitators

Logistically Easy (3/10)

Many of the nudges that were noted to be logistically easy involved moving smaller items such as bigger plates or FV rich food items closer to customers. For example, one participant noted:

“There are a couple there. Like the bigger plates. Placing FV rich foods closer to customers. I think it’s a simple thing to do and negligible cost associated and easy to do from a time perspective. And loyalty cards is... Well they used to have a standard whole fruit loyalty card but expanding that program would be very easy and interesting to do.”

Another participant noted they were currently implementing a nudge: moving big plates to the front and small plates to the back. This participant noted that it was easy to do and that other nudges “like this” are easy to implement from an operational standpoint:

“I know we do that... moving the big plates to front and small to the back... I think that’s easy enough I think things that are easy like that to implement are important... and fine operationally.”

When asked what would make implementing nudging easier, a participant noted,

“So, I’m just thinking it has to be easy operationally. Like looking at our menu boards when we’re reprinting them or looking at the placement of things. I think those things are fairly easy. Umm yeah... so those ones are simple and don’t take a lot of time from the operational side to implement and I think it’s totally doable.”

According to this participant, it is easier to implement some nudges while other operational changes were going on meaning that FS management would not particularly go out of their way to implement nudging but would be able to do it if it was not an inconvenience to their regular operations.

Less Coordination (2/10)

Another facet of operational facilitators was the aspect of nudges requiring less coordination between many staff under FS management and departments outside of FS. When one participant was asked how easy or difficult, they perceived nudging strategies to be in general, they noted the nudges requiring less coordination with outside campus groups would be the easier ones to implement:

(Researcher asked how easy or difficult they perceived nudging strategies to be.)
“I think it depends on which one we’re talking about. Umm because I think that some of them could be… like write a menu or I don’t think the loyalty cards would be super difficult either or obviously changing the default combos, I can personally offer more input on or more control. But the ones that are more difficult would be things that require cost or space changes, or bringing in different campus groups where it takes more coordination.”

(Researcher clarified whether they thought the ones that were easy to implement were the ones that they could do by themselves.)

“Or just my immediate team, yeah.”

Structural Facilitator

Renovations (2/10)

The only structural facilitator which was less-often mentioned, was when institutions were undergoing renovations and were able to prioritize permanent nudge interventions such as increasing the size of a salad bar. One participant noted this when discussing the recent renovations that were going on in some of their residence buildings:

“Well we’ve recently renovated residence “x”, we opened res “y”, and two of our newest units they have huge salad bars so you know… as we have opportunity to renovate or open new units… the salad bars in proportion to other areas are definitely growing in size.”

(Researcher asked if they made it a priority to change or grow their salad bars when renovating.)

“Yes, without a doubt.”

Time Facilitator

Quick to do (2/10)

Another less-often-noted facilitator was nudges that were considered to not take up much time. Some participants listed off specific nudges that they thought were easy to do and mentioned the factor of time contributing to why they thought it would be easy. The following participant was asked which nudges they would likely implement and discussed the following:

“There are a couple there. Like the bigger plates. Placing FV rich foods closer to customers. I think it’s a simple thing to do and negligible cost associated and easy to do from a time perspective. And loyalty cards is... Well they used to have a standard whole fruit loyalty card but expanding that program would be very easy and interesting to do.”

Another participant was asked which of the nudges from the list given in the interview guide would not be implemented by the FS management. The participant listed off nudges that would be difficult to implement and then proceeded to discuss nudges that would be easier because of factors including not taking a lot of time:

“And text messaging too. Feasibly, I don’t think we have… you know coordinating things like that. So, I’m just thinking it has to be easy operationally. Like looking at our menu boards when
we’re reprinting them or looking at the placement of things. I think those things are fairly easy. Umm yeah… so those ones are simple and don’t take a lot of time from the operational side to implement and I think it’s totally doable.”

Financial Facilitator

*Cheap (1/10)*

Another less-often noted facilitator of nudging was the mention of a nudge not being costly to implement. When one participant was asked which nudges they would likely implement, they listed off some of the ones they thought would be easy to implement and noted the negligible cost as being a factor for their reasoning for implementation:

(Researcher asked if there was anything from the list of nudges that they would likely implement.)

“There are a couple there. Like the bigger plates. Placing FV rich foods closer to customers. I think it’s a simple thing to do and negligible cost associated and easy to do from a time perspective. And loyalty cards is… Well they used to have a standard whole fruit loyalty card but expanding that program would be very easy and interesting to do. So… what would you pick to do right now… I think those are things we can do quickly and easily and I think would definitely have an impact. I liked some of the other ones there… there’s a couple that would be very… ugh a little tricky. I’m getting ahead of myself here… Did I answer that?”

Perceived Student Demands as Facilitator

*Students want to be prompted towards FV (1/10)*

The final facilitator of nudging that was noted by one participant was the fact that through the use of survey research, students at this particular institution had requested to have more “in-your-face” promotions to remind them to eat “healthy”. Because of this known fact, FS may feel more inclined to implement nudging because they believe students want it. This particular participant was asked how health conscious they believed their students were. The following was their response:

“I think they are very. They want healthy options. But you know something that has come in our research which is extremely telling is that they have lack of awareness of what is happening even though it’s happening right in front of them. They want healthy options and they’ve also stated they need nudging and reminding to do these things so I think it’s just the stage in life… they’re leaving home but they want healthy food. They’ve always had a parent helping them with this. So, they’ve admitted it: “Yes, we want this.” Like in question we’ve said do you want FS to do more in your face promos and they said yes they need help remembering to eat healthy.”

4.13 Major Theme: Most likely to implement nudges are the “easier” nudges

After analyzing which interventions were perceived as being the least to most likely to implement, it was evident that there was a common theme between the interventions that participants perceived as being difficult to implement and those that were considered least likely to implement and vice versa. See Table 16 and Table 17 for a list of nudges that participants perceived as easy to do and difficult to do as well as
most likely and least likely to do. All of the nudges listed in this table are organized from the most commonly-noted nudge to the least-commonly noted nudge.

Table 18 shows that FS staff perceived plate placement, FV loyalty cards and FV menu board placement as the top three easiest nudges to implement. These were also the top three most likely to implement nudges if participants weren’t already doing these. Of the nudges that participants noted they were currently doing, the only ones that were noted as easy to do and currently doing were FV loyalty cards, FV at beginning or end of menu boards and placing big plates in front of small plates.

Table 18: Relationship Between Easy to Implement and Most Likely to Implement

<table>
<thead>
<tr>
<th>Easy to do Nudges</th>
<th>Most Likely to Do Nudges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big plates in front, small plates behind (3/10)</td>
<td>FV loyalty cards (4/10)</td>
</tr>
<tr>
<td>FV loyalty cards (3/10)</td>
<td>FV at beginning or end of menu (3/10)</td>
</tr>
<tr>
<td>FV at beginning or end of menu (2/10)</td>
<td>Big plates in front, small plates behind (2/10)</td>
</tr>
<tr>
<td>FV closer to customers (1/10)</td>
<td>Change default combo option to FV (2/10)</td>
</tr>
<tr>
<td>Adding more FV to current recipes (1/10)</td>
<td>Place FV at checkout counter (2/10)</td>
</tr>
<tr>
<td>Change default combo option to FV (1/10)</td>
<td>Text messaging (1/10)</td>
</tr>
</tbody>
</table>

* This participant noted they had recently added vegetable offerings to their breakfast salad bar

Table 19 shows nudges that were perceived as difficult to do also coincided with the nudges that participants said they were least likely to do (express checkout line, text messaging, earmarking meal plan, spotlights to highlight FV, and moving a salad bar). According to participants, there were many notable barriers to these nudges as noted earlier.

Table 19: Relationship Between Difficult to Implement and Least Likely to Implement

<table>
<thead>
<tr>
<th>Difficult to do Nudges</th>
<th>Least Likely to Do</th>
</tr>
</thead>
<tbody>
<tr>
<td>Express checkout line (7/10)</td>
<td>Express checkout line (8/10)</td>
</tr>
<tr>
<td>Text messaging (6/10)</td>
<td>Text messaging (8/10)</td>
</tr>
<tr>
<td>Earmark meal plan (6/10)</td>
<td>Earmark meal plan (8/10)</td>
</tr>
<tr>
<td>Spotlights to highlight FV (5/10)</td>
<td>Spotlights to highlight FV (5/10)</td>
</tr>
<tr>
<td>Move salad bar (3/10)</td>
<td>Move salad bar (3/10)</td>
</tr>
<tr>
<td>Increase availability of FV (2/10)</td>
<td>Move FV to entrance (2/10)</td>
</tr>
<tr>
<td>FV at beginning or end of menu (2/10)</td>
<td>Change default combo option to FV (2/10)</td>
</tr>
<tr>
<td>App (1/10)</td>
<td>Large plates in front (1/10)</td>
</tr>
<tr>
<td>Plate placement (1/10)</td>
<td>Increase salad bar size (1/10)</td>
</tr>
<tr>
<td>Loyalty Card (1/10)</td>
<td>Respected Individual Endorsement (1/10)</td>
</tr>
<tr>
<td>Change default combo option to FV (1/10)</td>
<td>FV at beginning or end of menu (1)</td>
</tr>
<tr>
<td>Increase salad bar size (1/10)</td>
<td>App (1/10)</td>
</tr>
</tbody>
</table>

What is important to note is the overlap between Table 18 and 19 where some participants noted some nudges as being both difficult and easy to implement as well as overlap between nudges that were perceived as being most likely and least likely to implement. Reasons for this may be due to the difference in environmental settings between universities including their physical layout, lack of staffing, or other operational barriers which were noted earlier.
5 DISCUSSION

As of 2017 nudging as a form of health promotion has been widely accepted globally by over 150 governments who have enlisted behavioral science and nudging as part of their governmental structures. Furthermore, in many parts of Europe, Canada and the United States, citizens have shown support of nudging for health promotion (Reisch, Sunstein, & Gwozdz, 2017). From a FS manager perspective, the acceptance of nudging has not been reviewed in a post-secondary setting before this study. Other contexts such as restaurants (Filimonau & Krivcova, 2017) and convenience stores (Houghtaling et al., 2019) have been reviewed to understand barriers of implementing nudging. Furthermore, these studies also stress the importance of the acceptability and positive perceptions of nudging from FS in order for nudging to be implemented effectively. Our current study echoes the acceptability of nudging in select Canadian post-secondary schools, specifically among food service management staff.

The present qualitative investigation aimed to explore current and recent marketing practices for FVs and FV-rich meals in post-secondary institutions across Canada, to assess their awareness of nudge marketing techniques amongst FS management, and to identify the facilitators and barriers of implementing nudging of FVs and FV-rich meals. This is only one of the first studies to evaluate the perspectives and opinions of food service managers in the post-secondary environment on the marketing of FVs specifically and on their perceptions of nudging this particular category of foods. Therefore, there is limited literature to compare our results with. Sections 5.1-5.8 below provide an overview of the results and the specific answers to the research questions. Section 5.9 integrates the results of this study with other research findings.

5.1 Key Findings

In response to the objectives of the study, most of the participants had heard of the term, ‘nudging’ before (7/10). All of the participants also noted that they were or had recently marketed FVs and/or FV-rich meals using some form of marketing strategy and there were generally mixed perceptions towards the feasibility of nudging. Overall, it was found that most participants felt nudging was simple to do but generally depended on the type of nudge intervention being done. Those that were less costly, involved no construction or structural costs and/or involved less coordination with other groups on campuses were considered easy to do. Those that were perceived as difficult to do were typically costly, required structural changes and/or communication with external departments.

The remainder of this section will discuss the other major themes that answer the specific research questions of the study and address the subthemes obtained from the nature of the semi-structured interviews. Furthermore, other research studies that may echo these findings will be discussed along with limitations and implications for this study and future research suggestions.

5.2 Research Question 1: How do food service operators in Canadian post-secondary institutions currently market fruits, vegetables and fruit and vegetable-rich meals?

Use of social media, and a local dietitian to promote FV consumption as the most prominent direct marketing techniques, as well as the several other creative strategies described by different respondents, showed that this group of respondents were already interested in and active in promoting FV. The creative initiatives that supported improving consumer acceptance were particularly interesting, often in conjunction with other ideas around the popularity and request for plant-based meal options, enhancing cooking skills through educational classes led by dietitians and chefs, support for local farmers and even an in-house vertical farm wall to provide fresh and local herbs to FS locations.
It was interesting to see how various post-secondary institutions responded to the demands of their student populations and also keep on top of trends. Participants also discussed the push towards implementing more sustainable efforts on campuses and marketing their sustainability efforts through making events for local farmers to come and talk about their produce with students, or having their own chefs’ faces on billboards in cafeterias or dining halls with blurbs about where the food came from and how they prepare it. It appears that post-secondary institutions are not only innovation hubs for research produced by students but the FS departments themselves are also conducting research and developing innovative concepts to better their services.

5.3 Research Question 2: Are food service staff aware of nudge interventions as a marketing technique?
Research Question 3: If familiar, do food service operators currently use nudge-based marketing interventions to increase fruit, vegetable and fruit and vegetable-rich meal purchasing by customers?

Participants were aware of nudging interventions as a marketing technique. Over half of the participants (7/10) had heard of the term before and over slightly half were currently implementing nudge interventions (6/10). The most common nudge interventions being implemented by FS operators were the central salad bar, placing FV at front in display areas, loyalty cards for FV, and moving FV closer to entrances of FS locations.

Interestingly, even though structural and financial barriers exist to implementing some nudging techniques (moving a salad bar centrally or moving FV closer to entrances), participants were still doing some of these without realizing they were nudges. This means that despite existing perceived barriers to these nudges, FS are still willing to implement these. This emphasizes the importance of understanding varying contexts and environmental differences between institutions when analyzing feasibility of implementation of certain nudges.

5.4 Research Question 4: What are food service manager’s perceptions regarding the feasibility of using nudge interventions in food service outlets?

The majority of participants said that nudging was generally simple to do however feasibility depended on the specific nudge. Given that the descriptive data revealed a diversity of organizational structures and types of FS, it is not surprising that diverse opinions emerged. Nudges that involved construction and relocating of structures (such as salad bars, for example) were more difficult to do because of the costs associated with it. It was often noted that when doing a re-build of a FS location or opening a new FS location, increasing the size of the salad bar, as well as placing it centrally was a common priority.

In the most recent systematic review of nudging for FV promotion, Broers et al. (2017), using categories of properties, placement or a combination of both, show that the most effective nudge strategies are those that involve altering FV placement and combined nudges where both altering properties and placement of FV are involved. Specific nudges noted in our study that fit within these categories were: placing FV at checkout counters, placing FV-rich menu items at the beginning or end of menus, increasing size of salad bars, moving FV’s closer to entrances, moving FVs to the center of a location, placing big plates in front and small plates behind at FV-rich counters, placing FVs in front or closer to customers in display areas and adding more FV to current recipes.

Out of these nudges, participants believed nudges that involved altering placement of things was easier to do. Specifically, they thought moving big plates in front and putting small plates behind in FV-rich
locations (3/10), placing FV-rich menu items at the beginning or end of menus (2/10) and adding more FV to current recipes would be easy (1/10). Aside from just being perceived as easy to do, placing FV at the beginning or end of a menu (3/10), placing big plates in front and small plates behind at FV-rich stations (2/10), and placing FV at checkout counters were nudges they were most likely to implement.

What is slightly surprising about this data is the small numbers of participants who noted that these nudges would be easy to do or would likely implement. What may have helped the researcher to be prompted to gain more data on the use of these nudges was if the researcher specifically structured the nudge intervention table into two tables where one table included the questions: “Have you done anything like this in the past year?”, “Are you currently doing anything like this?” and “Would this interest you in the future?”. The second nudge table could have had a specific emphasis on facilitators and barriers of each nudge intervention. Not every single nudge intervention in the interview guide was expanded upon by participants regarding its perceived facilitators and barriers hence some interventions that truly could have been perceived as easy may have simply been overlooked by participants. Furthermore, with the nudge intervention table being towards the end of the interview, some participants had noted they were pressed for time and appeared to be rushing to finish the interview. This could have also caused some oversight of each nudge intervention when they were asked question 18: “If not already doing, which are you most likely to implement?” Alternatively, conducting multi-step interviews could have aided this issue to help screen individuals who were able to expand more on the topics of facilitators and barriers of specific nudge interventions.

Overall, FS managers are ensuring they are promoting the consumption of FV on their campuses and appear to be doing this through various types of nudge interventions as they have learned about nudging over recent years. They are more likely to implement nudges that they perceive as being easy to do.

5.5 Question 5: What are the facilitators and barriers to implementing nudge-based strategies in post-secondary institutions?

The general themes obtained when participants were asked about the facilitators and barriers to implementing nudging in general were categorized as structural, operational, financial, time, and perceived student demands. Different sub themes existed within each of these categories relating to facilitators or barriers.

There is not one overarching idea towards the facilitators or barriers of nudging as a whole. Each nudge intervention must be analyzed individually.

This information can be used to help inform future nudge development and can help streamline the process of choosing which nudges would work best in various post-secondary institutions given the variety in environmental differences.

A breakdown of the specific facilitator and barrier themes are discussed further below.

5.5.1 General Perceived Barriers to Implementing Nudges

The most common barrier to implementing nudging was structural barriers. This involved moving large objects such as salad bars, for example. The barrier to doing this often-involved cost. The second most common barrier was operational difficulties which included coordination with other departments, technicalities and logistics that may have involved changing processes, changing a current FS contractor, training staff on new nudging processes and the lack of being able to add more labor hours for nudging.
The use of I.T, specifically altering a POS system to track the success of new nudges would be difficult to do since staff noted they didn’t know how to manipulate the POS system. They also noted the process of manipulating software was time consuming or costly if this process were to be outsourced. Communicating to students through text messaging was noted as being intrusive of privacy and obtaining cell phone numbers of students was not typically-done by FS. Furthermore, simply connecting one on one with students in person was noted to be difficult as FS administration/management staff. Finally, tracking the effectiveness of a nudge was noted to be a barrier as staff noted the lack of ability to track effectiveness properly.

Other barriers included the cost of altering structures, time and the desire of students wanting choice. The most frequently-noted nudge that participants mentioned would reduce student choice is earmarking student meal plans because it was perceived as being forceful.

These general themes of nudge barriers can act as a framework for future studies involving further interviews with FS management to understand how they believe these barriers can be overcome and to perhaps gain a better understanding of what has been done in the past to overcome these barriers.

5.5.2 General Perceived Facilitators to Implementing Nudge

The same overarching themes were noted for facilitators of nudging: structural, operational, financial, time, and perceived student demands.

The most common structural facilitator was when an institution was already undergoing renovations, it was more likely that they would implement structural nudges during a renovation. This may include increasing a salad bar size or relocating it. Operational facilitators were nudges that were logistically easy to implement because they involved minimal changes and less coordination with other departments. Cheap nudges were considered easy to do. These generally included nudges that did not involve construction costs. Nudges that were also considered quick to do and did not require an in-depth marketing plan were considered easy. Finally, the perception of the increasing trend towards students becoming more health conscious and students specifically demanding more FV prompted FS departments to want to do more FV-specific marketing to give students what they want. This acted as a facilitator towards FS management wanting to implement more FV nudge strategies.

The themes noted here may help inform future implementers of nudging to determine which nudges would be easiest to implement in their environment without having to focus on overcoming the various barriers noted earlier.

5.6 Other Major Themes

5.6.1 Easy-To-Do Nudges are the Most-Likely-To-Do Nudges

Aside from the major themes arising from answering the research questions, some other interesting themes that emerged was the relationship between the nudges that were perceived as easy to implement and those that were the most-likely to implement.

Nudges that participants perceived as both easy-to-do and most-likely-to-do were changing the placement of plates where big plates go at the front and small plates go behind at FV-dense stations, writing FV options at the beginning or end of menus, and loyalty cards for FV. These nudges were all ones that required low costs to implement, and did not involve operational barriers such as hiring more staff, or
training more staff for example. What is interesting is that from the nudges that were easy and most-likely-to-do, some of the above nudges mentioned were nudges that were already being done by some of the other participants; particularly loyalty cards.

The nudges that were difficult-to-do were usually nudges that involved high costs, coordination between other campus groups, communication barriers with students and administration, training staff and adding new processes that would require more staff. The difficult-to-do nudges that aligned with the least-likely to do nudges were the express checkout line as the most popular in both categories, text messaging, earmarking a percent of the student meal plan, moving a salad bar, and adding spot lights to highlight FVs. Out of these nudges the only nudge that had been done most frequently was moving a salad bar centrally however this was only done when a renovation or a new build was occurring.

Understanding the relationship that exists between what participants perceived as being easy to implement and likely to do can help predict which nudges would be most feasible in post-secondary operations given the environmental context. The same findings can be paralleled to the nudges perceived as difficult such that these ones are least likely to be popular amongst FS departments unless a facilitator from the themes noted above happens to cross paths with the department (a new cafeteria being built would open the opportunity to implement spot lights on FV-dense areas and or place the salad bar centrally).

5.6.2 Student Demands of FS

One of the most common demands from students for FS was the request for more vegan/vegetarian options. As a result, it was evident that FS management were recently implementing interventions in place to meet this demand as seen earlier.

The second-most common demand was the desire for more local produce which many participants noted as being difficult year-round due to seasonality. One university noted the fact that they had a vegetable processing room that was used to keep local produce in year-round to address the issue of not being able to get local produce in winter months. Other notable demands were that students want more plant-based proteins, and in general, they want to have choices. Despite not always picking the FV-dense options yet demanding more of them, they still want the option to choose choices that are not considered high in FV such as fries or hamburgers, for example.

FS management appear to be continuously gaining feedback from their student populations to understand demands and continue to improve their FS services to satisfy students. The perceived recent trend towards vegan diets has surely benefited the nutritional landscape of universities as of late as well as the addition of FS-specific dietitians whose roles often are to improve the nutritional quality of the FS menus in tandem with chefs on campus. This collaboration has seemingly been beneficial for school’s aiming to meet student FV demands and the hope is that more post-secondary institutions would hire nutrition-expertise to focus on continuing to meet nutritional requirements for post-secondary school students.

5.6.3 Registered Dietitians Often Spearhead the Implementation of Nudge Research

Interestingly, RD’s that were hired within the FS departments (4/10) tended to be the ones who were spearheading the implementation of nudge interventions and/or conducting formal nudge research (2/10). In total 3/10 universities were conducting nudge research. In the case of the one university who was implementing nudging who had not hired a RD, this university noted that the nutrition department often offered volunteers and internship students to the on-campus FS department to help with nudging and
other FS-related nutrition initiatives. These students/volunteers would usually be managed by a RD. This reinforces the implications of hiring nutrition expertise and Registered Dietitians within post-secondary institution FS departments as they have the expertise to organize and implement interventions that support “healthy eating” mandates of post-secondary institutions.

5.7 Measuring General Marketing Effectiveness

Only 3 of the institutions had measured their general marketing strategies for FV promotion. It was often-noted that though some institutions did measure some of their strategies, they wished they had better ways to formally measure them. The most-common noted method of measuring effectiveness of general marketing strategies was to measure the sales of certain products or to look at the amount of dollars FS spent on purchasing certain items.

To ensure marketing efforts don’t waste time and money, specific evaluation methods of marketing interventions need to be implemented to understand the effectiveness of marketing for FV.

5.8 Measuring Nudge Effectiveness

Out of the participants that were implementing nudging (9/10) one of the more popular nudges that had been measured was the use of loyalty cards for FV promotion and purchasing (3/10). Loyalty card usage was measured by counting the total redeemed cards at the end of each year however participants noted they didn’t have a baseline to compare these with since they did not have data from previous years. The second nudge measured was adding more vegetables to sandwiches and placing stickers on these to state this fact (1/10). This participant noted not being able to obtain the data and noting that the evaluation method of the effectiveness of this nudge was not very strong. The last nudge that was noted to be measured was the increase in salad bar size (6/10). Participants that had done this recently had stated they measured the effectiveness of this nudge through looking at the increase in FS purchasing of FV and consumer sales of FV. In relation to this topic, some participants also noted their reason for not implementing specific nudges was due to the lack of ability to track the effectiveness of these nudges.

There is a lack of research on the effectiveness of nudge interventions for FV promotion specifically in post-secondary institutions. The importance of effectively evaluating nudge interventions will help strengthen this area of research as three institutions had noted they were conducting formal research on their use of nudge interventions. The lack of formal and rigorous evaluation methods for nudging seems to be an area requiring more research and attention and is crucial for strengthening this body of research.

5.9 Comparisons with Recent Research

5.9.1 Measurement of Nudge Effectiveness

As noted in the Literature Review, many previous nudge intervention studies have had weak results; some due to poorly-designed interventions and challenges in measuring change, some due to a lack of reported sample size (Broers et al., 2017) and due to various outcome measures used to estimate effectiveness (Vecchio & Cavallo, 2019). Another intervention study also echoed this by stating that appropriate outcome measures need to be used to determine nudge effectiveness (Velema et al., 2017). Velema et al., (2017) suggest two outcome measures that could be used to measure the effect of multiple nudge strategies executed concurrently: 1) sales of specific nutrient-dense product and 2) satisfaction of customers with the environment. The participants in our study noted sometimes measuring marketing effectiveness via sales of specific items however no participants noted the use of measuring customer
satisfaction. Setting appropriate outcome measures was overall echoed by our current study as participants noted a lack in setting appropriate outcome measures to measure nudge effectiveness, if any. Velema et al. (2017) also suggested that for long term viability of nudging, interventions need to be developed with input from employees, nutrition experts and FS management which was the purpose of our study.

5.9.2 Integration of These Findings with Most Effective Nudges

As reported in the Literature Review, nudging for the promotion of FV shows that altering the placement (d=0.39) (B Decision Structure, 2: Change option-related effort (Münscher et al., 2016)) as well as a combination of altering the placement and altering properties (B Decision Structure, 3: Change range or composition of options (Münscher et al., 2016)) of items (d=0.28) have the greatest effect (Broers et al., 2017). To elaborate, altering properties of items could be things such as improving the quality of FV or altering the aesthetic appeal of something, for example (Broers et al., 2017). Our current study shows evidence of participants perceiving nudging involving altering placement to be easier nudges to implement and were amongst the nudges they were also most likely to do.

These results are potentially beneficial for FS departments since the nudges they perceived as easier and most-likely to implement have been shown to be effective in promoting specific food choices. The concept of intentionally combining both placement alteration and property alteration was not specifically discussed with participants of this current study and could be something to explore in future studies.

This section further reviews the various categories of the Taxonomy of Choice Architecture Framework (Münscher et al., 2016) and relates them to this study’s findings as well as the most effective nudges for FV promotion from the literature (Broers et al., 2017). It should be kept in mind that the use of different frameworks in various reviews makes it more difficult to assess effects. For example, Broers et al. (2017) used the Hollands et al., (2013) framework which focuses on Properties and Placement in the physical micro-environment, which is more narrowly focused than Münscher et al.’s (2016) framework, which classifies the overall choice architecture.

Category A: Decision information within Münscher et al.’s (2016) framework would align most closely with Properties in the Hollands framework (Hollands et al., 2013). According to Broers et al. (2017) this category of nudging was not generally shown to be effective in promoting FV consumption.

The technique category of A1: translating information only had one nudge within this category in the interview guide: developing creative menu item names. Unfortunately, no known facilitators and barriers were noted along with this nudge.

Within the technique category of A2: Making information visible, one specific nudge within this category was noted by this pool of participants as being easy and most likely to implement: placing FV-dense menu items at the beginning or end of the menu.

From the technique category of A3: Provide social reference point, two nudges from the interview guide that fit this category were: having respected individuals or celebrities endorse FVs and displaying RD’s favorite picks on Instagram with curated pictures (a nudge that was specifically noted by some of the participants) (3/10). Both of these nudges were generally considered easy to do. Quite often the respected individual that was noted to be endorsing consumption of FVs were dietitians (3) or chefs (1). Overall, this category appears to be easy to do but depending on the social reference point being used, may be costly and may not make sense based on the size of the institution.
Under Category B: Decision structure, nudges from the interview guide that fit within this category generally appeared to be the most effective according to Broers et al. (2017) who mentioned that nudges involving altering placement and a combination of altering placement and altering properties of FV were the most effective however not all techniques within this category involve altering placement and/or properties of items. Furthermore, questions regarding the intentional combination of altering placement and altering properties of FV was not specifically asked in the interviews. Overall, category B within the Taxonomy of Choice Architecture Framework proved to be one of the easiest and most likely categories of nudging to implement.

Specifically, within B1: Changing choice defaults, the only nudge noted in the interview guide within this category was changing the default combo option to a FV. There were no noted facilitators of this nudge as it was quite common for institutions to sell a-la-carte. Most of the time it was the franchises that offered combos and not independently-operated FS locations hence the likelihood of FS being able to do this was low. One barrier of implementing this was the difficulty of reprogramming the POS system. According to Broers et al. (2017) this nudge was not considered to be one of the most effective nudges for FV promotion anyway.

Within the category B2: Changing option-related effort, there were six nudges that fell within this technique category within the interview guide: moving a station featuring FV-rich foods to the center of a FS location, placing FV-rich foods in front or closer to customers in display areas, moving salad bars or FV-rich foods close to entrances of locations, placing big plates in front and small plates behind for use at salad bars or any other FV-rich food areas and placing FV-rich items near checkout counters so that everyone sees them. Of these interventions, all of them involved altering the placement of FV. According to Broers et al. (2017) nudges involving altering placement have proven to be the most effective at promoting FV choices. Of these nudges, the ones involving large structural changes and construction costs were the least-likely to be implemented because of the costs associated with them. These included moving FV-rich stations to the center or entrance of FS locations. The only way this would be possible is if renovations were currently ongoing or if a new FS location was being built (3/10 institutions noted this). Interestingly, participants noted that placing a salad bar in the center of a location was a priority when rebuilding or building a new FS location (3/10) and they generally ensured that the size of any new salad bar being built or renovated was considerably large or larger than before (a B3 nudge technique noted below). Though it was not explicitly asked in the interview guide, this was a combined nudge (altering placement and altering properties) which was noted by Broers et al. (2017) to be one of the most effective types (d=0.28) of nudges for FV after altering placement (d=0.39).

Within category B3: Changing range or composition of options, there were three nudges that fit within this technique category: increasing availability or range of offerings of FV, increasing the size of a salad bar and adding more vegetables to sandwiches and placing stickers on them to show they contained higher amounts of vegetables (a nudge not in the interview guide but noted by a participant). Neither of these nudges were noted as most-likely to do nor easy to do. Changing the properties of FVs has been shown to be an effective FV promotion strategy when combined with altering placement as noted above. Unfortunately altering properties of FVs alone has not been noted to be effective according to Broers et al. (2017).

Finally, within category B4: Changing option consequences, the use of FV loyalty cards and creating an express checkout line for customers with high FV-containing meals were the only two nudges that fit within this technique category. Broers et al. (2017) did not note this technique category as being considered an effective type of nudge and feedback from participants of our study show two very opposing perceptions regarding the feasibility of each nudge noted within this category. For FV loyalty
cards, 6/10 of the participant institutions were implementing this nudge. The remainder of participants who weren’t implementing this nudge said they were most likely to implement it in the future (4/10). Participants noted this would be easy to do because of the lack of need for a combined marketing campaign and because it could be implemented by one person only. There were no known barriers to implementing this nudge.

Finally, one of the least popular nudges was the express checkout line. Many institutions noted that this would cause shame, would single out customers (4/10) and that it would be operationally difficult (3/10) because of coordination with staff and determining which foods fit.

It should be noted that the subjectivity of whether loyalty cards qualifies as a nudge or a general marketing technique could be debatable. For purposes of this study it has been included as a nudge due to the fact that this intervention involves micro incentives where only one F/V is free after 9 F/V purchases. According to the Taxonomy of Choice Architecture (Münscher et al., 2016) micro incentives can be considered nudges. Also, participants noted they generally didn’t need a marketing campaign for the FV cards and they were well-used by students without having to promote them. The dual process theory however, would promote the use of loyalty cards as a general marketing technique due to the concept that customers have to remember to use the card. This involves conscious, rational and analytic thinking (system 2) in order for customers to be prompted to buy more FV through this method. Since much of this paper refers to the Taxonomy of Choice Architecture to help classify nudges, it has been classified as a nudge intervention.

Under Category C: Decision assistance, none of the specific techniques within this category of nudging have been noted to be effective by Broers et al. (2017) and nudges within this category also appear to be less-often used in the literature specifically for FV-promotion (Broers et al., 2017).

Within technique category C1: Providing reminders, the two nudge interventions that fit this category were text messaging students about the availability of FV-rich dishes on campus and improving the lighting above FV-rich dishes or stations. It should be noted that improving the lighting above FV-rich dishes or stations was a difficult nudge intervention to categorize within Münscher et al.’s (2016) framework. C1 seems to be the best-fitting category in the Taxonomy of Choice Architecture Framework (Münscher et al., 2016) because this nudge involves enhancing the salience or prominence of objects which this specific technique category expands on. Neither of these nudges were noted by Broers et al. (2017) to be effective and each of these interventions were only noted once as being likely to implement. Most other participants thought the lighting would be difficult to do and that text messaging students would be difficult to do because FS didn’t have access to student’s phone numbers.

Finally, category C2: Facilitating commitment is not commonly noted in the nudging for FV literature (Broers et al., 2017) and there was only one nudge intervention used in the interview guide that could be categorized within this technique category: earmarking a percent of the student’s meal plans for FV purchasing. This nudge was generally not popular amongst all participants who noted that this would be overly-controlling and that students should have choice as to what they eat. Perhaps the reasoning that this category of nudging is less-often noted in research is that this technique can be difficult and too complex to organize and implement. Also as seen in our study, those implementing nudging interventions may perceive this as being overly controlling of customer’s decisions.
5.10 FS Manager Perceptions Towards Barriers of Nudging

There are few studies looking at perceptions of management towards implementing nudging. Two studies noted in this section were both studies from non-post-secondary FS locations hence the barriers noted in these studies may not all be generalized to this context.

A review study looking at the feasibility of nudging in convenience stores shows some alignment between various barriers to implementing nudging in this context and the post-secondary setting (Houghtaling et al., 2019). These barriers were issues of training staff, the concept of locations being owned by a franchise and causing a lack of control over what is supplied and where it is placed, lack of time for implementing new processes and the difficulty of coordinating new processes due to other ongoing business duties (Houghtaling et al., 2019).

Another recent study exploring the perceptions of restaurant owners towards implementing menu alterations as a nudge for “healthier” choices (Filimonau & Krivcova, 2017) paralleled some of the barriers noted by post-secondary FS management. These were the availability of resources including finances, labor, and time; location, size and type of business and lack of support and/or commitment from management (Filimonau & Krivcova, 2017).

Understanding the perceived barriers of FS management in the post-secondary context can help shape the development of future nudge interventions in these settings. Furthermore, either avoiding implementing nudges that would cross any of these barriers or working with FS management to iron out the barriers could be options to facilitating effective nudges and ensuring their longevity.

5.11 FS Manager Perceptions Towards Facilitators of Nudging

Our current study echoes suggestions from other studies regarding concepts that promote the feasibility of nudging. Whether nudging is feasible in a context or not, depends on the specific context it is being employed as well as the acceptability of nudging with stakeholders in that environment (Filimonau & Krivcova, 2017; Holligan, 2017; Houghtaling et al., 2019). Understanding this is crucial for ensuring the longevity and effectiveness of nudging.

Interestingly Houghtaling et al. (2019) notes that FS retailers of convenience stores meeting the demands of their consumers may act as a barrier to nudging “healthy” food items however for purposes of our current study, post-secondary FS management meeting the demands of their consumers for FV and FV-dense meals was a facilitator of nudging FV. From our study, FS management had a mandate to both generate income and to support the health of students overall. This was not asked directly in the interviews, but was known from the original key informant interviews. Thus, our participants demonstrated through their examples that they were already attempting to make the healthier choice the easier choice. Thus, convenience stores and post-secondary FS departments have very different business models with a variety of different goals.

One highly stressed point these researchers made is the importance of establishing a positive and trusting relationship between the retailers, or in this case, the FS managers of post-secondary institutions, and/or the choice architects themselves (Houghtaling et al., 2019). In the case where a manager themselves is in fact the choice architect, then it is likely that they would continue to do what is easy and only implement interventions that are the least costly, involve the least amount of coordination, and benefit the community or customers they are serving by meeting their demands (Houghtaling et al., 2019).
Another review focused on methods and results of engaging stakeholders to ensure effective interventions (Thapa & Lyford, 2014). The systematic review looked at the success of nudging in school lunchroom settings as well as looking at whether or not suppliers of the food for these schools were affected by the interventions. The effect on stakeholder or food supplier decisions was not noted in any of the articles. The study suggests politicians and business organizations should work with food suppliers to improve their food production processes as well as marketing practices to promote healthy behaviors. It also stresses the importance of engaging food suppliers in nudging approaches as it would likely make nudging more effective (Thapa & Lyford, 2014).

The above studies were conducted in various FS settings, not including post-secondary environments. Though most FS environments may share the common goal of generating profit, the various results reinforce the critical role of context in developing and testing nudge interventions. Given the diversity of organization models seen even in this small study, the relative importance of these competing goals must be kept in mind in evaluating the literature as to what works. In general, it can be agreed that common facilitators to nudging in the general FS context include nudges that are less time-consuming, least costly, meet the demands of the consumers and involve the least amount of staff training.

5.11.1 Ethical Considerations of Nudging

The ethics of nudging have been questioned over the years (Blumenthal-Barby & Burroughs, 2012). Three particular nudges within this interview study were noted by participants as potentially invading students’ privacy, potentially shaming students, or forcing them to do something they may not want to do, even if it was considered “better” for them. These nudges specifically were text messaging, creating an express check-out line for FV-dense meals, and earmarking a percent of the student’s meal plan for FV purchasing only. These nudges had been mentioned in the literature, but not implemented by any of the participants and were generally the least popular nudges. When implementing nudges such as the latter, students are committing to certain choices. For example, students would need to actively agree to receive text messages from FS. Earmarking a percent of a meal plan for FV purchasing would be considered equally draconian, and out of sync with societal values in Canada. The implementation of an express checkout line for FV-rich meal purchases would be impossible to enforce, may cause students to compare themselves to other students either in the line or not in the line and may cause more harm than good to students, mentally. These considerations can be found in a framework for ethical considerations for nudge strategies developed by Blumenthal-Barby and Burroughs in 2012. These ethical considerations need to be considered before implementing nudges and only nudges that far outweigh any potential for harm should be implemented (Blumenthal-Barby & Burroughs, 2012). Later authors have also commented that the ethics of nudging needs to be considered in the context of more general marketing, and similar ethical frameworks could be applied to all marketing and nudging (Schröder & Lyon, 2013).

5.12 Limitations and Strengths

5.12.1 Limitations

Only one interview was conducted at a time by one researcher over the phone during the day when participants were typically working. This caused some pressure to stay within the agreed time limit, preventing the researcher from asking further probing questions to obtain more detailed responses. Given how busy managers are, future studies may need to use a multi-step interview process.

Given that the researcher conducting interviews was a Registered Dietitian and participants were aware of this, this may have excluded discussing information about general marketing interventions that were
typically done in post-secondary settings by Registered Dietitians, assuming it was common knowledge. Example of this may have been nutrition posters or nutrition classes, for example.

Despite reaching presumed theoretical saturation due to the evidence of recurring themes, the results of this study are limited to the perceptions of only 12 individuals from 10 institutions with most of these participants coming from university institutions. Also, given that only one institution was completely outsourced to an external FS provider and two were mixed models (partly outsourced and partly self-operated) the sample is biased towards FS institutions that are independently-operated. In 2016, 72.2% of post-secondary foodservice sales in Canada were contracted thus this could mean that our sample was generally not representative of most FS operations in post-secondary institutions in Canada (fsSTRATEGY Inc., 2017). It should be noted that this study’s original exclusion criteria was exclusive of institutions of outsourced FS due to the perception of their lack of ability to alter their environments. Despite the exclusion criteria, participants of mixed and outsourced FS volunteered to participate. Their association with external contractors was not discovered until partway through the interviews and the researcher continued on with the interviews hence this specific exclusion criteria was omitted going forward. It is suggested that future studies be conducted to obtain a larger sample size including more post-secondary institutions of outsourced FS services.

Furthermore, the transferability to other contexts is limited. The demands of the customer bases from varying types of food-related businesses vary, making the post-secondary school setting a unique setting for research within itself.

Additionally, participants volunteered for this study and may be early adopters of nudging which may also mean these particular participants were biased towards promoting the implementation of nudge marketing techniques at their institutions. Furthermore, the perceptions and ideas of other staff members within the same organizations were not captured therefore limiting the perceptions to only one or two FS staff from the organization for each interview.

The interview guide was also set at the beginning of the study to ensure that comparable information was collected. There was an option for participants to be re-contacted but this was not done. It emerged that more information on marketing priorities was needed. A new question was introduced in the last four interviews: “As a FS manager/director, what are your top 3 priorities when it comes to marketing towards your student population?” This question helped gain a better understanding of the priorities of each participant given their different roles in the FS department. Six out of 10 participants missed being asked this question. Previous interview participants were not re-contacted due to a delay in review of the interviews.

What may be seen as both a strength and limitation was that the researcher was also a registered dietitian and hence biased towards the promotion of FV. This particular researcher also had a previous background in marketing so this may have affected the types of probing questions asked during interviews as well as caused various differences in themes derived. Help from the undergraduate research assistant to identify codes and themes helped establish rigor of the analysis to reduce researcher bias.

Finally, the measurement of nudge effectiveness was not a specific question asked in the interview guide which means some participants did not touch upon this at all unless it came out through natural conversation. Future studies reviewing similar topics should review effectiveness of nudge strategies and various measurements techniques used to determine nudge marketing effectiveness.
5.12.2 Strengths

The diversity of participants proved to be a strength due to the variety in responses and overall FS-related goals of each of the various positions. Furthermore, participants were all recruited from the Canadian College and University Food Service Association (CCUFSA) which is a specialized group of post-secondary-specific FS management and staff with an invested interest in improving their FS departments. Four out of 12 participants were registered dietitians and one was a nutrition manager who, by the nature of their background and profession, show a competing view for the promotion of FV whereas FS managers or directors may have a specific financial goal to keep within a specific budget altering their priorities.

The setting of this research adds to a novel area in the post-secondary institution field of research. There is no other known research (to our knowledge) on any studies that look at the perceptions of FS managers in post-secondary settings regarding the feasibility of nudging for FV.

Furthermore, this qualitative study used a semi-structured interview which allowed the researcher to expand on questions and obtain in-depth, higher quality data for a more detailed analysis. This data can be used to inform future survey-development to obtain a broader participant pool or to simply conduct further multi-step interviews with more specific questions relating to nudging as the interviews progress.

Lastly, during the analysis of transcripts three coders were used up until the 4th interview. Thereafter, two coders were used: the researcher, and a volunteer student researcher. This helped to strengthen the rigor of the thematic analysis.

5.13 Implications and Suggestions for Future Research

This research study covers a novel area within the field of nudging and choice architecture. It is the beginning of further exploratory studies. Moving forward, this study could inform the development of surveys to gain a larger understanding of perceptions, facilitators, and barriers towards the use of nudge strategies in post-secondary institutions.

Conducting round table discussions with FS managers, directors, marketing managers and dietitians may help to further develop ideas noted in this research and specifically to open up more discussion around setting appropriate outcome measures for specific nudges given the variety of post-secondary environments/contexts. Multi-step interviews could also be conducted with more participants of various job roles and institutional contexts to help grow this body of research. Future research could also focus on developing best practices for evaluation methods of nudging.

Furthermore, nudge-related research can be used to help inform policy development at an institutional or even national level. Starting from an institutional level, if post-secondary institutes are convinced of the positive effect nudging may have on increasing student FV consumption, post-secondary institution associations such as the CCUFSA in Canada could help guide campuses towards implementing nudge marketing for FV promotion. At a national level, governments could suggest or perhaps mandate that specific non-nutrient dense food items be placed on fast food menus in the middle and nutrient-dense items be placed at the beginning, for example. This area of research requires an investigation of ethics as well as understanding business agreements between food suppliers and restaurant-owners. Nudges also has the potential to extend beyond restaurants to supermarkets as well however this context is beyond the scope of this study.
It is suggested that more participants with a variety of contextual backgrounds be obtained for future research in this area. This includes more college institutions and more FS directors or assistant directors. It is also suggested that institutions with varying numbers of student populations be included to represent small, medium and large-sized institutions as well as both rural and urban institutions since the goals of a FS department and student demands may vary depending on the environment and setting of the institution.

The present study shows that FS management are indeed aware of their consumer demands and have adapted their menus and FS locations based on food trends and changing student demands over time. FS managers are increasingly becoming more aware of nudging and if they were not aware of it, they were informed of it through participating in this study. It is proposed that nudging will become more familiar amongst FS managers across Canada as Canadian post-secondary institutions disseminate their own intervention research on the use of nudging for FV promotion and other nutrient-dense foods.

We also found that nudge interventions need to be evaluated individually against the proposed environment/context before implementation. Stakeholder engagement and acceptability of each nudge is also crucial for the efficacy and longevity of the nudge. Nudging continues to be a proposed method to help post-secondary students make the FV-dense choice the easier choice.

This study could be used to inform future nudge intervention designs. The themes derived from the facilitators of nudging can help FS operators and/or choice architects determine which nudges may be easier to implement given their context. As noted, it is extremely important to obtain stakeholder perspectives and acceptance for implementing nudges in order to maintain the longevity of nudging and effectiveness.
6 CONCLUSION

This study addresses gaps within a new and pressing area within the study of nudge marketing. Nudging has shown to be an effective technique for promoting FV consumption however to ensure these interventions can be effectively executed, the feasibility of implementing these strategies needs to be understood. This study aimed to better understand the use of and perceptions of general marketing and nudge interventions for FVs in Canadian post-secondary institutions. Twelve participants were recruited for semi-structured interviews representing a total of 10 institutions.

Results show that all participants were marketing FV in some traditional way with 9/10 participant institutions also actively nudging for FV. Three out of ten of the institutions were actively conducting nudge research. Overall, FS management were generally interested in the use of nudging in their institutions. Perceptions of nudge feasibility depended on the specific nudge. Nudges that involved construction due to moving structures, high amounts of coordination with external departments, were costly, involved little-to-no training of employees and were time consuming were less-likely to be implemented. Nudges that involved no construction, required less coordination with external departments, involved little training of employees, were less time-consuming, helped meet the demands of their customers, and less costly were more likely to be implemented.

Finally, according to the specific nudges used in the interview guide, the nudges shown to be the easiest and most-likely to implement aligned with nudges that have been noted as being the most effective for promoting FV consumption. These nudges are categorized within technique category B2 of the Choice Architecture Taxonomy: Change option-related effort. Nudges within this technique category mainly involve altering the placement of FVs. The easiest and most likely to do nudges that our participants noted within this category were placing FV at checkout counters and placing big plates in front and small plates behind at FV-rich stations. Thus, it is recommended that FS management implement nudges that involve altering placement of FVs to ensure better efficacy of nudge interventions.

Overall, the importance of understanding the perceived facilitators and barriers of FS management and various other stakeholders towards nudging in post-secondary institutions can help ease the implementation, promote effectiveness and increase longevity of nudging in these settings.

This research could help inform FS departments in post-secondary settings to design and choose appropriate nudge interventions given their specific environmental context. Given that this is the first study of its kind, further research is suggested with larger sample sizes of FS management and a more varied post-secondary institution pool with a mix of both independent and outsourced FS. To help facilitate richer data, multi-step interviews could be conducted with institutions conducting nudging for FV to be selected for further interviews.


Holligan, S. (2017). Design of Nudge-Based Interventions for Increasing Vegetable Intake in Emerging Adults within On-Campus Dining Sites. (PhD), University of Guelph


APPENDIX A: KEY INFORMANT QUESTIONS – NUDGE

DEMOGRAPHICS

1. What is your current position?
2. Which institution are you part of?
3. How many campuses are part of this university?
4. How many of your FS locations are you responsible for?
5. Approximately how many students are enrolled in this university (?)

HOSPITALITY SERVICES MANDATE

These are the concepts we are trying to get at. Any idea of how better to ask this type of concept?

1. What do you see as top priority in your FS operation?
   - How do we gauge the importance of FV among FS managers?
   - Identify 3-4 important issues for managers in their operations (customer satisfaction, speed of service, profit, enough staff to run FS)
   - Where does providing “healthy” food fit into all of this?

FV CONSUMPTION/SALES

1. Given all of the food items you sell, what are your top priority items to sell?
2. How do you promote FV on your campus?
3. What ways do you sell FV on your campus?
4. What do you spend on FV?
5. How important do you feel it is to promote FV as the number one food item as a whole in your FS outlets?

NON-NUDGE BASED INTERVENTIONS

1. Have you in the past 2 years, tried any specific types of marketing interventions to try to increase the sales of FV? (i.e. health education posters, incentives, FV cards, changing the taste of vegetables).
2. If answered yes to the above question, did you measure the effect these strategies had?
   - Yes
   - No
   - Unsure
3. If the strategy was measured, how was it measured?
4. How effective were these strategies?
   - Did not measure effect
   - No noted effect
   - Effect noted
5. Would you be willing to set aside a budget to focus on increasing the purchasing and consumption of FV on your campus?
NUDGE INTERVENTIONS

Increasing ease of access to “healthy” foods

1. Have you done any of the following in any of your campus outlets?
   a. Put FV near the entrance of any of your food outlets?
   b. Put FV in central locations rather than corners?
   c. Put FV closer to customers and/or on eye to waist-level shelves?
   d. Place big plates for “healthy” foods in front, small plates in the back
   e. Put FV near cashier
   f. Create an express line for people buying “healthy” foods
   g. Change the lighting in your FS location so FV are under spotlights
   h. Vegetarian options before meat options at a hot table

Awareness of Nudge

1. Have you heard of nudge-based interventions?
2. Would you consider yourself knowledgeable on nudge approaches for increased FV?
3. Are you potentially interested in trying such approaches?
4. Has your campus ever run nudge-based interventions for FV in the past 2 years?
5. If yes:
   a. Describe the nudge intervention including year, month, length of how long nudge ran for, campus-wide or just in one outlet?
   b. Were the results measured?
   c. If yes, how were they measured?

Current Nudges

1. Is your campus currently running any nudge-based interventions for FV?
   Yes  No  Unsure

Future Nudges

1. Does your campus have any future plans to implement nudge-based FV interventions?
   a. If yes, what type of intervention?

FEASABILITY

1. Do you believe nudge-based marketing interventions for the promotion of FV on your campus is feasible?
2. Which of the below do you think would NOT be feasible in your setting?
   a. Put FV near the entrance of any of your food outlets?
   b. Put FV in central locations rather than corners?
   c. Put FV closer to customers and/or on eye to waist-level shelves?
   d. Place big plates for “healthy” foods in front, small plates in the back
   e. Put FV near cashier
   f. Create an express line for people buying “healthy” foods
g. Change the lighting in your FS location so FV are under spotlights
h. Vegetarian options before meat options at a hot table
3. Would you be willing to implement any of the above interventions?

**BARRIERS**

1. If any of the above are not feasible, explain why not

**ORGANIZATIONAL SUPPORT**

1. Funding
   a. Do you have funding for nutrition-related projects like trying nudges for FV?
2. Decision Making
   a. Who is responsible for the decision making at your independent campus eatery locations?
   b. Who is involved in changing the layouts at your campus eatery locations?
   c. Who is involved in changing the menu at campus eatery locations?
3. POS Tracking
   a. Do your POS systems have the ability to track separate food items like small vs large salads

**HEALTH PROGRAMMING**

1. Has your campus implemented food/nutrition-related programming? not sure that this is relevant to even include in the survey…?
   a. i.e. cooking classes, nutrition education

**FS**

1. What do you think would be helpful to you in supporting “healthy” eating on your FS food outlets?
   a. Changing the taste of vegetable offerings?
   b. Placing them closer to eye level
   c. Placing them at the entrances of food outlets
   d. Cooking classes for students
APPENDIX B: ETHICS CERTIFICATE

RESEARCH ETHICS BOARDS
Certification of Ethical Acceptability of Research
Involving Human Participants

APPROVAL PERIOD: June 21, 2018
EXPIRY DATE: June 20, 2019
REB: G
REB NUMBER: 18-05-031
TYPE OF REVIEW: Delegated
PRINCIPAL INVESTIGATOR: Yi, Sunghwan (yi@uoguelph.ca)
DEPARTMENT: Marketing & Consumer Studies
SPONSOR(S): OMAFRA Agreement Research Programs
TITLE OF PROJECT: Marketing of Fruits and Vegetables in Colleges and Universities: Food Service Manager Perspectives

The members of the University of Guelph Research Ethics Board have examined the protocol which describes the participation of the human participants in the above-named research project and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement, 2nd Edition.

The REB requires that researchers:
• Adhere to the protocol as last reviewed and approved by the REB.
• Receive approval from the REB for any modifications before they can be implemented.
• Report any change in the source of funding.
• Report unexpected events or incidental findings to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants, and the continuation of the protocol.
• Are responsible for ascertaining and complying with all applicable legal and regulatory requirements with respect to consent and the protection of privacy of participants in the jurisdiction of the research project.

The Principal Investigator must:
• Ensure that the ethical guidelines and approvals of facilities or institutions involved in the research are obtained and filed with the REB prior to the initiation of any research protocols.
• Submit an Annual Renewal to the REB upon completion of the project. If the research is a multi-year project, a status report must be submitted annually prior to the expiry date. Failure to submit an annual status report will lead to your study being suspended and potentially terminated.

The approval for this protocol terminates on the EXPIRY DATE, or the term of your appointment or employment at the University of Guelph whichever comes first.

Signature: 
Date: June 21, 2018

Stephen P. Lewis
Chair, Research Ethics Board-General
APPENDIX C: RECRUITMENT ADS

Information Sheet Given out at CCUFSA Trade Show
Banner Display Used at CCUFSA Trade Show

RESEARCH STUDY:
Marketing
Fruits &
Vegetables

PERSPECTIVES, OPPORTUNITIES AND
CHALLENGES

WE WANT TO HEAR
FROM YOU!

REB# 18-05-031
Contact: KBans@UoGuelph.ca
APPENDIX D: FOLLOW UP EMAIL

Research Study: Perspectives, Opportunities and Challenges in Fruit and Vegetable Marketing

Dear, xxx

Thank you for providing your contact information at the Canadian College and University FS Association (CCUFSA) Conference in Collingwood, Ontario, last week. I am following up to plan for the phone interview for the study we discussed.

We invite you to take part in our interview study to better understand the opportunities and challenges you face in marketing fruits and vegetables to your student population.

The summary results will be made available to you as soon as soon as the project is complete.

Should you choose to participate, some things to note:

- Interview length: 30-60 minutes
- Location: In-person (If <200km distance from the University of Guelph) or on the phone
- One main participant as initial contact from each institution
- Participants should be: staff of a college/university FS operation (director, manager, chef, dietitian, any other appropriate staff member to speak to the issues on behalf of the organization)
- Interview questions will be sent in advance

This project has been reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants. (REB# 18-05-031)

If you are interested in more information or participating, please contact myself, Kiran Bains, with the contact information of the person who will be participating. I will then send a URL link to arrange a time for the interview.

Thanks in advance and I look forward to hearing from you!
APPENDIX E: SECOND FOLLOW UP EMAIL

Subject Line: Invitation Reminder: Perspectives, Opportunities and Challenges in Fruit and Vegetable Marketing

Dear CCUFSA Member,
This is a reminder of your invitation to participate in a University of Guelph research study on the perceptions, opportunities and barriers of marketing fruits and vegetables at post-secondary FS operations.

If you are interested in participating, some things to note:
• Interview questions will be sent to you in advance
• Interview length: 30-60 minutes
• Location: In-person (If <200km distance from the University of Guelph) or on the phone
• One main participant as initial contact from each institution
• Participants should be: staff of a college/university FS operation (director, manager, any other appropriate staff member)

A summary report of the results from all study participants will be made available to you at study completion. This may be useful in your planning, particularly on emerging trends.

This project has been reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants. (REB#: 18-05-031)

If you are interested in more information or participating, please contact your relevant staff member who will be able to respond to the interview questions and have them contact Kiran Bains.

Thank you,
APPENDIX F: COLD RECRUITMENT EMAIL

Subject Line: Research Study: Perspectives, Opportunities and Challenges in Fruit and Vegetable Marketing

Dear CCUFSA member:

You have been contacted as a CCUFSA member to participate in an interview research study being conducted by a University of Guelph research team, led by Dr. Sunghwan Yi. We had a booth at the recent CCUFSA conference and want to offer the opportunity for all members to participate.

If you have already signed up to participate at the conference, you will have already received an email. I am inviting you to participate in an interview to help us better understand the opportunities and challenges you face in marketing fruits and vegetables to your student population.

A summary report of the results from all study participants will be made available to you at study completion. This may be useful in your planning, particularly on emerging trends.

Should you choose to participate, some things to note are:

- Interview questions will be sent to you in advance
- Interview length: 30-60 minutes
- Location: In-person (if <200km distance from the University of Guelph) or on the phone
- One main participant as initial contact from each institution
- Participants should be: staff of a college/university FS operation (director, manager, chef, dietitian, any other appropriate staff member to speak to the issues on behalf of the organization)

This project has been reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants. (REB#: 18-05-031)

If you are interested in participating, please contact your relevant staff member who will be able to respond to the interview questions and have them contact myself, Kiran Bains. If you would like more information on the study, I will also be happy to respond to your questions.

Thank you in advance,
APPENDIX G: CONSENT DOCUMENT

CONSENT TO PARTICIPATE

The purpose of this letter is to provide you with the information you require to make an informed decision on participating in this research.

Study Title:
Marketing of Fruits and Vegetables in Colleges and Universities: FS Manager Perspectives

Purpose of the Study:
This research will provide needed in-depth qualitative information on FS managers’ perspectives on fruit and vegetable marketing in Canadian colleges and universities. We will also assess familiarity and use of nudge-based marketing interventions in the post-secondary food environment.

Procedures Involved in the Research:
Participation in this study is completely voluntary. You will be asked to complete a 30-60 minute interview with myself, the student investigator (Kiran Bains, RD). The interview questions will be sent to you in advance, prior to conducting the interview.

The interview will be audio recorded for transcription later so that your response can be integrated with other participants’ responses for analysis. You will have the opportunity to review the transcription prior to analysis. You will also be able to withdraw from the study up until this point.

Potential Harms, Risks:
The risks involved in participating are minimal. You do not need to answer questions that you do not want to answer or may make you feel uncomfortable.

Potential Benefits:
You will not benefit directly from participation in this research however you will receive a copy of the summary report. You will also be contributing to helping us understand the opportunities and challenges FS managers/directors face when it comes to fruit and vegetable marketing on post secondary school campuses.

The overall research findings may be published and may be used by researchers to promote fruit and vegetable consumption in future studies.

Payment or Reimbursement: None

Confidentiality
You are participating in this study confidentially. I will not use your name or specific school institution name in the published research. Every effort will be made to protect your confidentiality and privacy however, given the familiarity colleges and universities have with each other, information given may be identifiable by association. Please keep this in mind when disclosing information during the interview.

The information you give will be transcribed after the interview is complete. The audio recording will be destroyed as soon as transcription of the interview and checking for errors is complete. Identifying information will be kept until the summary research report is sent back to participants. De-identified information (transcripts and analysis) will be kept for 2 years after publication of a research article on a University of Guelph’s shared directory with controlled access.

The identifying information you provide will be available only to the research team (listed below), to the extent allowed by law. Your contact information and data from the interview will be stored on a university secure drive, managed by the I.T team for the department of Family Relations and Applied Nutrition (FRAN).

**Participation and Withdrawal:**

Your participation in this study is voluntary. If you decide to withdraw from the study you can at any time during the interview, up until the end of the interview and again, when you receive your transcribed interview for your review should you wish to review it.

If you decide to withdraw, there will be no consequences to you. Your information and transcription (if already complete) will be deleted and not be used for data analysis. You may also skip any question you prefer not to answer.

We expect a total of 20-30 participants in this study.

**Information about the Study Results:**

A summary report of the results from all participants will be sent to you unless you state otherwise below.

The researcher will undertake to publish the results of the project in a peer reviewed journal.

**Research Sponsor:** This study is funded by Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

**Questions about the Study:** If you have questions or need more information about the study itself, please contact me at:

Kiran Bains, RD  
Kbains@uoguelph.ca  
519-824-4120 Ext. 56174
This project has been reviewed by the Research Ethics Board for compliance with federal guidelines for research involving human participants. (REB#: 18-05-031)

If you have questions regarding your rights and welfare as a research participant in this study please contact: Director, Research Ethics; University of Guelph; reb@uoguelph.ca; (519) 824-4120 (ext. 56606)

CONSENT

- I have read the information presented in the information letter about a study being conducted by Dr. Sunghwan Yi.
- I have had the opportunity to ask questions about my involvement in this study and to receive additional details I requested.
- I understand that if I agree to participate in this study, I may withdraw from the study at any time up until the end of the interview or at the point of review of the transcript (see below)
- I have been given a copy of this form.
- I agree to participate in the study.

Verbal Consent Obtained: [ ] Yes [ ] No
(For phone interview)

OR

Signature: ___________________________ Date: ___________________________
(For in-person interview)

Name of Participant (Printed) ____________________________________________

1. [ ] Yes, I would like to receive a transcript of my interview to review prior to analysis of the interview:

Please send them to me at this email address ________________________________

Or to this mailing address: ________________________________________________

2. [ ] I do not want to receive a summary of the study’s results.

3. I agree to be contacted about a follow-up interview to clarify any of my responses and understand that I can always decline the request.

[ ] Yes, please contact me at: ______________________________________________

[ ] No
APPENDIX H: INTERVIEW GUIDE

UNIVERSITY OF GUELPH

Institution Name:
Participant Name(s):
Position:

Have you read the consent form?
Interview will be recorded for later transcription; do I have your consent to continue?

General Questions

1. Please tell me more about your role and what it entails?
2. Setting of your operation:
   a. How many students are enrolled at your institution?
   b. Is there more than one campus at your institution?
      i. YES
         1. Are you the director for each of the campuses?
            a. Yes
            b. No
               i. Which campus are you the director of?
               2. How many students in your respective campus?
      ii. NO

3. Do you have a residence on campus?
   a. Yes
      i. Roughly how many?
      ii. Do you require them to purchase meal plans?
      iii. How many dining halls are there to mainly serve students living in on-campus residence?
   b. No
      i. Where would most of your 1st/2nd year students live?

FS Environment

4. Is your campus independently operated?
   a. YES
      i. Do you oversee all the FS operations at all of the locations on campus?
   b. NO
      i. 100% externally operated – Move to question 5
      ii. Mixed (independent and external) – Move to question 5

5. IF NO (to #4): External FS company (e.g., Aramark, etc.) contracted to manage FS outlets:
   a. Which company?
      i. Do they also control the marketing of different food items/specials at your FS locations?
6. IF NO (to #4): If your institution uses a mixture of the two approaches: can you explain who is managing what?

7. Describing the FS environment:
   a. How many residence dining halls, general dining halls/food courts associated with a student center, snack bars in total?
   b. Residence dining halls:
      i. Is there a general style you follow in each of the dining halls or are each different? (i.e. salad bar near entrances, pop and chips near cash register)
   c. General dining hall/food courts:
      i. General style/layout? (i.e. salad bar in middle, all franchises and no independent FS kiosks)
   d. Any restaurants?
   e. Any franchises?
      i. YES
         1. Which ones? (Coffee, fast food, smoothie joints, donut places, gourmet takeaway, convenience kiosks, independently owned food establishments, food trucks)
      f. Any grocery stores?

8. Are there any outlets that have a cycle menu? (i.e. Do your menus stay the same day to day? Or do they vary everyday, every few days, on rotation, 3-week cycle where different dishes repeat?
   a. Which ones?
   b. How often does it rotate?

---

Meal items rich in fruits and vegetables available for purchase

9. In terms of meals rich in fruits and vegetables offered at your institution, which of the following is offered?
   a. Salad bar
   b. Whole fruits
   c. Fruit cups (plastic cups/containers for fruit pieces)
   d. Veggie containers (plastic cups/containers for veggies and dips)
   e. Pre-packaged salad (plastic containers for salad and salad dressing)
   f. Deli sandwich/wraps/pitas with option to customize vegetables (add, change)
   g. Hot entrees with sides, one of which is steamed or cooked veggies
   h. Stir-fry meals offering a range of veggie ingredients
   i. Veggie sides available for burger or other grill-type of fast foods
   j. Other fruit or veggie-rich foods available in your FS locations

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FS Director Perspectives/Priorities
10. As a FS manager/director, what are your top 3 priorities when it comes to marketing towards your student population?

11. How do you gauge the needs/wants of your students relating to your FS?
   a. i.e. (Advisory committee? How often do they meet? Which students are represented here? How big is committee? Wide range of ages represented?)

12. Any specific demands/requested changes relating to fruit/vegetable offerings?

13. On a scale of 1-5, how satisfied do you think your students are with the current F+V offerings/environment on your campus?
   a. (very dissatisfied) 1 2 3 4 5 (very satisfied)
   b. Are there any specific trends you are noticing relating to fruit and vegetables? (i.e. trend towards vegan/gluten free/local produce?)

14. In your opinion, how health-conscious are your students in making food choices on campus? (e.g., very variable, okay with eating fast foods every day vs. preferring to have varied meals with “healthy” ingredients)

**Nudge Strategies**

- This is the last set of questions
- A set of NEW strategies for changing food choice behaviour called “nudging” is becoming more popular. These strategies are intended to subtly nudge people to choose certain options instead of forcing them or forbidding them not to purchase other options.
- Unlike traditional strategies the new strategies do not try to educate or convince people
- Instead, the new strategies may include the following:
  o Make FV-rich items more noticeable at the point of choice
  o Move FV-rich items to places that are more prominent or easier to reach than other items
  o Offer a combo that Include FV as sides to an entrée item rather than having students buy FV sides separately
  o Change the presentation of FV-rich items so that it is easier to choose or more natural to choose compared with other food options.

15. Have you heard about the term “nudging” or “choice architecture” in the context of food choice?

16. The next question involves a series of nudge strategies. I will ask you a series of questions for each strategy listed. These strategies are taken from recent research studies. In the last year have you tried:
<table>
<thead>
<tr>
<th>Have you done anything like this in the past year?</th>
<th>Are you currently doing anything like this?</th>
<th>Would this interest you in the future?</th>
<th>What would impede implementation of this in your setting? (labor intensive, cost)</th>
<th>What would facilitate the ease of implementing this strategy?</th>
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<tr>
<td>Increased size of salad bar</td>
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<td>Move salad bar or FV rich foods close to entrance of a FS location</td>
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<td>Move a station featuring FV-rich foods in the center of the FS locations</td>
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<tr>
<td>Placing big plates in front and small/medium plates in the back for use at salad or any other vegetable-rich foods</td>
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<tr>
<td>Placing FV-rich foods in front or closer to customers in display areas</td>
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<tr>
<td>Writing FV-rich food options at the beginning or end of the menu boards (vs. in the middle) so that they catch more attention</td>
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<tr>
<td>Placing FV-rich items near the check-out counter so</td>
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<tr>
<td>Have you done anything like this in the past year?</td>
<td>Are you currently doing anything like this?</td>
<td>Would this interest you in the future?</td>
<td>What would impede implementation of this in your setting? (labor intensive, cost)</td>
<td>What would facilitate the ease of implementing this strategy?</td>
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<td>that everyone would see them while checking out</td>
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<tr>
<td>Creating an <strong>express check-out line</strong> for people buying FV-rich items/meals</td>
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<tr>
<td>Improve the lighting for FV-rich dishes or stations (e.g., putting them under spotlights)</td>
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<tr>
<td>Loyalty cards for providing small incentives for frequent purchase of FV-rich foods (e.g., one free fruit after 9 FV purchases)</td>
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<td>Changing the default combo <strong>option</strong> to a FV</td>
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<tr>
<td>Text-messaging students about FV-rich dishes</td>
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<td></td>
</tr>
<tr>
<td>Having celebrities or respected or popular individuals endorse frequent consumption of FV-rich foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you done anything like this in the <strong>past</strong> year?</td>
<td>Are you currently doing anything like this?</td>
<td>Would this interest you in the <strong>future</strong>?</td>
<td>What would <strong>impede</strong> implementation of this in your setting? (labor intensive, cost)</td>
<td>What would <strong>facilitate</strong> the ease of implementing this strategy?</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>-------------------------------------------</td>
<td>----------------------------------------</td>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Having residence students earmark a certain percentage of their meal plan deposit into FV-rich foods so that students can overcome temptation to eat burgers and fries too frequently.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. Any other strategies not mentioned above that you have done to subtly nudge people to choose FV-rich dishes?

18. If not already doing, which are you **most likely to implement**?

19. Which strategies are you **unlikely to implement**? Why?

20. Who or what group would be mainly responsible for the decision to implement any of the new strategies above?

21. In general, do you perceive nudging strategies as being easy or difficult to implement?
   a. In general, what do you see as being a major barrier to implementing any of these strategies?

**General Marketing Strategies on Campus**

22. Have you done any marketing strategies in the past year on campus to promote fruit and vegetables?
   a. Posters emphasizing importance of fruit/veg intake in general (posted by FS or by university administration or by student groups)
   b. Posters emphasizing availability of specific fruit or vegetable-rich meals
   c. Offering temporary or permanent discounts on fruits or vegetable-rich foods/meals
   d. Increasing the availability or range of fruit or vegetable offerings (e.g., more diverse fruits, fruit cups)
   e. Changing recipes for existing items so that they contain more FV ingredients
   f. FV cards (i.e. after 9 purchases of FV, get the 10th free)
   g. Any other marketing interventions not mentioned above.
23. If you have tried any of the above strategies, did you formally measure the effect of the strategies on sales?
   a. Which ones, if any, were effective and ineffective?

24. Do you have any final remarks/comments?

Thank you!

Would you be okay if I followed up with you if I needed further clarification on any of the above?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

Would you like to review the transcription of this interview before we combine your responses with others? The transcription should be complete within a couple months.

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

You will have a chance to review your responses and ask for rephrasing or removal of certain parts of your responses that you may find misrepresenting your opinion.
APPENDIX I: CODE MANUAL FOR NUDGING

Note: The following coding manual contains only the interpretive nudge-related content. Descriptive nudge content was also contained in the original coding manual with code frequencies however this information was directly translated into the various tables in the results section. The following table was derived from the nodes used in NVivo 12 Plus to organize the nudge-related themes from the interviews.

<table>
<thead>
<tr>
<th>Code</th>
<th>Sub Code</th>
<th>Sub code frequency (Number of institutions that noted this code) (Out of 10 institutions)</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overarching perceptions of nudge</td>
<td>Simple</td>
<td>8</td>
<td>A nudge was considered simple by a participant when they perceived it to be easy to implement.</td>
</tr>
<tr>
<td></td>
<td>Depends on strategy</td>
<td>7</td>
<td>Some participants were unable to give a definitive answer about the perceived feasibility of nudging. When participants were asked what their general perceptions of nudging was, many felt it depended on the strategy due to the variety in nudges.</td>
</tr>
<tr>
<td></td>
<td>Difficult</td>
<td>4</td>
<td>A nudge was considered difficult by a participant when they perceived there to be various barriers to implementing it.</td>
</tr>
<tr>
<td></td>
<td>Restricts student choice</td>
<td>1</td>
<td>A participant believed nudging can restrict student’s choice but stated this in relation to one specific nudge.</td>
</tr>
<tr>
<td></td>
<td>Time consuming</td>
<td>1</td>
<td>A participant perceived nudging to be time consuming, depending on the nudge.</td>
</tr>
<tr>
<td></td>
<td>Costly</td>
<td>1</td>
<td>A participant noted nudges to be costly depending on the nudge.</td>
</tr>
<tr>
<td>Nudge barrier</td>
<td>Structural barrier</td>
<td>9</td>
<td>Nudges involving structural changes such as moving a salad bar, or adding an express checkout line in cafeterias that have already been built cannot be restructured for nudging, lack of space to add or maneuver things around, structural changes cannot be implemented quickly.</td>
</tr>
<tr>
<td>Code</td>
<td>Sub Code</td>
<td>Sub code frequency (Number of institutions that noted this code) (Out of 10 institutions)</td>
<td>Definition</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Operationally difficult</td>
<td>(See sub codes of this code below)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ Technicalities and logistics</td>
<td>5</td>
<td>Changing placement of items or creating express checkout lines involved specific technical changes and process or logistic changes that were perceived as being difficult.</td>
<td></td>
</tr>
<tr>
<td>→ I.T</td>
<td>5</td>
<td>Altering POS systems for additional or customized items would be difficult, time consuming or costly given the nature of tampering with I.T.</td>
<td></td>
</tr>
<tr>
<td>→ Difficult to coordinate</td>
<td>5</td>
<td>Nudges requiring more staff or departments are more time consuming and may face barriers to implementation because of more coordination required.</td>
<td></td>
</tr>
<tr>
<td>→ Communicating to students</td>
<td>5</td>
<td>Not having access to student’s personal phone numbers for text messaging or being the administration and struggling with connecting with students on their level.</td>
<td></td>
</tr>
<tr>
<td>→ Staffing issue</td>
<td>2</td>
<td>Training staff for creating new processes and whether the new processes would be consistently done, not having enough staff/labor hours for new processes.</td>
<td></td>
</tr>
<tr>
<td>→ Switching FS contractor</td>
<td>1</td>
<td>Unlikely to change items in the POS system if a new FS contractor is likely to take over.</td>
<td></td>
</tr>
<tr>
<td>Students want choice</td>
<td>4</td>
<td>Students should be able to choose non FV-dense options when they want. Don’t want to be coerced or nudged towards FV all the time.</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>4</td>
<td>Nudges requiring structural changes and renovations would be costly.</td>
<td></td>
</tr>
<tr>
<td>Tracking nudge effectiveness</td>
<td>2</td>
<td>Not being able to track whether the intervention is/was effective or not prevents one from bothering to implement a nudge since they won’t be able to or will have difficulty or lack of rigor with data analysis.</td>
<td></td>
</tr>
<tr>
<td>Time consuming</td>
<td>1</td>
<td>Involving more staff/other parties/departments.</td>
<td></td>
</tr>
</tbody>
</table>

Nudge facilitators

Perceived student demands by FS (See sub codes of this code below)
<table>
<thead>
<tr>
<th>Code</th>
<th>Sub Code</th>
<th>Sub code frequency</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>➞ Vegan or vegetarian</td>
<td>10</td>
<td>Participants perceived students wanting more of these options or knew they wanted these options through formal feedback surveys. This may act as a prompt for participants to want to market these items more.</td>
<td></td>
</tr>
<tr>
<td>➞ Plant based protein</td>
<td>3</td>
<td>Participants perceived students wanting more of these options or knew they wanted these options through formal feedback surveys. This may act as a prompt for participants to want to market these items more.</td>
<td></td>
</tr>
<tr>
<td>➞ More FV</td>
<td>2</td>
<td>Participants perceived students wanting more of these options or knew they wanted these options through formal feedback surveys. This may act as a prompt for participants to want to market these items more.</td>
<td></td>
</tr>
<tr>
<td>➞ Cooked veg</td>
<td>1</td>
<td>A participant perceived students wanting more of these options or knew they wanted these options through formal feedback surveys. This may act as a prompt for participants to want to market these items more.</td>
<td></td>
</tr>
<tr>
<td>➞ Students want reminders to eat “healthy”</td>
<td>1</td>
<td>A participant noted that students told FS through formal surveys that they want more “in-your-face” marketing to be reminded to eat “healthy”.</td>
<td></td>
</tr>
<tr>
<td>Operationally easy</td>
<td>(See sub codes of this code below)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>➞ Logistically easy</td>
<td>3</td>
<td>Simpler nudges such as changing placement of non-structurally fixated items such as plates or written menu items were noted as simple.</td>
<td></td>
</tr>
<tr>
<td>➞ Less coordination</td>
<td>2</td>
<td>Less coordination with other staff or departments means the nudge is easier to implement and the specific staff member has more control and input over the intervention.</td>
<td></td>
</tr>
<tr>
<td>Structural facilitator</td>
<td>(See sub code of this code below)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code</td>
<td>Sub Code</td>
<td>Sub code frequency (Number of institutions that noted this code) (Out of 10 institutions)</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>→ Ongoing renovations</td>
<td>2</td>
<td>Renovations allow FS management to implement permanent nudges such as an increased salad bar size or relocating a salad bar to an entrance or center of a cafeteria</td>
<td></td>
</tr>
<tr>
<td>Quick to do</td>
<td>2</td>
<td>Less time needed for coordinating staff for nudges requiring less staff involvement such as a dietitian implementing loyalty cards or changing the placement of items.</td>
<td></td>
</tr>
<tr>
<td>Cheap</td>
<td>1</td>
<td>Some nudges are less costly than others including changing placement of non-structurally fixated items such as plate placement.</td>
<td></td>
</tr>
</tbody>
</table>