Explaining Local Food Consumption Behaviors in Allegheny College Students

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ALLEGHENY COLLEGE

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Submitted in fulfillment of the senior thesis requirements of the Department of Environmental Science at Allegheny College and approved by the senior thesis committee.

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Scientists have recently been studying determinants of food consumption behavior with a focus on sustainable food systems. This stems from increased consumer demand of products to sustain our growing population. The current food system is not sustainable and we must recognize and implement other food systems, such as local food, to help reduce the damaging environmental impacts we already face. Changing food consumption behaviors is difficult because it is greatly influenced by habit. It is important to understand the determinants of behavior both individually and holistically. A survey was conducted to gather information from about 200 Allegheny College students regarding food consumption. This study looks at five behavioral determinants, based on relevant literature, that were tested to assess their predictability of local food consumption behavior among Allegheny students by means of a behavioral model. "Attitude" variables were found to be significant predictors of grocery purchasing behavior, while other variables (Knowledge, Behavioral Control, Subjective Norms, and Situational Factors) did not show any significant correlation. Two behaviors (Grocery Index and Consumed Meals Index) were tested using a multiple regression. Only the regression model on the Grocery Index was significant ($p<0.05$). Since only one studied variable proved to be a noteworthy predictor, this study shows that the behavioral model created to predict local food consumption is not adequate. Based on the results from this study, it is recommended that the College utilizes an experiential learning program geared toward facilitating positive attitudes toward local food consumption. The Allegheny College community could be an innovator of sustainable food programs. Through the use of education as well as a focus on strengthening consumer attitudes, we can promote local foods and create a change in the food consumption paradigm.

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Introduction

Material consumption drives economic and environmental change, both locally and globally. As a material-intensive nation, the U.S. is constantly competing to market products in an efficient and profitable way (Wilk, 2002). However, there is much more that goes into the buyer's decision to consume products than just price or cost. The quality of the product, convenience of purchasing the product, and social pressures and influences may impact decision-making as well. We are a rapidly changing nation; things go in and out of fashion in the blink of an eye. Social media and guidance from family and peers greatly manipulate our perception of what is "acceptable" and what isn't. In this way, we follow each other in our actions out of fear of social exclusion (Nestle et al., 1998).

Food is consumed at a substantial rate in our nation, and is no exception to the decision factors that influence material consumption. Food is vital to our survival and the food consumption choices we make have lasting impacts on the environment and on society (Kerton & Sinclair, 2010). The conventional, industrialized, global food system that many U.S. citizens are accustomed to is not sustainable and will not continue to provide for future generations (Bissonnette & Contento, 2001). Erosion of cropland has been severely degraded to the point where almost one-third of the world's agricultural land is not usable. Moreover, the growing need for more agricultural land has accounted for 80% of the world's deforestation (Wood et al., 2006). There is also a growing concern about the safety and quality of food and the damaging health effects of the synthetic chemicals that are applied to food (La Trobe, 2001). Components of the current food system such as the increase in pesticide and preservative use, the increase in distance traveled to provide people with food, and the consolidation of the agribusiness must be changed. More importantly, consumers themselves need to adjust their method of choosing what food they purchase and eat (Bissonnette & Contento, 2001). Sustainable consumption is becoming a more prominent alternative food system, providing us with new ideas on how to drastically change how we act and think about the food we consume.

Local food is one type of sustainable food consumption and has a few important benefits. By eating locally grown food, consumers not only help stimulate local economies, they help cut down on global environmental pollution by decreasing the distance that food has to travel before

it reaches the consumer (La Trobe, 2001). Local growing is also economically viable for farmers since they get a fair price for their products without adding middlemen into the distribution chain. For consumers, foods are at the peak of their freshness and are typically harvested using less energy as compared to conventional methods of farming (Huff, 2011). The distance food travels with regards to conventional methods can be high. Some debate, though, that the carbon footprint of local foods may not be so different from the footprint of foods grown thousands of miles away. The large cargo ships that transport imported and exported foods and goods are becoming more efficient. It can be argued that these ships are less carbon-intensive than growing a vegetable in a heated greenhouse. Other aspects of food production such as water use and harvesting techniques may in fact use more energy than transporting foods thousands of miles (McWilliams, 2007). Furthermore, many of the "food miles" accounted for are due to everyday trips to the grocery store, not just transporting food across the country or around the world. Even though local foods are not transported long distances to the consumer, the consumer must still expend some energy to travel to purchase and eat the food ("Voting," 2006). This is important to keep in mind, however it does not refute the benefits of local foods and sustainable consumption in general. It is essential to note that "local" food is not always "sustainable," however it is commonly referred to as an important component of sustainable food systems. It is understood that "local" and "sustainable" may not always be used synonymously, however in this study, and in the literature cited in this paper, when the term "local" is used, it refers to a type of sustainable food system.

Despite the increasing mass environmental movement, public familiarity of environmental issues is still relatively low (Pooley & O'Connor, 2000). Few consumers are conscious of local food sources such as farmers' markets, buying directly from farmers, and community supported agriculture (CSA). Even fewer take advantage of them. Furthermore, local foods are not widely available to serve 315 million U.S. citizens. Consumption practices are difficult to change and it will not be without great effort that we make a transition to a more sustainable way of eating. This conduct is based on a decision-making process that takes into account the individual needs and wants, which can be significantly influenced by convenience or habit (Vermeir & Verbeke, 2006).

Many efforts to increase local food consumption have targeted education since traditional thinking says we can change sustainable behavior through education and knowledge about the environment (Hungerford & Volk, 1990). However, in many ways, attitude and social influences can have an even larger impact on behavior than knowledge alone. Positive attitudes have been linked to positive behaviors and social pressures can influence consumers' purchasing decisions. There are other factors that influence how someone behaves such as behavioral control, subjective norms, and situational factors. This research aims to understand local food consumption behaviors in college students. I utilized a multiple regression analysis to predict local food consumption behavior using knowledge, attitudes, behavioral control, subjective norms, and situational factors as the predictor variables. It was hypothesized that these variables would have a significant effect on determining local food consumption behavior. Understanding local food consumption behavior at the College will allow for the formation of proper educational programs to teach and promote sustainable behaviors.

Literature Review

Model Design

The [Theorized] Behavioral Change System (Appendix B) shows how knowledge influences attitude or awareness, which in turn influences behavior (Hungerford & Volk, 1990). This model suggests that if we make people more familiar with certain issues, this new awareness will motivate them to act a certain way. Traditional thinking says we can change behavior by increasing knowledge about an issue. Modern research says there are numerous variables in addition to knowledge that are associated with responsible environmental behavior.

Hines et al. (1987) conducted a meta-analysis of environmental behavior research. Variables from previous research were assessed to form the Hines Model of Responsible Environmental Behaviour (Appendix C). This model shows many psychosocial aspects that influence behavior, such as attitude, personal responsibility, knowledge, and situational factors. This model is the most extensive in that it addresses the most variables. Hines et al. (1987) claim that predicting responsible environmental behavior is not simple because there are so many variables involved. Variables almost always interact with each other in some way, and are not likely to act alone in predicting behavior. Most of the variables in this model act directly on behavioral intention,

which then acts on behavior. "Situational factors" is the only variable that acts directly upon behavior and can work to support or hinder the effects of other determinants of behavior.

Another important model is the Theory of Planned Behavior, or TPB (Appendix D). The TPB uses attitudes, subjective norms, and perceived behavioral control as its variables (Nurse et al., 2010). The variables of TPB were shown to predict behavioral intention and behaviors relating to food production practices (Bissonnette & Contento, 2001). This theory is very important in that it emphasizes the key variables that can influence sustainable food behavior. It is used widely among researchers performing studies comparable to this one. The TPB has been expanded to create the Extended Theory of Planned Behavior, or ETPB. Instead of three variables, the TPB is used as a foundation in which other variables can be added, such as perceived self-identity and personal responsibility (Bissonnette & Contento, 2001). Bissonnette & Contento's study utilized the Theory of Planned Behavior (TPB). One shortcoming of this study was that it only focused on a specific group of individuals (adolescents), so they could not accurately generalize to the entire population. They also had to conduct a quantitative study because the pilot study showed that adolescents did not want to engage in deep discussion. Because the adolescents were not knowledgeable in some areas of environmental issues, their attitudes were uncertain. This point is essential to my study because the individuals I will be surveying are college students. The students may similarly be opposed to engaging in deep discussion, and quantitative studies may be the only approachable method. Furthermore, they might not be knowledgeable in certain areas of environmental science and their attitudes may reflect that. It is important to know that successful studies have been accomplished even with these drawbacks.

These models all share similarities, yet are somewhat different in their design. After evaluating the literature, I created a new model to predict local food consumption behavior (Figure 1). It includes the determinants of behavior most easily assessed among college students and most likely to have a significant impact on behavioral prediction. While most models include a "Behavioral Intention" component, I chose to exclude it for the purpose of simplifying the model for this study.

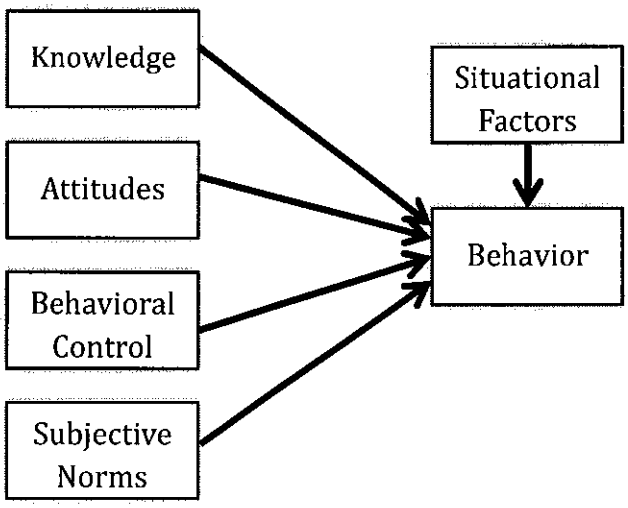


***Figure 1*: Behavioral model created to predict local food consumption behaviors in Allegheny College students**

Knowledge

There is a lack of general knowledge regarding sustainable consumption. Some studies have shown that the majority of consumers do not have high awareness or understanding of sustainable products because the benefits of those products are poorly communicated. The less information or knowledge that is available, the more uncertain consumers are. This uncertainty suggests a need for social information in the sense that consumers will look to others to aid them in their purchasing and consumption decisions (Vermeir & Verbeke, 2006).

A greater knowledge base can come from education, whose goal is to shape human behavior (Hungerford & Volk, 1990). Pooley & O'Connor (2000) claim environmental education is an influential aspect of behavioral change. This type of education focuses on defining the problem, searching for and becoming aware of solutions, and motivating someone to work toward a solution. Stapp et al. (1969) go further to say there are four objectives of environmental education. The first objective is to develop a clear understanding that humans are part of a holistic system and that everything in the biophysical environment interacts. The second objective is to show a broad understanding of the environment and its role in society. The third objective is to have a solid understanding of the environmental issues and how they affect a

particular individual. The fourth objective is to develop an attitude of concern for the environment, and motivate the individual to work toward a solution.

Education alone does not effectively impact an individual's decision to change his/her behavior, though. There are other factors that come into play. Knowledge is powerful, but there are gaps in its effectiveness. In order to successfully bring about change, other determinants of behavior must be assessed.

Attitudes

There is a longstanding gap within the attitude-behavior paradigm, as behavior is not always consistent with attitude (Vermeir & Verbeke, 2006). To promote sustainable consumption, a positive attitude toward sustainable products is favorable. Attitude can be influenced by human health, environmental factors, convenience, and social influence. Pooley & O'Connor (2000) claim that beliefs and emotions can predict attitudes regarding environmental issues. Beliefs and emotions are what stimulate us to make a personal connection with something. The need for a personal connection to a product is crucial when it comes to consumption. Those with ties to health effects or who have strong feelings toward the environment may choose to behave in a certain way regarding sustainable consumption. Those who are highly involved with environmental programs are more likely to purchase locally grown or sustainable food. Also, those concerned with the origin of their food and what preservatives or chemicals are in it could be more inclined to consume local food so that they have more control over its source and production process (Vermeir & Verbeke, 2006). Attitudes can suggest that one may behave a certain way, but as shown in the models above, there are additional dynamics to consider.

Behavioral Control

A person's behavioral control is essentially the ease or difficulty of which they can consume a product (Vermeir & Verbeke, 2006). In sustainable consumption terms, it is directly related to the perceived availability of the related items. If a consumer feels that there is a lack of local food markets, there will be a lesser chance that they act on the behavior to consume local foods. Lack of availability, in economic terms, means a higher price and greater inconvenience for consumers. Furthermore, even if there is a high motivation to consume local foods, if the perceived availability of those products is low, the chances of the actual consumption behavior

could be reduced (Vermeir & Verbeke, 2006). Inconvenience in terms of high price and a lack of availability of the products can lead to negative attitudes.

Subjective Norms

Through the study of behavioral influences, we know there are many aspects of the behavior model that cause someone to act in a particular way. It should be stressed that social influences are just one aspect of behavior and cannot exclusively cause a change in behavior without taking into account other features. Social influence is, however, one of the most pervasive determinants of behavior. Also known as conformity, it is when an individual agrees with a discernible majority (Burnkrant & Cousineau, 1975). Deutsch & Gerard (1955) discuss two types of social influence. The first is informational social influence, where pressure exists to accept information as evidence about reality. The second is normative social influence, which is the pressure to conform to expectations of a person or group.

Bamberg & Moser (2006) conducted an analysis of psychosocial determinants of pro-environmental behavior. Their study was a replication and extension of Hines et al. (1987). They found that people fulfill social norms for fear of exclusion as well as use them as information about what behavior is appropriate in society (Sherif, 1936).

Nestle et al. (1998) conducted a study in which they examined the behavioral and social influences on food choice. They stated that most studies comparable to theirs focus on physiological and psychological determinants and less on cultural, social, historical, and demographic factors. They concluded that most eating occurs in the presence of others, and that less consumption occurs when people eat alone, compared to more consumption occurring when people eat in a group. Family and friends provide a source of modeling and peer pressure, while the media is a source of information regarding food and nutrition, capable of persuading an audience.

There are many factors that influence consumer behavior in adolescents. Story et al. (2002) use a social cognitive theory (SCT) to explain the interaction of behavior, environmental influences, and personal influences. The interpersonal factors they discuss are social environmental influences. They say that adolescents' consumer behaviors are strongly influenced by their peers,

friends, and family. This correlates with a study by Venkatesan (1966), which concludes that individuals tend to adhere to the group norm through social pressure.

These influences can affect consumer behavior by observational learning (modeling), reinforcement, and perceived social norms. Family exerts one of the largest impacts on adolescents because the family is the main provider of food and influences what foods are available to the adolescent. Subsequently, consumer behavior habits can be altered based on the changes of parental influences on food choice. Peers are important in that their influence lies in the conformity to social norms and what is acceptable to the peer group. Since eating is a social and sometimes recreational activity, social norms are important to young adult life (Nestle et al., 1998).

Behavior

Vermeir & Verbeke (2006) investigated the attitude-behavior gap by means of a consumer behavior model from Jager (2000). They analyzed key determinants of behavior: values/needs, knowledge, and behavioral control. They found that behavior and behavioral intention were strongly correlated, but behavior is not always consistent with attitude. This is because behavioral intention directly influences behavior, but attitude (as well as other psychosocial influences) only directly influences behavioral intention, thereby indirectly influencing behavior. There are strong correlations between behavioral intention and behavior, but behavioral intention is not always an accurate predictor of behavior. In the same study, Vermeir & Verbeke found that attitudes and behavioral intentions towards sustainable consumption were stronger when people were more involved in environmental issues. In addition, in order to influence consumer behavior lucratively, the consumers must believe that their behavior will positively impact the environment (Nurse et al., 2010). Once again, it is important to note that there are many determinants of behavior that all interact in some way. Behavior is unlikely to be predicted by one single variable due to the complex, interconnected process of our decision-making.

Modeling Behavior

Vermeir & Verbeke (2008) use the Theory of Planned Behavior (Appendix D) in their study. They performed a stepwise multiple regression analysis to examine relationships predicted by the TPB. The regression model showed that 50.1% of the variance in behavior could be explained by

the variables (attitudes, perceived social influences, perceived consumer effectiveness, and perceived availability). They found a high positive correlation between attitudes and behavioral intention. In their study, they looked at how the variables predicted behavioral intention instead of behavior. This ended up being a limitation to their study since the brand of products the consumers were "intending" to consume was fictional. However, previous research stated there was a positive link between behavioral intention and behavior.

In another study performed by Bissonnette & Contento (2001), an Extended Theory of Planned Behavior (ETPB) was used to predict sustainable consumption behaviors. They also utilized a stepwise multiple regression analysis, in which they found that attitudes explained most (20.3%) of the total variation in the variables.

Methods

Survey Design

This study used a survey to gather information from Allegheny College students. After receiving approval from the Institutional Review Board, the survey was administered via email and was completed and submitted by the participants online. All answers to the survey questions remained anonymous. I presented a short speech about my senior project to a variety of academic classes at Allegheny in the fall of 2012. I utilized a non-random sampling of participants by choosing classes that would provide me with an equal distribution of majors in each of the College's three academic divisions as well as grade levels. I passed around a sign-up sheet in these classes on which students, if they were willing, could sign up to take my survey. As an incentive to participate in this study, the students who completed the survey were entered into a drawing to win a $25 gift card to Amazon. The survey took 5-10 minutes to complete. Of the 203 surveys collected, 2 surveys were not used because they were not 100% complete. A total of 201 participants (roughly 10% of the student population) provided me with a representative sample of Allegheny students. The final sample consisted of 53 freshmen, 46 sophomores, 62 juniors, and 40 seniors (Appendix E). The composition of majors represented was as follows: 21% Humanities, 39% Natural Sciences, and 33% Social Sciences (Appendix F).

Scales were developed to measure each of the variables. Some survey questions were scored on a 5-point Likert-type scale. Others were scored from 0 to 1 based on dichotomous "yes" or "no"

responses to those questions. Questions with "yes" or "no" responses were used most often for ease and simplicity of being entered into the analytic software. However, other types of questions were asked as well to get the best possible information.

Variables Measured

The variables measured in this study are explained in Table 1. These variables represent sub-categories of the main variables in my model. Most survey questions in this study were derived from relevant literature. The survey consisted of 34 questions that targeted respondents' degree of knowledge, attitudes about local food consumption, perceived behavioral control over consumption decisions, degree of social influence on what and where to eat, situational factors that included transportation methods, and food consumption behaviors (Table 2).

Eight knowledge questions were asked to assess the degree of comprehension of local, organic, sustainable, and processed foods (Appendix A, 1-8). The answers to these questions were combined to form one score of x/8 for each participant, indicating how many of the eight questions they answered correctly. There were several questions that measured attitude (Appendix A, 9, 25-27, 29-31). Behavioral control was measured by asking questions regarding the availability of local foods in Meadville and in the participant's hometown (Appendix A, 19-20). Four social influence questions were asked to measure subjective norms (Appendix A, 21-24). The answers to these questions were also combined to form one score, indicating how many answers they responded to positively. A score of 4/4 suggests the participant is highly influenced by social pressures. Situational factors were measured by how they actually travel to purchase or consume food (Appendix A, 28). The behavior measurement is two-fold. The first behavior variable is measured by a series of 7 questions that asked what percent of the participant's groceries were bought from food markets and stores in Meadville, PA (i.e. Wal-Mart, Tops, Market House, etc.) (Appendix A, 12-18). The second behavior variable is measured in 2 questions that ask what percentage of their weekly consumed meals are campus (Parkhurst) meals versus cooked meals (in a dorm, apartment, house, etc.) (Appendix A, 10-11). A limitation of this measurement is that it does not account for any meals that were eaten off campus at a restaurant, at a college function, or something similar.

Table 1: Description of each measured variable sub-category

Variable	Description
Knowledge	A score out of 8 depicting participants' comprehension of food systems. 8/8 is a perfect score.
Environmental/Vegan	Participants consume food based on environmental reasons or if they are vegetarian or vegan
Kosher/Halal	Participants consume food based on religious reasons (i.e. Kosher or Halal)
Health/Nutrition	Participants consume food based on pre-existing health conditions, sodium content, nutrition, gluten-free, or calories
Price/Cost	Participants consume food based on the price or cost of the food
Consumed Meals Index	Behavior index depicting how many consumed meals are Parkhurst or cooked meals
Grocery Index	Behavior index depicting what percentage of groceries are bought at various locations in Meadville, PA
Accessibility in Meadville	How accessible consumers perceive local foods to be in Meadville
Accessibility in Hometown	How accessible consumers perceive local foods to be in their hometown
Social Attitude Influence	A score out of 4 depicting participants' degree of influence by social pressures. 4/4 means participants are highly influenced by their peers.
Satisfied with Choices	If the participants are satisfied or not with the nutrition and food choices they make at Allegheny
Satisfied with Availability	If the participants are satisfied or not with the nutrition and food choices available to them at Allegheny
Healthier at Home	Participants feel that they eat healthier at home
Healthier at School	Participants feel that they eat healthier at school
Equally as Healthy	Participants feel that they eat equally as healthy at home and at school
Actual Transportation - Control	Participants travel to the grocery store or out to eat in methods that give them control (i.e. walk, bike, own car)
Actual Transportation - No Control	Participants travel to the grocery store or out to eat in methods that do not give them control (i.e. CataBus, borrow a car, friend(s)/parents drive them)
Preferred Transportation - Control	Participants prefer to travel to the grocery store or out to eat in methods that give them control (i.e. walk, bike, own car)
Preferred Transportation - No Control	Participants prefer to travel to the grocery store or out to eat in methods that do not give them control (i.e. CataBus, borrow a car, friend(s)/parents drive them)
Campus Program with Local Food	If participants would be in favor of a campus-wide program that implemented local food choices
Buy Local Food	If participants would be inclined to buy local food

Table 2: Distribution of survey question topics among studied variables

Knowledge	Attitudes	Behavioral Control	Social Attitude Influence	Situational Factors	Behavior
Scored x/8 to assess degree of comprehension of local, organic, sustainable, and processed foods (1-8)	1. Contributing factors of food consumption (9) a. Environmental & Vegan b. Kosher/Halal c. Health/Nutrition d. Price/Cost 2. Satisfied with Choices (25) 3. Satisfied with Availability (26) 4. Healthier at Home (27) 5. Healthier at School (27) 6. Equally as Healthy (27) 7. Preferred Transportation - Control (29) 8. Preferred Transportation - No Control (29) 9. Campus Program with Local Food (30) 10. Buy Local Food (31)	1. Accessibility in Meadville (19) 2. Accessibility in Hometown (20)	Scored x/4 to measure subjective norms (how influenced participants are by social pressures) (21-24)	1. Actual Transportation - Control (28) 2. Actual Transportation - No Control (28)	1. Grocery Index (12-18) 2. Consumed Meals Index (10-11)

Note: **Numbers in parentheses indicate corresponding survey questions in Appendix A.**

Data Analysis

Pearson correlation coefficients were calculated to show how the variables correlate with the 2 behaviors, and thus, which of the variables were significant predictors. A multiple regression was performed using the IBM SPSS predictive analytic software. The two behavior indices (Grocery Index and Consumed Meals Index) served as the determinant variables in the multiple regression analysis. The Knowledge, Attitude, Behavioral Control, Subjective Norms, and Situational Factor variables served as the independent variables.

I first looked at the independent variables. Three factors of consumption (Kosher/Halal, Health/Nutrition, and Price/Cost) could not be entered in the multiple regression analysis due to lack of variability in the survey question responses (Appendix G, H, I). Question 27 (Appendix A) on the survey was dummy-coded so that the SPSS program could recognize it as a predictor

variable. This question was transformed into three separate variables: "Healthier at Home," "Healthier at School," and "Equally as Healthy." The original question was designed as a polychotomous nominal variable and was transformed into three dichotomous variables so that SPSS could recognize the responses to these questions as possible predictors of behavior.

Next, I looked at the dependent variables. Two behavior indices were created to transform multiple survey question responses into one value for simplification of entering data into SPSS:

(1) Grocery Index: An index of the percentage of groceries bought was formed, taking into account where the groceries came from and what percent local foods are found at those stores. I multiplied the percentage of groceries bought at each of the locations by the percentage of local food those stores contain. The sum of all the products created the index for groceries. The "Grocery Index" created a scale from .00 to .60 indicating how much local food the participants bought when grocery shopping, with .00 being the lowest and .60 being the highest. Some of the participants' answers of the percentage of groceries they bought at each store were rescaled to equal 100% if they added up to over that amount. If the percentages of these questions did not add up to 100% then it is assumed there were other answers that were not represented on the survey.

(2) Consumed Meals Index: An index of the percentage of meals eaten was generated by subtracting the amount of campus meals from the amount of cooked meals. The scale ranged from -5 to 5. The more negative the number, the more cooked meals were eaten; the more positive the number, the more campus (Parkhurst) meals were eaten.

Results

Descriptive Statistics

Knowledge

Very few participants (7.5%) answered all the "Knowledge" questions correctly, but 69.7% of participants answered more than half the questions accurately. Two survey questions (#5 and #7) seemed to confuse the students. If these questions were omitted (and the score would be out of 6 rather than 8), many more participants (58.2%) answered all questions correctly. The mean for the 8-questions knowledge score is 5.88, while the mean for an improved 6-question knowledge

score is 5.26. Most students had a good grasp on the concept of local foods, as 92.6% and 93.6% answered those respective questions correctly.

Behavioral Control

The majority of students (35.8%) claimed that local foods were accessible in Meadville, while 33.8% said they were fairly accessible, and 18.9% said they were very accessible. Only 5.5% said they were always accessible in Meadville. More than double that number (12.4%) said that local foods were always available in their hometown. However, the majority of students were in the middle about local food availability back home.

Subjective Norms

Almost half the participants (43.3%) answered that they were highly influenced by social pressures, meaning they answered 4 out of 4 "Social Attitude Influence" questions with a "yes." Only 2.0% said they would not be influenced at all by what their friends and peers did, ate, or where they went.

Attitude

The vast majority of participants said health and nutrition reasons (86.1%), and price and cost (86.1%) influenced their decision to consume certain foods. Almost all (98.5%) said that they did not choose to eat foods based on religious (Kosher/Halal) reasons. A lower amount (42.3%) said that environmental factors or being vegetarian/vegan was a contributing factor to their food consumption. The participants' satisfaction with the nutrition and food choices they make was almost split (52.7% said they are satisfied). A majority of students (69.7%) said they are not satisfied with the nutrition and food choices available to them at Allegheny. Most participants (68.2%) claim they eat healthier at home, while only a few (13.4%) say they eat healthier at school. The remaining 18.4% say they eat equally as healthy at home and at school. A surprising 52.2% of participants checked off that they would choose to travel to the grocery store or go out to eat by methods in which they had control (i.e. their own car, walking, biking). Most supported a campus program that offered almost all local food choices (78.6%) as well as being inclined to buy foods they knew to be locally grown (71.1%).

Situational Factors

Only 25.9% of participants claimed they had total control over how they travel, meaning they walk, bike, or drive their own car. Even less than that (22.9%) claimed they had no control over how they traveled to get groceries or go out to eat, meaning they use the CataBus, borrow a car, or have a friend or parent drive them. The majority of respondents (51.2%) answered that they use a mixture of means to go out so they are both in control and not in control.

Behavior

Most of the participants scored .09 (19.9%) or .10 (24.4%) on the "Grocery Index," with about half (48.3%) scoring less than .10 on a scale that goes up to .60. On the "Consumed Meals Index," 50.2% of participants scored a 4 (30.8%) or a 5 (19.4%), meaning that 80% or more of the participants' consumed meals are campus (Parkhurst) meals. The mean for this index is 2.07 and only 21.4% of participants scored a negative number meaning a majority of their consumed meals are cooked.

Multiple Regression Analysis

A preliminary multiple regression analysis was performed by evaluating all the independent variables by examining the box plots and histograms. This showed how the data differed from the normal distributions and if there were any outliers that impacted the analysis. It was found that some variables could not be analyzed due to a low degree of variance in the participants' answers (Appendix G, H, I). These variables were 3 of the contributing factors of food consumption (Kosher/Halal, Health/Nutrition, and Price/Cost). After removing these independent variables, multiple regressions were performed on each of the 2 behavior indices, "Grocery Index" and "Consumed Meals Index."

The multiple regression using the "Consumed Meals Index" as the dependent variable was not significant. The mean square of the regression was .320 and the mean square of the residual was .350. These two numbers are not significantly different from each other, resulting in a low F of .912, which does not warrant a significant regression model. Furthermore, the significant F change was .552, which is not significant ($p<0.05$).

The multiple regression using the "Grocery Index" as the dependent variable was significant. The mean square of the regression was .067 and the mean square of the residual was .006. This resulted in a high F of 11.874, meaning the mean squares were statistically different from each other, thus evidencing a significant regression model. Furthermore, the model had a significant F change of .000 ($p<0.05$).

At first a correlation matrix was created that showed what variables were significantly correlated with each other. After doing a multiple regression with only those variables, it was determined which variables were significant in that model. Ultimately, 5 significant variables (Environmental/Vegan, Satisfied with Availability, Equally as Healthy, Preferred Transportation – No Control, Buy Local Food) were isolated and yet another multiple regression was performed, using only those 5 variables to get a significant regression model. However, 2 outliers in the "Grocery Index" boxplot skewed the data. After removing those data points (IDs 15 and 16) I ran the regression again to get an even more significant regression model. The regression model shows an R Square of .235, meaning 23.5% of the variance in behavior can be predicted by the variables. The multiple regression equation from that model is as follows:

$$Y = \beta_0 + \beta_1 \text{ (Environmental/Vegan)} + \beta_2 \text{ (Satisfied with Availability)} + \beta_3 \text{ (Equally as Healthy)} + \beta_4 \text{ (Preferred Transportation – No Control)} + \beta_5 \text{ (Buy Local Food)}$$

The above equation is based on the following multiple regression model:

Table 3: Multiple Regression Model on Grocery Index Behavior

Multiple Regression Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	.070	.011		6.371	.000
Environmental/Vegan	.042	.011	.246	3.676	.000
Satisfied with Availability	-.030	.012	-.161	-2.433	.016
Equally as Healthy	.065	.014	.297	4.560	.000
Preferred Transportation - No Control	.048	.023	.135	2.134	.034
Buy Local Food	.033	.012	.177	2.683	.008

***Note*: $R^2 = .235$ ($p<0.05$)**

Discussion

There were a surprising number of students who did not answer all the "Knowledge" questions accurately. Since less than 10% answered completely correct, it is assumed that there were flaws in the comprehensibility of two of the questions. The question design was straightforward and not meant to trick the participants. It is a constraint to this study that 2 out of 8 knowledge questions were not designed to such an extent as to accurately assess participants' comprehension of organic, sustainable, local, and processed food systems. Knowledge was not as significant a variable in the multiple regressions as it was thought to be. Most modern literature states that knowledge and education play a vital role in determining behavior. However, knowledge alone is not a good indicator of how someone is going to behave. There must be other significant variables taken into account along with knowledge to make a positive impact.

The majority of participants claimed that local foods were "fairly accessible" to "accessible" at school. They did not perceive local foods to be a dominant food source in Meadville. This may account for some of the variability in behaviors because, as the literature states, if one does not identify something to be easily accessible, they are less likely to consume that product. The behavioral control variable was also not significant in either of the multiple regression analyses.

Almost three-quarters of the participants answered positively to at least 3 out of 4 of the "Social Attitude Influence" questions. Not surprisingly, most students at Allegheny seem to be impacted by social pressures of their peers. At the higher education level, students are learning to be more and more independent and make decisions of their own. However, at college, there remains the social pressure of what is acceptable and the ability to "fit in." If large amounts of people choose to do one thing, there is a greater chance of others doing the same thing. Social influences continue to be an important factor to consider when determining behavior, although it was not demonstrated in this study.

Most of the "Attitude" variables were considered significant in the regression model. Three of the determinants of food consumption (Kosher/Halal, Health/Nutrition, and Price/Cost) could not be entered into the regression because there was too small a variance in responses to be analyzed (Appendix G, H, I). The fourth determinant, "Environmental/Vegan," was a significant predictor of what groceries the participants shop for and where. One determinant of food consumption that

(Appendix G, H, I). The fourth determinant, "Environmental/Vegan," was a significant predictor of what groceries the participants shop for and where. One determinant of food consumption that was not measured was cultural differences. It may be beneficial to look at this in the future. Most students said they were not satisfied with the nutrition and food choices available to them through Parkhurst dining services at Allegheny. "Satisfied with availability" was also a significant predictor of local food consumption behavior. This correlates with the fact that most participants said they eat healthier at home, most likely where there is greater availability of nutrition and food choices. Only half the participants said they preferred methods of transportation in which they had control. This was surprising because we would assume that consumers would prefer to be in control over factors such as time and method of transportation. Whether or not consumers were likely to buy local food was also a significant predictor of local food consumption. Most said they were inclined to buy local food, as well as support local food choices on campus, mirroring studies showing that positive behavioral intentions or attitudes about food consumption generally means there is a greater chance of that behavior being carried out.

How participants actually travel is known as a "Situational Factor." Very few claimed that they traveled in ways that gave them total control, such as walking, biking, driving their own car. These methods are thought to be more convenient because the individual person has control over when and where they are going grocery shopping. It is no surprise that this variable was not a significant predictor of behavior, since it typically serves to either aid or inhibit the impact of other behavioral determinants.

The multiple regression analysis on the "Grocery Index" behavior was significant. This behavior can be predicted by five attitudinal variables whose correlations are statistically significant ($p<0.05$). The percent of variance accounted for (.235) may seem low but it is similar to many studies that have used models analogous to the one used in this study. The model did not include a "Behavioral Intention" component for the purpose of simplification. Behavioral Intention is often positively correlated with behavior. Therefore, the variables could have an impact on behavioral intention as well, but it was not measured. These results did not confirm the hypothesis that all the variables in the model would significantly predict local food consumption

behavior. However, it did confirm that "Attitudes" would predict this behavior in students at Allegheny College.

Limitations

There are several limitations to this study. Students were not randomly selected and thus, there are reservations about generalizing to the entire college population. Another limitation is the rescaling of the "Grocery Index." If the answers to the 7 grocery-related survey questions did not add up to 100%, it must be interpreted that there were other answers not represented in the survey. Additionally, the "Consumed Meals Index" did not account for meals eaten off-campus at a restaurant, at a school function, or some place comparable. Every effort was made to gather an equal distribution of grades and majors among the students. The final sample contained fewer Humanities majors than expected and more Natural Science majors (Appendix F). Also, the responses from students at Allegheny College may not be indicative of responses from college students across the nation. Finally, the results of this study are restricted by the subject matter in the survey. Therefore, the results may not be representative of all views on local food and sustainable consumption. More emphasis should be placed on designing the survey questions to appropriately measure the variables so as to achieve more accurate results in multiple regression analysis.

Conclusion

Based on the literature, 5 behavioral determinants were chosen for this study and a model was generated and tested to see if those determinants had an effect on local food consumption behavior. My hypothesis stated that each would have a significant effect on determining behavior, but my results showed that only "Attitude" variables had significant effects. Results from other studies, such as Vermeir & Verbeke (2008) and Bissonnette & Contento (2001), showed that attitudes were one of the most important predictors of behavior.

It is likely that this sample population was too small and focused to have a significant effect. The population at Allegheny College is already very small, with a meager 2,100 students. As a liberal arts college, there are undoubtedly some similarities among its students, so there may be lower variability. For instance, there may be similarities in the way students think due to the fact that every student is required to take two FS courses and is encouraged through the distribution

system to take a wide variety of classes to promote a more holistic way of thinking. Furthermore, in order to attend the College, students were required to score above a certain SAT/ACT level. Since this study focused on this one, small population, it may be that the model that was created was not suited for this type of population. In addition, geographic location may be an issue. In an area where local foods are readily available and are consumed by a majority of the population, the results of this study are sure to have turned out differently. The survey was designed to be quantitative for convenience and time constraints of the study. This survey, as well as the results of the study, could be used as a foundation for a future qualitative study.

This study has shown that only "Attitude" variables are significant to determine behavior for this sample of participants. Positive attitudes are formed from a personal connection to a feeling or belief and are more likely to cause positive behaviors. Thus, experiential learning may be useful in providing that sort of personal connection, becoming more aware of issues and their solutions. This can happen in part with environmental education but that only goes so far. Having a positive attitude towards sustainable products or consumption is a good starting point, but it is crucial to also have hands-on experience and increase the understanding of food systems and environmental impacts of those systems. The attitude-behavior gap explained earlier is still present in many contemporary studies and should not be ignored due to the results of this study. Determinants of behavior are highly integrated and attitudes are unlikely to be the only variable affecting consumer behavior.

Environmental education has been the foundation for forming long-term solutions to environmental issues. Primarily, the approach has been to provide more information and knowledge about the issue to form a solid understanding and be able to work toward a solution. However, in some scenarios the emphasis should be placed more on forming a more positive attitude since knowledge does not always foster positive behaviors. As stated above, attitudes can be predicted by beliefs and emotions (Pooley & O'Connor, 2000). Environmental education programs that solely focus on knowledge could be impeding the full impact of the program. This is not to repudiate the fact that knowledge is fundamental. There should be a knowledge baseline on which other behavioral determinants can have an effect. That way, humans can make an informed decision on their behavioral choices. Even though there is no one variable that is more

important than the rest, sometimes a specific variable should be taken into account more, depending on the target population. Since this study points out that attitudes are the most significant predictor of behavior, we should look at education programs focusing on improving beliefs and emotional connections toward local food consumption.

Campus food programs can be important influencers of alternative food systems to combat the challenges of the conventional system. These programs can be outlets for the campus and surrounding community to learn about, promote, and experience local foods in a new way. Experiential learning on farms or at farmers' markets can increase the personal connection to local foods and can facilitate positive attitudes (Barlett, 2011). The campus community is a great outlet for helping to change societal frameworks regarding sustainable consumption. Social influences have a large impact on consumer behavior and by learning and working with each other, community members can generate new and improved ways to inform each other as well as other communities. Allegheny College could utilize the newly implemented community garden outside of Carr Hall ("The Carrden") to foster a hands-on learning experience for students and community members. Furthermore, we could use the Local Foods Dinner on campus once or twice a year to further stimulate awareness and generate a relationship with local farmers.

Future Research

Future research should use a more systematic approach to gathering participants to work towards a more representative sample. Also, perhaps using a qualitative method of gathering data would be more beneficial. The study could be extended to different, namely larger, populations to see if there is a more significant effect of the determinants of behavior on the food consumption behavior itself. One suggestion would be to expand to a larger population to complete the survey and study. College students can still be used, but it may be more beneficial to take samples of students from a variety of colleges and assess them together.

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Appendix A: Survey

How would you characterize the following food systems? (Questions 1-8)

1. Canned fruit or vegetables sold in Giant Eagle.
    - Local
    - Sustainable
    - Organic
    - Processed
    - I don't know
2. PepsiCo aims to preserve and improve soil fertility and minimize soil loss through erosion.
    - Local
    - Sustainable
    - Organic
    - Processed
    - I don't know
3. Beef from livestock that were not given growth hormones or antibiotics, and grass-fed on a pesticide-free range.
    - Local
    - Sustainable
    - Organic
    - Processed
    - I don't know
4. Students can receive fresh produce and eggs weekly, directly from farmers during the growing season.
    - Local
    - Sustainable
    - Organic
    - Processed
    - I don't know
5. Eggs from a certified farm.
    - Local
    - Sustainable
    - Organic
    - Processed
    - I don't know
6. Tomatoes grown at Fresh From The Vines, located in Crawford County, and sold at the Market House in Meadville.
    - Local
    - Sustainable
    - Organic
    - Processed
    - I don't know

7. Potatoes grown using Integrated Pest Management as a pest-control technique.
    - Local
    - Sustainable
    - Organic
    - Processed
    - I don't know
8. Coffee beans from Africa dehydrated into instant coffee.
    - Local
    - Sustainable
    - Organic
    - Processed
    - I don't know
9. What factors contribute to your decision of what food to consume? (Choose all that apply.)
    - Environmental
    - Pre-Existing Health Condition
    - Price/Cost
    - Sodium Content
    - Vegetarian/Vegan
    - Nutrition
    - Kosher/Halal
    - Gluten-Free
    - Calories
10. What percentage of your weekly meals are cooked in your apartment, dorm room or house?
    - N/A – No access to kitchen
    - 0-20%
    - 20-40%
    - 40-60%
    - 60-80%
    - 80-100%
11. What percentage of your weekly meals are campus (Parkhurst) meals?
    - N/A – No meal plan
    - 0-20%
    - 20-40%
    - 40-60%
    - 60-80%
    - 80-100%
12. What percent of your groceries (produce, meats, dairy, or dry goods) come from Wal-Mart?
13. What percent of your groceries (produce, meats, dairy, or dry goods) come from Giant Eagle?
14. What percent of your groceries (produce, meats, dairy, or dry goods) come from Tops?
15. What percent of your groceries (produce, meats, dairy, or dry goods) come from Valesky's?

16. What percent of your groceries (produce, meats, dairy, or dry goods) come from the Market House?

17. What percent of your groceries (produce, meats, dairy, or dry goods) come from a convenience store (CVS, Walgreens, etc.)?

18. What percent of your groceries (produce, meats, dairy, or dry goods) come direct from farmers (farmers' stands, Community Supported Agriculture, etc.)?

19. How accessible do you feel local foods are in Meadville?

Not accessible	Fairly accessible	Accessible	Very accessible	Always accessible
o	o	o	o	o

20. How accessible do you feel local foods are in your hometown?

Not accessible	Fairly accessible	Accessible	Very accessible	Always accessible
o	o	o	o	o

21. If your friends or boy/girl-friend ate off-campus more, would you eat out more as well?
    - o Yes
    - o No

22. Would you consider eating at a restaurant in town where more Allegheny students are eating?
    - o Yes
    - o No

23. Would you be interested in knowing where Allegheny students ate, aside from on-campus (Parkhurst)?
    - o Yes
    - o No

24. Would you choose to cook in your dorm room, apartment, house, etc. if your friends or boy/girl-friend cooked more?
    - o Yes
    - o No
    - o N/A – no access to kitchen

25. Are you content with the nutrition and food choices that **you make** at Allegheny?
    - o Yes
    - o No

26. Are you content with the nutrition and food choices **available to you** at Allegheny?
    - o Yes
    - o No

27. Do you feel that you eat healthier at home or at school?
    - o Home
    - o School
    - o Equally as healthy

28. When you grocery shop or go out to eat, how do you get there? (Check all that apply).
    - o Walk
    - o Bike
    - o CataBus
    - o Your own car
    - o Friend(s) drive you
    - o Borrow a car
    - o Parents

29. If you had your choice, how would you get to the grocery store or go out to eat? (Check all that apply).
    - o Walk
    - o Bike
    - o CataBus
    - o Your own car
    - o Friend(s) drive you
    - o Borrow a car
    - o Parents

30. How would you feel about a campus-wide program that implemented almost all local food choices?
    - o In favor
    - o Not in favor
    - o Don't care

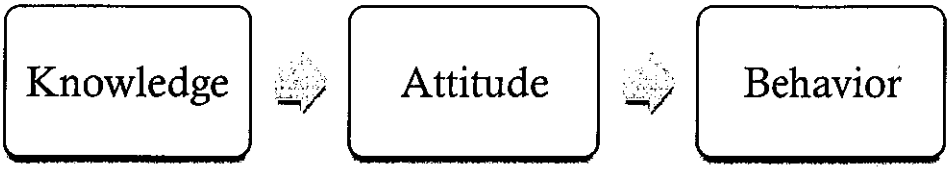
31. Would you be more inclined or more hesitant to buy food if you knew it was locally grown?
    - o Inclined
    - o Hesitant
    - o Don't care

32. What is your class year?
    - o Freshman
    - o Sophomore
    - o Junior
    - o Senior

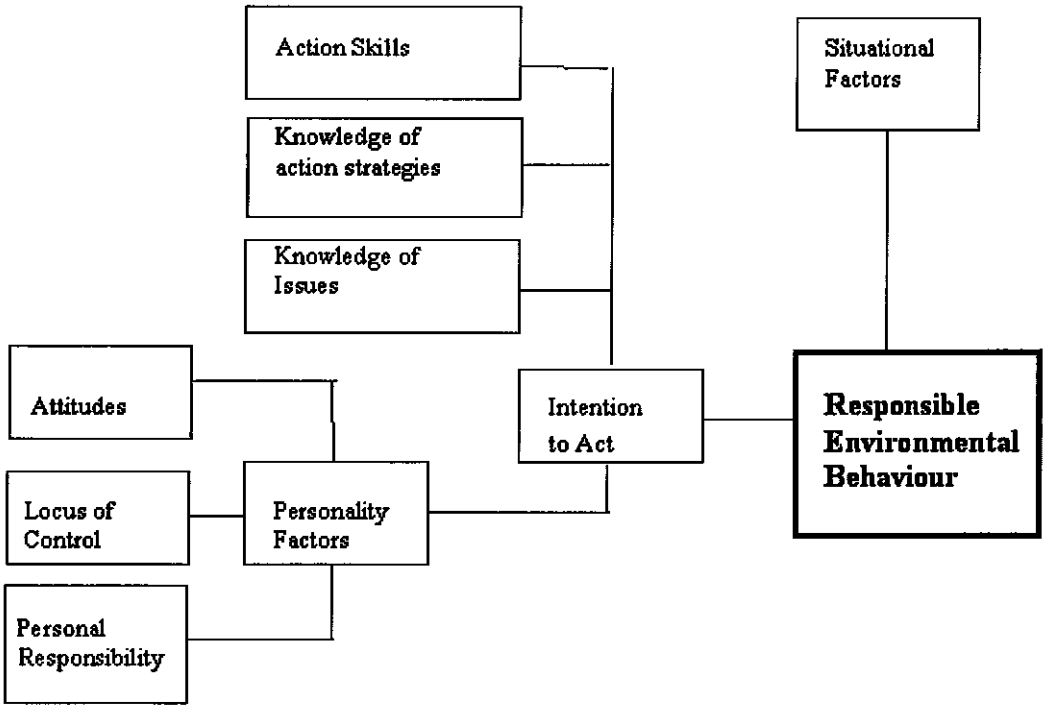
33. What is your major?

34. If you are a double-major, what is your second major?

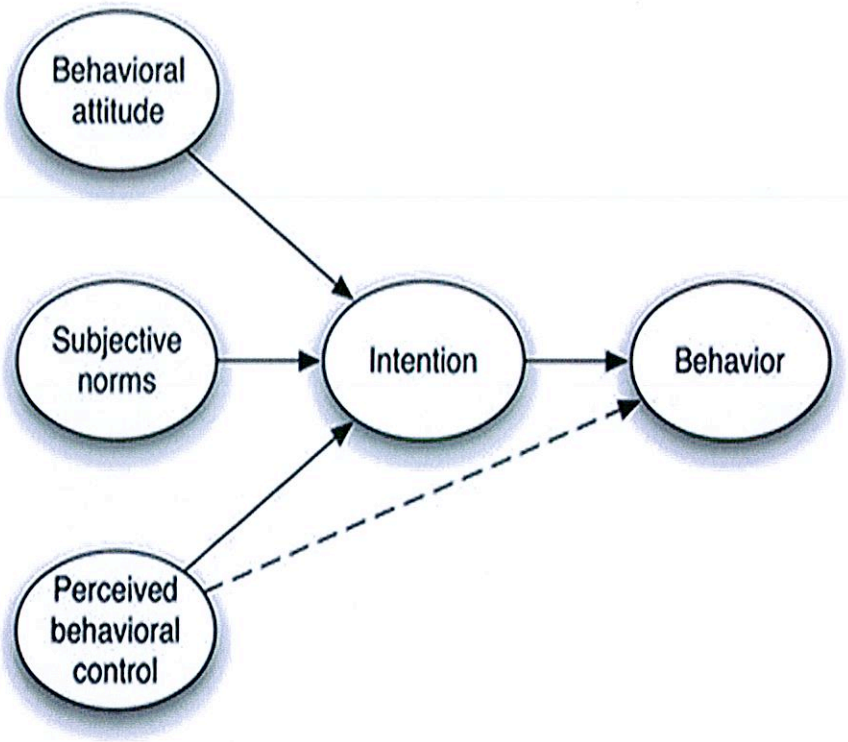
Appendix B: [Theorized] Behavioral Change System (Hungerford & Volk, 1990)



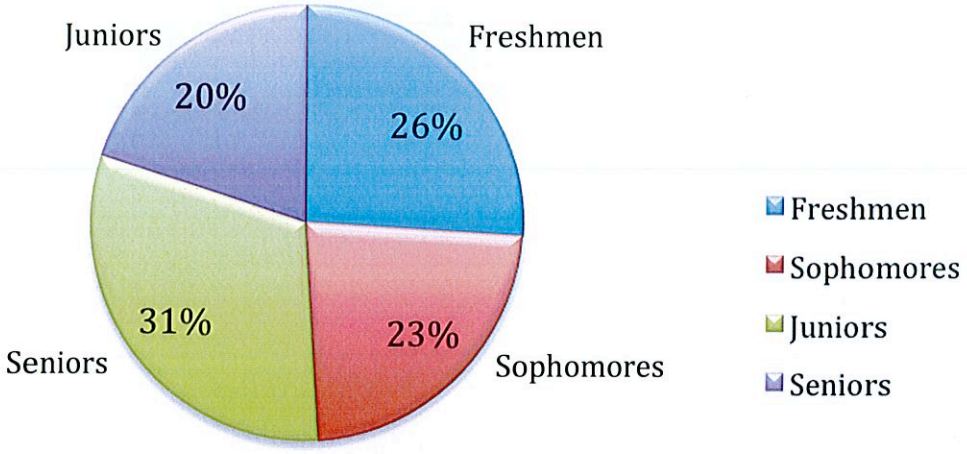
Appendix C: Hines Model of Responsible Environmental Behaviour (Hines et al., 1987)



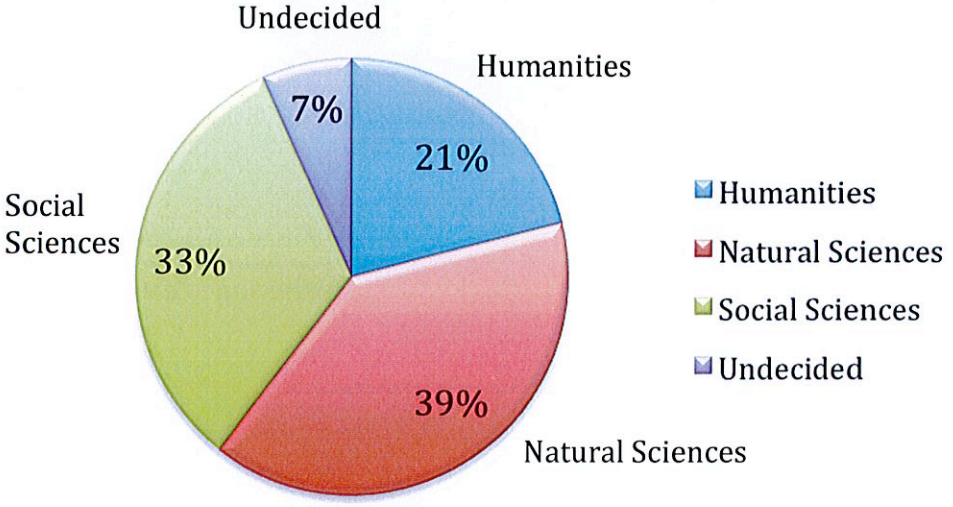
Appendix D: Theory of Planned Behavior (Ajzen, 1991)



Appendix E: Distribution of grade levels among participants

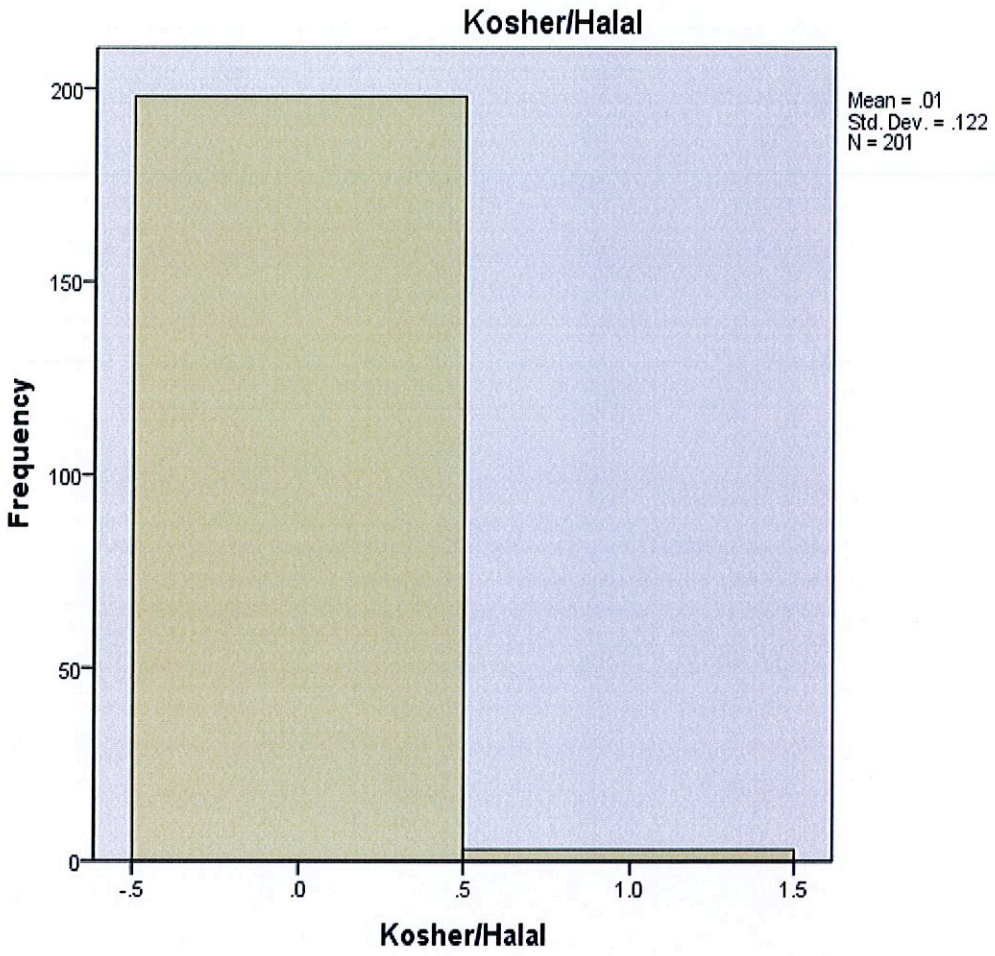


Appendix F: Distribution of majors among participants

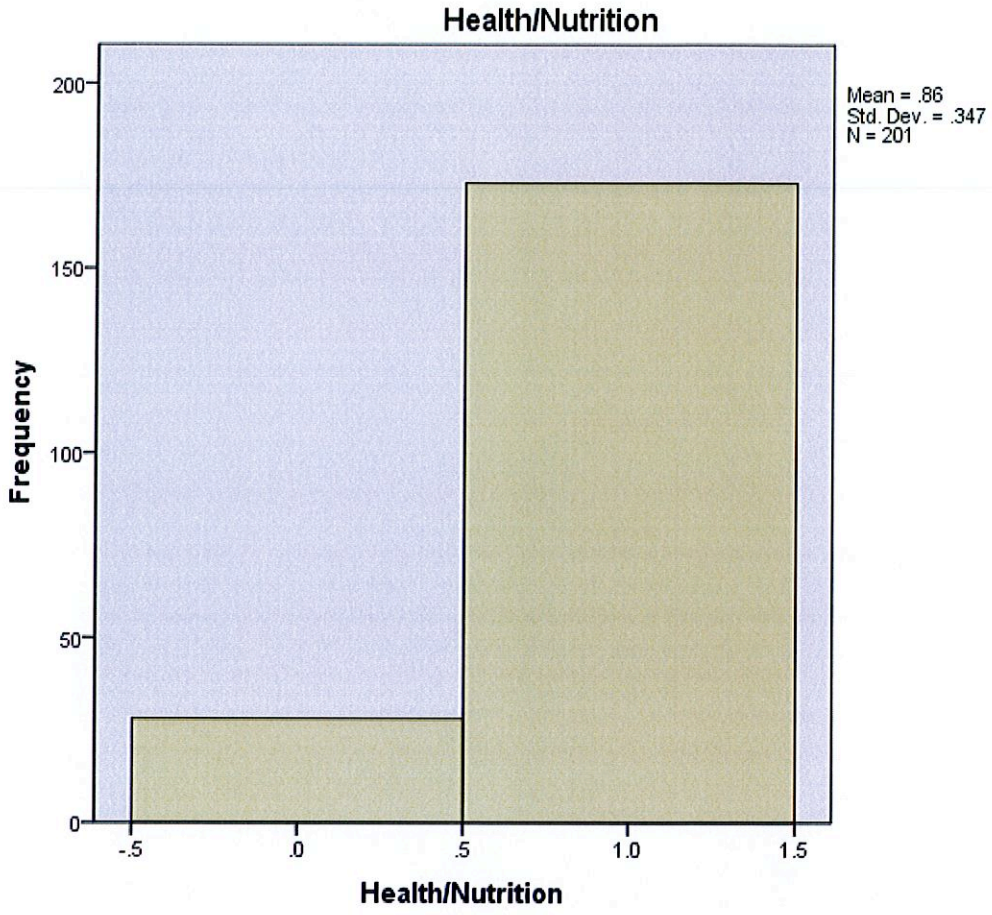


***Note*: Double-majors were included in the percentages. The five Women's Studies majors were excluded because they do not fit in any of the three academic divisions.**

Appendix G: Histogram of Kosher/Halal



Appendix H: Histogram of Health/Nutrition



Appendix I: Histogram of Price/Cost

