THE CONSUMER PREFERENCE ANALYSIS FOR ORGANIC FOOD IN THE

MID-ATLANTIC REGION OF THE UNITED STATES

By

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ABSTRACT OF THE THESIS

The consumer preference analysis for organic food in the Mid-Atlantic region of the United States

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The objective of this study is to focus on the consumer preference for purchasing organic food by assessing the consumer's opinions toward organic processed food, the impact from different information sources on the consumer's food purchasing habits, and to uncover the attributes influencing four groups of consumers with different characteristics. In this study, over 1,000 organic products consumers were surveyed in five states, namely, New York, New Jersey, Pennsylvania, Delaware, and Maryland. Main factors include family size, annual income, gender, age, education, primary occupation, awareness of food safety, purchasing frequency of organic products, and the category of most frequently consumed organic foods. Multiple econometric models were developed to conduct the consumer preference analysis.

According to the results, the respondents who view pesticide and herbicide residues as serious or somewhat hazardous are more likely to consume organic processed food but are highly unlikely to become frequent buyers. These differences might be related to consumers' attitudes toward organic food prices, organic food varieties, and their demographic characteristics. By assessing how consumers gain knowledge of organic foods, the respondent's age, income level, awareness of food safety and nutritional information, opinions toward organic products, and their willingness to purchase organic products show a significant impact on consumer preferences towards organic foods. We segmented the consumers by using principal component

analysis into four groups as "Organic supporter", "Direct channel buyer", "Quality follower", and "Thrifty domestic consumer". The preliminary results indicate that among the four groups, the consumer's characteristics and preferences, willingness to pay for the organic food price premium, opinions towards quality, and the product varieties that are available can significantly impact the purchasing decision for food products.

The information generated by this study is useful to provide producers with a framework for understanding the appeal and demand of the organic produce market. Through analyzing the consumer's profile, this research can help the market strategy of organic food producers and business planners to optimize the distribution channel, and therefore maximize the consumers' purchasing power of organic foods to expand the market.

Keyword: Organic food, Consumer preference, Marketing strategy

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Introduction

Organic is a labeling term that refers to agricultural products produced in accordance with the

Organic Foods Production Act of 1990 (OFPA) and the National Organic Program (NOP)

Regulations (great sentence!). The guidelines for organic production reinforce the use of

materials and practices that promote natural and ecological systemic balances and promotes

the integration of farming to the natural ecosystem. Since many benefits are associated with

the rapid growth of organic products, the producers and business operators need to overcome

the issues of capacity underutilization by attracting a steady and diverse customer base.

Organic processed food
Although the organic food market in the United States continues to grow rapidly, the

consumer's willingness to pay the price and their attitudes towards organic processed food has

not been comprehensively investigated when compared to fresh foods. When foods are labeled

as "organic," it means the products were managed under the criteria, established by the Organic

Foods Production Act of 1995(Gold, 2016; Rihn, 2016). And since the 1990s, consumer demand

for organic products has shown double-digit growth("Overview," 2017). Such a fast-expanding

market provides enormous incentives for U.S. farmers to produce a broad range of organic

products.

Organic products are now available in nearly 3 out of 4 conventional grocery stores. 93 percent

of the sales occur through conventional and natural food supermarkets and chains. The other 7

percent of sales take place through farmers' markets, foodservice, and some other marketing

channels ("Organic Market Overview," 2017). In 2016, the U.S. organic product sales reached

$43.3 billion("U.S. organic sales post new record of $43.3 billion in 2015," 2016). Among the

various organic food categories, fresh fruits and vegetables have been the long-time top-selling

category since the inception of the organic food industry over 3 decades ago("Organic Market Overview," 2017). The previous study shows the researchers have noticed organic processed food, such as packaged/prepared foods and snack foods, have been expanding rapidly(Na He & John C. Bernard, 2011). According to USDA ERS data for 2012, organically grown fresh fruits and vegetables accounted for 43 percent of U.S. organic food sales, followed by dairy (15 percent), packaged/prepared foods (11 percent), beverages (11 percent), bread/grains (9 percent), snack foods (5 percent), which adds up to 36% of the market, meat/fish/poultry (3 percent), and condiments (3 percent)("Organic Market Overview," 2017).

The market began to extend to processed food only in recent years(Klont, 1999). Being an important part of organic food products, organic processed foods are usually defined as processed food that are free from artificial additives, MSG, GMOs in general, dairy from cows treated with antibiotics or artificial growth hormones, and synthetic chemicals including pesticides, herbicides, fungicides and chemical fertilizers that are used in any part of production process.

As the market for organic processed food continues to grow, the consumer's willingness to pay for and their attitudes towards organic processed food have rarely been investigated. The factors which contribute to the choice of organic processed food might be different than that of the fresh organic fruits and vegetables. When consuming fresh organic products, consumers can easily identify the foods as organic products, due to their knowledge of the common concept of "organic"("How is organic food processed?,"). However, when it comes to processed food and multi-ingredient combination, the consumers' understanding and awareness of organic products might be different(Shepherd & Dean, 2008).

According to previous studies, consumers tend to be more willing to pay a premium price for shorter shelf life organic products, such as fresh fruits and vegetables(Shepherd & Dean, 2008). When organic produce is sold fresh, the buyer's belief about the products include the idea of "natural"(Yiridoe, Bonti-Ankomah, & Martin, 2005), not with any degree of "processed". With regard to multiple ingredients and food processing, consumer's understanding of organic fresh foods and organic processed food might be different. Therefore, the factors which influence people's choice could be quite different from their choice to purchase organic processed food. Such differences lead to a series of questions about consumer attitudes toward their willingness to pay for organic processed food.

Hutchins and Greenhalgh have suggested that it is necessary to develop a cohesive marketing strategy for both marketers and growers, which depends on a full understanding of the consumer and considers all parties in the food chain, initiated by leaders in the industry, in order to effectively promote organic products(Shepherd & Dean, 2008). Since there is no reason to presume that consumer motivation to purchase processed organic foods should match results found in studies of organic fresh foods (Hutchins & Greenhalgh, 1997), the consumer interpretation of and confidence in processed organic foods is essential to determine the marketing strategy for such products.

The objective of this paper is to understand consumers' preference for organic processed food in the Mid-Atlantic regions of the United States and provides insights to food processors and farmers into the potential markets for such products. Specifically, we wish to understand whether consumers' demand for organic processed foods in different from their demand for organic fresh food. Even other researchers mainly focus on the willingness to pay for organic foods, we still refer to their analysis to select the variables to put in our models (Batte, Hooker,

Haab, & Beaverson, 2007; Govindasamy & Italia, 1999; Na He & John C. Bernard, 2011; Rihn,

2016).

Information resources

Under the influence of media publicity regarding the dangers of pesticide residues since the

1980s, organic agriculture continues to be one of the most rapidly growing farming sectors in

the U.S (Youngberg & DeMuth, 2013). Therefore, when examining the consumer's purchasing

preference for organic foods, the media is an essential tool to communicate organic product

information to the public.

As the organic market grows, consumers increasingly criticize the globalization of agricultural

production for its economic, environmental and social consequences (Abbott, 2003; Jones,

Comfort, & Hillier, 2003; Yiridoe et al., 2005; Zander & Hamm, 2010). Market observations

indicate consumers appreciate ethical concerns and a large share of consumers are willing to

pay additional prices for organic products (AFZ (Allgemeine Fleischerzeitung), 2009; LZ

(Lebensmittelzeitung), 2008; Mende, 2008; Organic Monitor, 2009; Raynolds, 2000). According

to previous studies, the organic agriculture movement is under the influence of both theoretical

and practical values (Organic Monitor, 2009). The core values, as the authors described, are

especially principles of health, ecology, fairness, and care (Dinis, Ortolani, Bocci, & Brites;

Susanne Padel, Röcklinsberg, & Schmid, 2009). Since the communication process of organic

agriculture concept is colloquial, usually through a label based on standards that specify

production condition or word of mouth, the challenge for the global market remains

understanding how products grow and integrate within the market without losing internal

coherence for these core values (IFOAM).

The passing of information through connections or media has been viewed as "getting the right

information into the hands of the right people at the right time so as to influence decision-

making" (Dinis et al., 2015; Dobbins, Rosenbaum, Plews, Law, & Fysh, 2007). A purchase

decision, usually consists of different elements: problem recognition, information search,

evaluation of alternatives, and product choice and outcome (Kay & Carruthers, 2017; Kotler,

2000; Solomon, 2006). Information search as part of a purchase decision is a process by which

the consumer surveys their environment for the appropriate data to make a reasonable decision

(Zander & Hamm, 2010). Information search tends to be more extensive with younger people,

women, and people who received higher education (Solomon, 2006). Consumers' decisions are

carefully embedded into the marketing strategy which includes product pricing and distribution

decisions (Zander & Hamm, 2010). Beyond that, by creating complementary promotions,

marketers could influence consumers to fulfill their needs and desires by directed offerings from

marketers' firms (Hastings et al., 2003; Kitchen, 1999).

Recent studies suggest that different sources of information may transfer different values and

practices to organic farmers(Kitchen, 1999). For example, information sources are the methods

to increase technical and scientific knowledges to organic growers. These sources include but

are not limited to organic conferences, farm tours, online communities and newsletters

(Coughenour, 2003; Crawford, Grossman, Warren, & Cubbage, 2015; Eshuis & Stuiver, 2005).

Researchers proved consumers' trust in media as a source of information about organic food as

an influential factor for their purchase behavior of organic produce(Nerbonne & Lentz, 2003).

However, the different values or impacts for organic food consumers from different sources of

information, were rarely investigated. Each market player has a different focal point and

chooses a different way of communicating and phrasing the product related

information(Dumortier, Evans, Grebitus, & Martin, 2017). Also, the various enterprises' concepts

and activities with additional attributes in their organic foods production leads to the question

of how consumers respond to these concepts(Aschemann & Hamm, 2008).

The reasons for us to select the listed four approaches are based on previous studies about message framing effects on food. The Internet is one of the main sources used by consumers to search for information about food (Jacob, Mathiasen, & Powell, 2010; Kuttschreuter et al., 2014; Redmond & Griffith, 2006; Tian & Robinson, 2008; Zander & Hamm, 2010). Especially for youth and young age people, online media plays an increasingly critical role in their lives (Hilverda, Kuttschreuter, & Giebels, 2017). For adolescents, their friends and family usually influence their food choice and their value of food because of the complexity of their social networks, food rules and communication strategies (Contento, Williams, Michela, & Franklin, 2006; De Bourdeaudhuij & Van Oost, 1998; Weber, Story, & Harnack, 2006). Researchers also state that food and beverages were the most highly advertised products(Feunekes, de Graaf, Meyboom, & van Staveren, 1998; Kelly et al., 2010). Promotional techniques in television advertising have shown to be concentrated in advertisements for unhealthy food product information(Dibb & Harris, 1996). Last but not least, the food consumers' perception could differ from experts/specialists' assessments (Kelly et al., 2010; Wilkinson, Rowe, & Lambert, 2004). Also, numerous studies give examples about how information exchanges between organic growers, researchers, and extensions that modify farming practices (Crawford et al., 2015; Ingram, 2010; Kroma, 2006; Siegrist, 2008; Warner, 2006). Therefore, the influence of university/specialist/experts has to be counted into the main resources from which people receive food information.

Segmenting the attributes and acceptance

Since many benefits are associated with the rapid growth of the organic products industry, the producers and business operators need to devise strategies to attract customers(Piaskowski, Fuerst, Carpenter-Boggs, Weddell, & Roberts, 2013).

However, the consumers are still confused about the term "organic"(Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007; Onyango①a, Govindasamy, & Alsup-Egbers, 2015). Variables such as the level of market development, the different interpretations of associated food terms (e.g., 'cage-free' and 'natural') and the product category (e.g. Farmed salmon) can aggravate the consumer's confusion (Chryssochoidis, 2000; Fotopoulos & Krystallis, 2002; Hughner et al., 2007; Richard K Hutchins & Greenhalgh, 1997).On the contrary, the increasing number of certification labels and various products that the stores are offering may have negative effects on the consumers' trust in organic foods(Aarset et al., 2004). Considering that the future organic market will be driven by the demand side(Dumortier et al., 2017; Hamzaoui-Essoussi, Sirieix, & Zahaf, 2013), it's important to understand the motivations and preferences of organic food consumers.

Positioning and distribution strategies of organic products are highly related to the market growth of the organic agriculture industry. Distributors contribute, at different levels and with different strategies, to the consumers' level of knowledge of, preferences for, as well as the impact on the awareness of organic food products(Vukasovič, 2016). Generally, organic products could be found at two major distribution channels(Hamzaoui-Essoussi et al., 2013). Conventional distribution channels, such as supermarkets, local grocery store, and wholesale clubs are channels where consumers do not see and interact with the producer and information about the food is limited(Hamzaoui-Essoussi et al., 2013; Hamzaoui Essoussi & Zahaf, 2009). Direct channels usually refer to the community farmers' market, shop at the farm (maybe "Pick your own" markets), and road stands where the shoppers could interact with the producers directly (Hamzaoui-Essoussi et al., 2013; Smithers, Lamarche, & Joseph, 2008). Research found that consumers who place importance on supporting local distribution channels are more likely to

purchase organic foods than those who did not consider that option(Hamzaoui-Essoussi et al., 2013; Shepherd, Magnusson, & Sjödén, 2005). In 2017, nearly 30% of the organic products sales in the U.S. happened at wholesale clubs, followed by natural and fresh food stores, conventional grocery stores, mass supermarkets and discount grocery stores (Torjusen, Lieblein, Wandel, & Francis, 2001).

Beyond the method consumers receive organic food information, more directly, the distribution channels could be a barrier which prevent the development of the organic food market since potential consumers who want to buy organic products may lack a source for obtaining them (Nielsen, 2017).

Consumer perceptions and purchase pattern of organic products, compared to conventionally grown product variants across food categories(Atănăsoaie, 2011; Verain, Sijtsema, & Antonides, 2016). The reasons frequently cited by consumers for the purchase of fruits and vegetables are health, taste, or products' origin. Meanwhile, for pork and other meats, provenance, as well as prices and sale promotions are also critical factors(Andersen & Lund, 2014; Baudry et al., 2017). In similar fashion, chemical residues are a major concern for organic fruit and vegetables, but less so the case for organic dairy products (Baudry et al., 2017; Migliore, 2009).

Yet, the consumers' willingness to pay has variation among different categories. For example, organic fruits and vegetables are the most popular category of organic products(S. Padel & Foster, 2005), and the consumers' willingness to pay for them are perceived differently from other products. Studies show consumers exhibit a lower percentage of unwillingness for premium prices for organic fruits and vegetables(USDA ERS, 2017). Therefore it seems obvious for organic products producers and retailers to gain profits from the increasing demand for cross-selling of organic foods(Krystallis & Chryssohoidis, 2005).

The identified consumer segments regard food-category attributes in line with other recent studies, and shows the importance of attribute segmentation at the food-category level (Juhl, Fenger, & Thøgersen, 2017; Verain et al., 2016). It could be helpful as it connects between insights gained from studies about overall organic foods consumption and analyses that only focus on a specific context or category(Onwezen et al., 2012).

Whether the consumption activity is frequent or not is crucial to address the level of importance across different types of consumers' behavior patterns and the food choice motivation behind them(Verain et al., 2016). Findings indicate the organic purchase motivation between frequent consumers and non-frequent buyers of organic foods are distinct(Baudry et al., 2017). Consumers with favorable attitudes would have more willingness to consume higher amounts of organic foods more frequently and show extra effort to find the organics that they look for(Shepherd et al., 2005).

Therefore, we add the consumers' purchasing frequency for each of the distribution channels and organic product categories we listed in the questionnaire to help us identify the consumer groups.

Methodology

Data Source

An online survey was conducted to capture organic consumer's interest and expectations about organic fruits and vegetables. All participants were pre-screened, and their identities checked. Other criteria included:

1. Age 18 and older

2. Residents of the Mid-Atlantic region (New York, New Jersey, Pennsylvania, Delaware and Maryland State).

3. The primary food organic shopper of the household

4. Had purchased organic products in the past 12 months.

The questionnaire points toward organic marketing attribute that identifies the type of produce bought, visits per month, dollars spent and other related demographic information.

The 1,100 survey participants were pre-screened from a collective database of 5,191 participants from New York, Delaware, New Jersey, Maryland, and Pennsylvania via the internet from March 7st to 15th, 2016. The survey respondents were selected based on the total population in each state. The data were collected through stratified random sampling techniques by using Survey Sampling International (SSI) LLC online survey company (Warrington PA). The online tool was pre-tested on 100 organic consumers to refine and clarify each proposed question prior to the final deployment of the survey. The survey was developed by the researchers and was approved by the Office of Research and Sponsored Programs at Rutgers University. Candidates were chosen randomly by the Survey Sampling International, LLC (Warrington PA).

Throughout the survey, specific terms of organic, conventional, natural, community supported, locally and eco-friendly produce was additionally defined to make sure that the participants had the same level of understanding of the basic terms used in the survey. The key components of this study included an assessment of consumers' preferences, shopping patterns, opinions, willingness to pay premiums for locally grown organic produce and willingness to buy organically grown as well as analysis of the demographic characteristics of likely purchasers. Most of the questions in the survey are categorical in nature with a few open-ended questions for participants to fill in dollar amounts. The demographic question included socio-economic attributes of age, gender, annual household income, household size, education level, ethnicity and current employment status.

Logistic Regression Model

Organic processed food

The aim of this study is to investigate how consumer characteristics impact the likelihood of purchasing organic processed food and their purchase frequency, using two probability-based regression models.

In the first model, we selected a binary variable (PROC) as the dependent variable. In the second model, we selected another binary variable (HFPROC) as the dependent variable. Using a binary dependent variable not only make interpretation easier but also directly reflect the probability of being interested in certain calculation.

The logit framework was selected for this analysis because its asymptotic characteristic constrains the predicted probabilities to a range of zero to one(Aslihan Nasir & Karakaya, 2014). Logistic regression converts the dependent variable into its logarithmic odd ratios. Assuming the probability of a binary dependent variable Y to be true is P_Y, and the probability for Y to be false

is 1- P_Y, the logistic regression model could be written as the relationship in k independent variables x and coefficients β of the independent variables:

$$F(x) = logit(Y) = \ln\left(\frac{P_Y}{1 - P_Y}\right) = \beta_0 + \sum_{i=1}^{k} \beta_i x_i + \varepsilon$$

The logistic regression model estimates the coefficients β of the independent variables in a linear way. Estimated coefficients should best explain the dependent variable by the given independent variables. Once the coefficients are estimated, a predicted value based on independent variable values of each sample can be calculated. For the *j*th sample of the total n samples, the predicted value can be calculated as:

$$\widehat{F(x)}_j = logit(\widehat{Y}_j) = \ln\left(\frac{P_{\widehat{Y}_j}}{1 - P_{\widehat{Y}_j}}\right) = \beta_0 + \sum_{i=1}^{k} \beta_i x_{ij} + e$$

With the predicted value $\widehat{F(x)}_j$, we are able to calculate the estimated probability of $\widehat{Y}_j$ being true. After rearranging this equation, we can calculate $P_{\widehat{Y}j}$ using the following:

$$P_{\widehat{Y}j} = \frac{\exp(\widehat{F(x)}_j)}{1 + \exp(\widehat{F(x)}_j)} = \frac{1}{\exp(-\widehat{F(x)}_j) + 1}$$

However, the marginal effect of x_i on $P_{\widehat{Y}j}$ still remains unclear. In fact, the margin can be calculated through,

$$\frac{\delta P_{\widehat{Y}j}}{\delta x_{ij}} = \frac{\beta_i \exp(-\widehat{F(x)}_j)}{\left(1 + \exp(-\widehat{F(x)}_j)\right)^2}$$

Or if the independent variable is discrete,

$$\frac{\delta P_{\widehat{Y}j}}{\delta x_{ij}} = P_{\widehat{Y}j}(x_{ij} = 1) - P_{\widehat{Y}j}(x_{ij}=0).$$

To summarize, we chose logit regression method because 1) the dependent variable was binary; 2) we wanted to investigate how each independent variable affects the probability of a consumer being interested in organic processed food, and the frequency of purchasing organic processed food; and 3) we wanted to use this model to predict the likelihood of one being interested in organic processed food, and the frequency of purchasing organic processed food, given one's attributes. Additionally, considering most of our independent variables are categorical data, at least one classification for each category has been dropped to avoid perfect collinearity.

When constructing the logit model, software NLogit, a premier statistical package for logistic model estimation from LIMDEP was used. We performed all our descriptive statistics using SPSS.

The purpose of this study is to investigate the organic processed food consumers' characteristics and preferences in the Mid-Atlantic region. Therefore, as in the first model, we used "PROC", a binary variable indicating whether a consumer purchased organic processed food or not, as the dependent variable. And in the second model, another binary variable "HFPROC", indicates whether the organic processed food buyer's purchase such products 3-4 times/month or more, which indicates a high-frequency buyer.

Based on the objectives and previous studies on the consumer's organic food preference, we selected three groups of independent variables from the survey data: demographic, organic foods purchasing habits, and awareness of organic foods. Demographics included gender, age, numbers of family members, household income, occupation, the level of education, and the primary residence of a respondent. Organic food purchasing habits include the respondents' purchasing channel, purchasing frequency, premium price that they are willing to pay, if they would like to switch grocery stores to purchase organic foods, and if they look for organic

options in restaurants. Questions about the participant's awareness of organic foods indicate

the resources of getting organic product information, respondents' options towards organic

food products that relate to food variety, foods price, food safety, and environmental concerns.

Although these variables were selected, not every category was included in the final models.

Some categories were dropped, which did not show a significant relationship with the

dependent variables. Some interaction terms were created to eliminate collinearity among

variables.

Information resources

This study's aim is to investigate the different characteristics among consumers sorted by their

major information sources on getting organic foods, three probability-based regression models

were used.

According to the statistics of the survey, by the Internet (75.2% of the respondents), by

TV/Newspapers/Radio (50.4% of the respondents), and by Friends or Relatives (42.2% of the

respondents) are the three resources which the respondents chose as the information resources

that they would like to acquire organic produce information. Therefore, we selected the three

binary variables: THE INTERNET (The Internet is the most important resources to get information

about organic products), TVNEWS (TV/Newspapers/Radio is the most important resources to

get information about organic product), and FRIENDS (Friends or Relatives is the most important

resources to get information about organic product), as the dependent variable for each

regression model. Using a binary dependent variable not only make interpretation easier but

also directly reflect the probability of being interested with certain calculation.

Based on the objectives and previous studies on the organic food consumer's preference, we

selected three groups of independent variables from the survey data: demographic, organic

food purchasing habits, and awareness of organic foods. Demographics included gender, age,

numbers of family members, household income, occupation, the level of education, and the

primary residence of a respondent. Organic food purchasing habits include the respondents'

purchasing channel, purchasing frequency, the category of organic food that they purchase,

premium price that they are willing to pay, if they would like to switch grocery to purchase

organic foods, and if they look for organic options in restaurants. Questions about participants'

awareness of organic foods indicate the respondents' options towards organic food products

that related to food variety, foods price, food safety, and environmental concerns. Although

these variables were selected, not every category was included in the final models. Some

categories were dropped, which did not show a significant relationship between the dependent

variables. To have a parallel comparison of the three models and maintain.

Segmenting the attributes and acceptance
PCA method was applied by using SPSS 24.0 with Varimax as a rotation method and eigenvalues

greater than 1.0 as a cut-off point for the number of factors extracted based on the PCA (Ramu

Govindasamy, 2001) to reduce the questions on the survey into a smaller set of factors. The

principal component analysis can gather highly correlated independent variables into a principal

component, and each individual components are mutually independent, therefore it does not

transform a set of correlated variables to a set of uncorrelated principal components(Baudry et

al., 2017). A standard latent root equal to one and a Screen test were conducted to decide how

many factors to retain, followed by a confirmatory analysis to ensure the internal reliability of

those selected factors(Liu, Kuang, Gong, & Hou, 2003). The ordinal variables can help the

followed logical analytical method to identify factors explaining the pattern of correlations

within a set of observed variables, also factor analysis can reduce constructs represented by

broad variables to manageable dimensions (Onyango①a et al., 2015). In this study, we select

18 ordinal variables about the consumers' grocery shopping location and frequency, their organic consumption categories and frequency, and the qualities they valued when doing their grocery. Five major components, named after "Organic Driven", "Direct Market Driven", "Food Quality Driven", "Local Driven", and"Price Driven" were extracted from the selected 18 variables with 59.8% total variables explained.

Clustering method remains the most popular and most widely used method for multivariate survey information(Onyango①a et al., 2015). A k-means cluster analysis by SPSS 24.0 was conducted, to identify clusters of respondents with similar motivations for organic foods consumption pattern. ANOVA tests were applied to examine the inter-cluster heterogeneity. Four clusters were identified and labeled as: "Food quality follower", "Thrifty domestic consumer", "Direct channel buyer", and "Organic supporter".

Finally, a multinomial logistic regression analysis was carried out on the four clusters identified in the PCA and clustering to investigate the relationship between organic foods consumers' purchasing pattern and the socioeconomic attributes of them. Multinomial logistic regression is a classification method which generalizes logistic regression to multiclass problems(Onyango①a et al., 2015). It is a model which given a set of independent variables, could predict probabilities of the different possible outcomes of a categorically distributed dependent variable(2012).

The dependent variables in the regression analysis are the cluster obtaining from PCA and Cluster Analysis. Results on significant factors impacting the four dimensions on organic product consumption are summarized in a later section. We chose the logit regression method because we wanted to investigate how each independent variable affects the probability of a consumer's segmentation. Also, we wanted to use this model to predict the likelihood of one respondent to be recognized as one group's member given its attributes. Additionally, considering most of our

independent variables are categorical data, at least one classification for them has been

dropped to avoid collinearity.

Results

Organic processed food

Participant profile

Among the 1,100 respondents who met the criteria and completed the survey, 21.5% never

purchased processed organic foods (Table 1). Meanwhile, 78.5% of the respondents are organic

processed food buyers (Table 1). Among the 863 organic processed food buyers, 301

respondents are recognized as high-frequency buyers, purchasing organic processed food 3-4

times per month or more, which counted as 27.4% of the total respondents (Table 1). Nearly

60% of the total respondents stated they would like to buy organic juice/sauce, followed by

organic sliced fruits vegetables, organic Dried/chips fruits vegetables, organic

Jam/jelly/marmalade that have a similar count of observation (Table 2). Organic chutney/pickles

and organic wine are ranking at the bottom of the list with about 20% count from the total

respondents, and there is also nearly 20% of the respondents do not want to choose any of such

processed organic products (Table 2), similar to the percentage of respondents who never

purchase organic processed food.

Table 1 Organic Processed Food Purchasing Frequency

	Frequency	Percentage
Organic processed food purchase frequency		
Never	237	21.5%
organic processed food buyers	*863*	*78.5%*
Rarely (1 or 2 times/year)	218	19.8%
Sometimes (1 time/month)	344	31.3%
Frequent organic processed food buyers	*301*	*27.4%*
Often (3-4 times/month)	237	21.6%
Regularly (more than 1 time/week)	64	5.8%
Total	1100	100.0%

Table 2 Processed Organic Fruits and Vegetables Food That Respondents Would Like To Buy

	Frequency	Percentage
Juice/sauce	657	59.7%
Sliced fruits vegetables	509	46.3%
Dried/chips fruits vegetables	424	38.6%
Jam/jelly/marmalade	420	38.2%
Chutney/pickles	241	21.9%
Wine	229	20.8%
None of them	197	17.9%

From the demographic profile (Table 3) we can determine that respondents who live in suburban communities accounted for more than 50% of the organic processed food buyers. Comparable results were found for the high-frequency buyers. Female consumers are about three times more likely than male consumers to become organic processed food buyers and also more frequent organic processed food buyers.

The respondents who received higher education (2-year College or higher-level education) are the most participants (82.6%) of purchasing organic processed food. when we look at each category, the respondents who receive 4-year college education are nearly 40% of the observations. Comparable results were found for the high-frequency buyers.

The respondents whose household annual income before tax falls below $80,000 account for a larger portion (55.4%) of organic processed food purchasers compared to high-income respondents. On the contrary, in the case of high-frequency buyers, the respondents whose household annual income before tax falls below $80,000 account for a smaller portion (47.1%) of organic processed food purchasers compared to high-income respondents.

The residents from New York accounted for more than 40% of organic processed food buyers, followed by Pennsylvania, New Jersey, and Maryland residents. Delaware residents have the lowest counts. When we look at high-frequency buyers, the results are much different. Residents from Maryland share the least portion, instead, residents from Delaware account for about 15% of the total high-frequency buyers.

The younger generation and middle age respondents account for more than 70% of processed food buyers. Meanwhile, the elder population accounts for nearly 30% of processed food buyers. Also, the respondents whose age is between 18-56 years old, account for 75% of high-frequency buyers.

Caucasian respondents hold the biggest share of organic processed food buyers (81.9%). The respondents with African American background, Hispanic/Latino background, and Asian background are also sharing similar portion together. The respondents with Caucasian background share a relatively large portion of high-frequency buyers (75%), compared to other ethnicities.

The respondents who are employed by others account for the largest portion of both organic processed food buyers and high-frequency buyers (50%). Farmers have the least count of observations. Retired respondents, self-employed respondents, and homemakers share similar portions in both the types of buyers.

Table 3 Organic Processed Food Buyers' Profile

	Purchase organic processed food (n=863)		Purchase organic processed food in high frequency (n=301)	
	Frequency	Percentage	Frequency	Percentage
Living community				

Urban	239	27.7%	92	30.6%
Suburban	484	56.1%	164	54.5%
Rural	140	16.2%	45	15.0%
Gender				
Female	647	75.0%	227	75.4%
Male	216	25.0%	74	24.6%
Education				
Up to highs cool	150	17.4%	50	16.6%
Higher education	*711*	*82.6%*	*250*	*83.1%*
2 year college	161	18.7%	63	20.9%
4 year college	340	39.5%	119	39.5%
Graduate degree	210	24.4%	68	22.6%
Household annual income before tax				
<$20,000	53	6.1%	21	7.0%
$20,000-$39,999	124	14.4%	39	13.0%
$40,000-$59,999	141	16.3%	46	15.3%
$60,000-$79,999	160	18.5%	53	17.6%
High household annual income before tax	*385*	*44.6%*	*159*	*52.8%*
$80,000-$99,999	118	13.7%	47	15.6%
$100,000-$249,999	232	26.9%	84	27.9%
>$250000	35	4.1%	11	3.7%
Primary residence				
New Jersey	145	16.8%	49	16.3%
New York	361	41.8%	128	42.5%
Pennsylvania	232	26.9%	78	25.9%
Maryland	111	12.9%	2	0.7%

	Purchase organic processed food (n=863)		Purchase organic processed food in high frequency (n=301)	
	Frequency	Percentage	Frequency	Percentage
Delaware	14	1.6%	44	14.6%
Age				
Young (18-37)	307	35.6%	129	42.9%
Middle age (37-56)	299	34.6%	98	32.6%
Elder (57-89)	257	29.8%	74	24.6%
Ethnicity				
White	707	81.9%	227	75.4%
African American	45	5.2%	24	8.0%
Hispanic/Latino	45	5.2%	24	8.0%
American Indian and Alaska native	3	0.3%	2	0.7%
Asian	56	6.5%	21	7.0%
Others	7	0.8%	3	1.0%
Primary occupation				
Retired	157	18.2%	45	15.0%
Self-employed	99	11.5%	34	11.3%
Employed by others	422	48.9%	152	50.5%
Homemaker	122	14.1%	41	13.6%
Farmers	1	0.1%	1	0.3%
Others occupation	62	7.2%	28	9.3%

The buyers' purchasing habits also influence the participants to consume organic processed food (Table 4):

More than 50% of organic processed food buyers would like to look for organic options when eating at restaurants. The percentage goes higher to 70.1% among frequent organic processed food buyers.

Nearly all the organic processed food buyers and high-frequency buyers confirm that, in the grocery store where they most often purchase agricultural products, organic products are available.

The respondents who would like to switch supermarkets, to be able to purchase organic products accounted for more than 70% of organic processed food buyers and 85% of frequent organic processed food buyers.

We asked the respondents if, under a normal circumstance, their favorite fresh fruit or vegetable costs $1 per pound, how much more they are willing to pay for organically certified produce. Twenty-seven percent of organic processed food buyers would like to pay over 20 cents, followed by 6-10 cents and 1-5 cents. The rank order is very similar among frequent organic processed food buyers, but the portions are different. More than 35% of the buyers would like to pay over 20 cents premium, which is higher than organic processed food buyers.

Among organic processed food buyers, the respondents who, on an average month, go to the supermarket more than 3 times to buy agricultural products account for the largest portion. The respondents who go to community farmers markets more than 3 times account for about 25% share. The share goes higher among the frequent organic processed food buyers.

Table 4 Organic Food Buyers' Purchasing Habits

	Purchase organic processed food (n=863)		Purchase organic processed food in high frequency (n=301)	
	Frequency	Percentage	Frequency	Percentage
Looking for organic options in restaurant	484	56.1%	211	70.1%
Organic produce available from the store that most often purchases groceries	834	96.6%	298	99.0%
Switch supermarkets to purchase organic product	619	71.7%	255	84.7%
Premium price (fresh fruit or vegetable costs $1 per pound, how slightly more for organic certified produce)				
No	34	3.9%	8	2.7%
1-5 cents	163	18.9%	50	16.6%
6-10 cents	184	21.3%	54	17.9%
11-15 cents	130	15.1%	38	12.6%
16-20 cents	119	13.8%	43	14.3%
Over 20 cents	233	27.0%	108	35.9%
Purchase frequency per month and location				
More than 3 times at supermarkets	580	67.2%	207	68.8%
More than 3 times at online purchase	56	6.5%	32	10.6%
More than 3 times at farm direct market	130	15.1%	69	22.9%

	Purchase organic processed food (n=863)		Purchase organic processed food in high frequency (n=301)	
	Frequency	Percentage	Frequency	Percentage
More than 3 times at community farmers market	219	25.4%	91	30.2%
More than 3 times at community supported agriculture	120	13.9%	51	16.9%

The respondents' awareness of organic foods also influences the purchasing patterns of organic processes food (Table 5):

For both organic processed food buyers and high-frequency buyers, the Internet is the most common resource for them to access organic product information. Followed by TV/news/radio and Relatives/friends.

The interesting fact is, only about one-fifth of organic processed food buyer believe organic fruits and vegetables offer more variety, compare to conventionally grown products. Nearly 90% of them believe organic products have a higher price. The same attitude can be observed among frequent organic processed food buyers. About 30% of them believe organic fruits and vegetables have more variety, compare to conventionally grown products. Also, nearly 90% of them admit organic products have a higher price.

More than 70% of the organic processed food buyers believe they buy organic products for health reason. More than 80% of frequent organic processed food consumers are also with the same belief.

Nearly all organic processed food buyers and frequent buyers believe residues from pesticides or herbicides are a hazard to human health and environmental sustainability. But, there is a higher portion of people with the opinion that such residues are a serious hazard among frequent buyers. People considering such residue only as somewhat of a hazard make up a greater portion of processed organic food buyers.

Table 5 Awareness of Organic Foods

	Purchase organic processed food (n=863)		Purchase organic processed food in high frequency (n=301)	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Where to get information about organic produce				
TV/news/radio	457	53.0%	166	55.1%
Internet	682	79.0%	262	87.0%
Relatives/friends	384	44.5%	148	49.2%
Universities/extension specialists	142	16.5%	63	20.9%
None	64	7.4%	13	4.3%
Organically grown fruits and vegetables compared to conventionally grown produce in supermarkets and other retail facilities				
More variety	186	21.6%	93	30.9%
Higher price	773	89.6%	267	88.7%
Buy organic fruits and vegetables for health reasons	623	72.2%	251	83.4%
How to feel about residues from pesticides or herbicides				
Serious hazard	595	68.9%	218	72.4%

	Purchase organic processed food (n=863)		Purchase organic processed food in high frequency (n=301)	
	Frequency	Percentage	Frequency	Percentage
Somewhat hazard	263	30.5%	79	26.2%
Not a hazard at all	5	0.6%	4	1.3%

Organic processed food purchasing likelihood

After reviewing the factors that influence consumers' decision to purchase organic processed food, we selected the explanatory variables for the two logistic regression models. Some variables were combined to capture the interaction impacts. The variables in the two models are similar so that the characteristics between organic processed food buyers and frequent buyers can be compared. While running the regression, to maintain a high prediction correct, and to achieve more significant variables at the same time, we ended up with a slight difference between the two models. Concepts such as error due to the omission of relevant variables and inclusion of irrelevant variables were kept in mind while selecting variable for each of the two models. For example, the variable "JUICE_SAUCE" was absent the organic processed model, whereas, it was introduced in the frequent organic processed food buyer model.

The two logit regression models are:

1. PROC model

Logit (PROC) $=\ln\left(\frac{P_{PROC}}{1-P_{PROC}}\right)$

$=\alpha+\beta_1 RESTAURANT+\beta_2 HAZARD\_SE+\beta_3 HAZARD\_SW+\beta_4 INTERNET$

$+\beta_5 SUPMKFQ+\beta_6 ONLINE\_OVER3+\beta_7 FM\_OVER3+\beta_8 CSA\_OVER3+\beta_9 AVAILABI$

$LITY +\beta_{10} SWTICH +\beta_{11} OG\_HEALTH +\beta_{12} PREMIUM1 +\beta_{13} PREMIUMH$

$+\beta_{14} PRICE +\beta_{15} URBAN +\beta_{16} SUBURBAN +\beta_{17} GENDER +\beta_{18} HIGHEDU$

$$+\beta_{19}\text{SELF\_EMP} +\beta_{20}\text{EMPLOYED} +\beta_{21}\text{WHITE} +\beta_{22}\text{AFRICAN} +\beta_{23}\text{FSIZE}$$

$$+\beta_{24}\text{NEW\_JERSEY} +\beta_{25}\text{NEW\_YORK} +\beta_{26}\text{PENN} +\beta_{27}\text{DELAWARE} +\beta_{28}\text{ELDER}$$

$$+\beta_{29}\text{AFRI\_EDU} +\beta_{30}\text{AFRI\_INC} +\mu$$

2. HFPROC model

Logit (HFPROC) $=\ln\left(\frac{P_{HFPROC}}{1-P_{HFPROC}}\right)$

$=\alpha+\beta_1\text{RESTAURANT}+\beta_2\text{HAZARD\_SE}+\beta_3\text{HAZARD\_SW}+\beta_4\text{INTERNET}+\beta_5\text{SUP}$

$\text{MKFQ}+\beta_6\text{ONLINE\_OVER3}+\beta_7\text{FM\_OVER3}+\beta_8\text{DIRECT\_OVER3}+\beta_9\text{AVAILABILI}$

$\text{TY}+\beta_{10}\text{SWTICH}+\beta_{11}\text{OG\_HEALTH}+\beta_{12}\text{PREMIUMH}+\beta_{13}\text{VARIETY}$

$+\beta_{14}\text{JUICE\_SAUCE}+\beta_{15}\text{URBAN}+\beta_{16}\text{SUBURBAN}+\beta_{17}\text{GENDER}$

$+\beta_{18}\text{HIGHSCHOOL}+\beta_{19}\text{2\_COLLEGE}+\beta_{20}\text{SELF\_EMP}+\beta_{21}\text{EMPLOYED}$

$+\beta_{22}\text{WHITE}+\beta_{23}\text{AFRICAN}+\beta_{24}\text{INCOME\_2}+\beta_{25}\text{INCOME2\_4}+\beta_{26}$

$\text{FSIZE}+\beta_{27}\text{NEW\_JERSEY}+\beta_{28}\text{NEW\_YORK}+\beta_{29}\text{PENN}+\beta_{30}\text{DELAWARE}$

$+\beta_{31}\text{ELDER}+\beta_{32}\text{ELD*INCOME2\_4}+\beta_{33}\text{HS*INCOME2\_4}+\beta_{34}$

$\text{CL*INCOME\_2}+\mu$

Lists of all dependent variables and independent variables and explanations for the two models are provided below (Table 6).

Table 6 Descriptive Statistics of Dependent and Independent Variables

Variable		N	Mean	Std. Deviation
Dependent variable				
PROC	1= the respondent has purchased processed organic food, 0= otherwise	1100	0.78	0.41

Organic Food Buyers' Purchasing Habits

RESTAURANT	1= look for organic options in restaurants, 0= otherwise	1100	0.51	0.50
SUPMKFQ	1= in an average month, over 9 times buy agricultural produce at supermarkets, 0= otherwise	1100	0.14	0.35
ONLINE_OVER3	1= in an average month, equal and over 4 times buy agricultural produce at online purchase, 0= otherwise	1100	0.05	0.23
FM_OVER3	1= in an average month, equal and over 4 times buy agricultural produce at community farmers market, 0= otherwise	1100	0.24	0.43
CSA_OVER3	1= in an average month, equal and over 4 times buy agricultural produce at community supported agriculture, 0= otherwise	1100	0.12	0.33
AVAILABILITY	1= organic produce available from the store that most often purchase groceries, 0= otherwise	1100	0.96	0.19
SWITCH	1= switch supermarkets to purchase organic product, 0= otherwise	1100	0.66	0.47
PREMIUM1	1= pay 1-15 cents more for organic certified products, 0= otherwise	1100	0.56	0.50
PREMIUMH	1= pay over 16 cents more for organic certified products, 0= otherwise	1100	0.38	0.49

Awareness of Organic Foods

INTERNET	1= get information about organic products from internet, 0= otherwise	1100	0.68	0.43
HAZARD_SE	1= think residues from pesticides or Hebrides is a serious hazard, 0= otherwise	1100	0.31	0.47
HAZARD_SW	1= think residues from pesticides or Hebrides is somewhat a hazard, 0= otherwise	1100	0.75	0.46

		N	Mean	Std. Deviation
OG_HEALTH	1= buy organic fruits and vegetables for health reasons, 0= otherwise	1100	0.69	0.46
PRICE	1= organically grown fruits and vegetables have higher price to conventionally grown products, 0= otherwise	1100	0.91	0.39
Variable		**N**	**Mean**	**Std. Deviation**
Demographic profile				
URBAN	1= the respondent is from urban community, 0= otherwise	1100	0.26	0.44
SUBURBAN	1= the respondent is from suburban community, 0= otherwise	1100	0.57	0.50
GENDER	1= the respondent is male, 0= otherwise	1100	0.25	0.43
HIGHEDU	1= the respondents have 2 year college education or above, 0= otherwise	1100	0.80	0.40
SELF_EMP	1= the respondent is self-employed, 0= otherwise	1100	0.12	0.32
EMPLOYED	1= the respondent is employed by others, 0= otherwise	1100	0.48	0.50
WHITE	1= the respondent is White, 0= otherwise	1100	0.83	0.38
AFRICAN	1= the respondent is African American, 0= otherwise	1100	0.05	0.23
INCOME	1= the annual income of the household before taxes is $80K or above, 0= otherwise	1100	0.46	0.50
FSIZE	1= number of persons in the household is 3 or more than 3, 0= otherwise	1100	0.46	0.50
NEW_JERSEY	1= the respondent is a resident of New Jersey state, 0= otherwise	1100	0.18	0.39
NEW_YORK	1= the respondent is a resident of New York state, 0= otherwise	1100	0.41	0.49
PENN	1= the respondent is a resident of Pennsylvania state, 0= otherwise	1100	0.26	0.44

Variable		N	Mean	Std. Deviation
DELAWARE	1= the respondent is a resident of Delaware state, 0= otherwise	1100	0.02	0.14
ELDER	1= the respondent's age is between 57-89, 0= otherwise	1100	0.34	0.47
Interaction terms				
AFRI_EDU	1= the respondent is African American and has 2 year college education or above, 0= otherwise	1100	0.04	0.20
AFRI_INC	1= the respondent is African American and household annual income before taxes is $80K or above, 0= otherwise	1100	0.02	0.14
Dependent variable				
HFPROC	1= the respondent has purchased processed organic food equal or more than 3-4 times per month, 0= otherwise	1100	0.27	0.45
Organic Food Buyers' Purchasing Habits				
RESTAURANT	1= look for organic options in restaurants, 0= otherwise	1100	0.51	0.50
SUPMKFQ	1= in an average month, over 9 times buy agricultural produce at supermarkets, 0= otherwise	1100	0.14	0.35
ONLINE_OVER3	1= in an average month, more than 3 times buy agricultural produce at online purchase, 0= otherwise	1100	0.05	0.23
FM_OVER3	1= in an average month, more than 3 times buy agricultural produce at community farmers market, 0= otherwise	1100	0.24	0.43

		N	Mean	Std. Deviation
DIRECT_OVER3	1= in an average month, more than 3 times buy agricultural produce at direct market at the farm, 0= otherwise	1100	0.14	0.34
Variable		**N**	**Mean**	**Std. Deviation**
AVAILABILITY	1= organic produce available from the store that most often purchase groceries, 0= otherwise	1100	0.96	0.19
SWITCH	1= switch supermarkets to purchase organic product, 0= otherwise	1100	0.66	0.47
PREMIUMH	1= pay over 16 cents more for organic certified products, 0= otherwise	1100	0.38	0.49
JUICE_SAUCE	1= like to buy organic juice/sauce, 0= otherwise	1100	0.60	0.49
Awareness of Organic Foods				
INTERNET	1= get information about organic products from internet, 0= otherwise	1100	0.75	0.43
HAZARD_SE	1= think residues from pesticides or Hebrides is a serious hazard, 0= otherwise	1100	0.68	0.47
HAZARD_SW	1= think residues from pesticides or Hebrides is somewhat a hazard, 0= otherwise	1100	0.31	0.46
OG_HEALTH	1= buy organic fruits and vegetables for health reasons, 0= otherwise	1100	0.69	0.46
VARIETY	1= organically grown fruits and vegetables have more variety compared to conventionally grown products, 0= otherwise	1100	0.19	0.29
Demographic profile				
URBAN	1= the respondent is from urban community, 0= otherwise	1100	0.26	0.44
SUBURBAN	1= the respondent is from suburban community, 0= otherwise	1100	0.57	0.50
GENDER	1= the respondent is male, 0= otherwise	1100	0.25	0.43

Variable		N	Mean	Std. Deviation
HIGHSCHOOL	1= the respondents have high school education, 0= otherwise	1100	0.20	0.40
2_COLLEGE	1= the respondents have 2 year college education, 0= otherwise	1100	0.17	0.38
SELF_EMP	1= the respondent is self-employed, 0= otherwise	1100	0.12	0.32
EMPLOYED	1= the respondent is employed by others, 0= otherwise	1100	0.48	0.50
WHITE	1= the respondent is White, 0= otherwise	1100	0.83	0.38
AFRICAN	1= the respondent is African American, 0= otherwise	1100	0.05	0.23
INCOME_2	1= the annual income of the household before taxes is less than $20K, 0= otherwise	1100	0.06	0.23
FSIZE	1= number of persons in the household is 3 or more than 3, 0= otherwise	1100	0.46	0.50
NEW_JERSEY	1= the respondent is a resident of New Jersey state, 0= otherwise	1100	0.18	0.39
NEW_YORK	1= the respondent is a resident of New York state, 0= otherwise	1100	0.41	0.49
PENN	1= the respondent is a resident of Pennsylvania state, 0= otherwise	1100	0.26	0.44
DELAWARE	1= the respondent is a resident of Delaware state, 0= otherwise	1100	0.02	0.14
ELDER	1= the respondent's age is between 57-89, 0= otherwise	1100	0.34	0.47
Interaction terms				
ELD*INCOME2_4	1= the respondent is between 57-89 and household before taxes is less than $20K, 0= otherwise	1100	0.05	0.23

Variable		N	Mean	Std. Deviation
HS*INCOME2_4	1= the respondent has high school education and household annual income before taxes is between or $20K-$40K, 0= otherwise	1100	0.05	0.22
CL*INCOME_2	1= the respondent has 2 year college education and household annual income before taxes is less than $20K, 0= otherwise	1100	0.01	0.17

The two logistic regressions used all the 1,100 samples during its estimation. The PROC model has an overall 80% correct prediction rate. Among the 30 independent variables, 5 of them are significant at the 10% level, 13 of them are significant at the 5% level, and 2 of them are significant at the 1% level, total 20 significant variables at or above 10% significant level. The HFPROC model has an overall 76% correct prediction rate. Among the 32 independent variables, 5 of them are significant at the 10% level, 11 of them are significant at the 5% level, and 6 of them are significant at the 1% level, total 22 significant variables at or above 10% significant level. Two tables on predictive accuracy were provided in Table 7 and Table 8. And coefficient estimations are listed in Table 9 and Table 10.

Table 7 Logistic Regression Table of Correct Prediction for PROC model

Actual Value	Predicted Value		Total
	0	1	
0	52 (4.7%)	185 (16.8%)	237 (21.5%)
1	31 (2.8%)	832 (75.6%)	863 (78.5%)
Total	83 (7.5%)	1017(92.5%)	1100 (100%)

Table 8 Logistic Regression Table of Correct Prediction for HFPROC model

Actual Value	Predicted Value		Total
	0.0000	1.0000	
0	732 (66.50%)	67 (6.1%)	799 (72.6%)
1	193 (17.5%)	108(9.8%)	301 (27.4%)
Total	923 (84.1%)	175 (15.9%)	1100 (100%)

Table 9 Logistic Regression Coefficient Estimations for RPOC model

Variable	Coefficient	S.E.	Marginal
Organic Food Buyers' Purchasing Habits			
RESTAURANT	0.5847	0.190	**0.0519***
SUPMKFQ	0.2196	0.245	0.0052
ONLINE_OVER3	0.6363	0.558	0.0050
FM_OVER3	-0.3074	0.221	-0.0135
CSA_OVER3	0.6847	0.350	**0.0122***
AVAILABILITY	0.4226	0.397	0.0803
SWTICH	0.4665	0.194	**0.0567****
PREMIUM1	0.6004	0.319	**0.0607***
PREMIUMH	0.7818	0.353	**0.0489****
Awareness of Organic Foods			
INTERNET	0.3947	0.185	**0.0553****
HAZARD_SE	1.5681	0.806	**0.2207***
HAZARD_SW	1.6456	0.811	**0.074****
OG_HEALTH	0.2226	0.180	0.0607
PRICE	-0.8708	0.345	-0.1089
Demographic profile			
URBAN	0.5077	0.274	**0.0215***

Variable	Coefficient	S.E.	Marginal
SUBURBAN	0.2775	0.224	0.0280
GENDER	0.1582	0.196	0.0066
HIGHEDU	0.5683	0.208	**0.0887***
SELF_EMP	-0.4838	0.279	**-0.011**
EMPLOYED	-0.3917	0.196	**-0.0332**
WHITE	-0.0288	0.286	-0.0041
AFRICAN	-1.6751	0.700	**-0.0229**
INCOME	-0.4144	0.182	**-0.0335**
FSIZE	0.4365	0.188	**0.0351**
NEW_JERSEY	-0.6461	0.301	**-0.0237**
NEW_YORK	-0.3313	0.283	-0.0241
PENN	-0.3208	0.298	-0.0156
DELAWARE	-1.2932	0.541	**-0.006**
ELDER	-0.4985	0.203	**-0.031**
Interaction terms			
AFRI_EDU	1.8623	0.920	**0.0079**
AFRI_INC	-0.912	0.867	-0.0041

*** Significant in 0.01 level

**Significant in 0.05 level

* Significant in 0.1 level

Table 10 Logistic Regression Coefficient Estimations for HFRPOC model

Variable	Coefficient	S.E.	Marginal
Organic Food Buyers' purchasing Habits			
RESTAURANT	0.3818	0.1779	**0.1527**
SUPMKFQ	0.5548	0.2182	**0.0695**
ONLINE_OVER3	0.7279	0.3237	**0.0372**
FM_OVER3	-0.4135	0.2091	**-0.0735**
DIRECT_OVER3	0.7037	0.244	**0.0871***

Variable	Coefficient	S.E.	Marginal
AVAILABILITY	1.6097	0.6663	**0.7649****
SWITCH	0.5111	0.2167	**0.2553****
PREMIUMH	0.327	0.1626	**0.1005****
JUICE_SAUCE	0.9798	0.1844	**0.439*****
Awareness of Organic Foods			
INTERNET	0.591	0.2188	**0.3221*****
HAZARD_SE	-1.4226	0.844	**-0.8715***
HAZARD_SW	-1.4317	0.8482	**-0.3003***
OG_HEALTH	0.7538	0.1982	**0.3779*****
VARIETY	0.6594	0.19	**0.1119*****
Demographic profile			
URBAN	0.1699	0.2639	0.0361
SUBURBAN	0.1099	0.2285	0.0493
GENDER	-0.2122	0.1884	-0.0400
HIGHSCHOOL	0.1248	0.2412	0.0199
COLLEGE_2	0.141	0.2171	0.0196
SELF_EMP	-0.2641	0.2719	-0.0227
EMPLOYED	-0.0352	0.1877	-0.0135
WHITE	-0.4093	0.2348	**-0.2888***
AFRICAN	0.1514	0.3766	0.0068
INCOME_2	-0.1252	0.3927	-0.0056
INCOME2_4	0.8344	0.3187	**0.1108*****
FSIZE	0.1223	0.1763	0.0450
NEW_JERSEY	-0.4907	0.2851	**-0.0654***
NEW_YORK	-0.4532	0.2509	**-0.1431***
PENN	-0.3867	0.2596	-0.0768
DELAWARE	-1.6497	0.8052	**-0.0150****
ELDER	0.1509	0.2187	0.0409

Variable	Coefficient	S.E.	Marginal
Interaction terms			
ELD*INCOME2_4	-1.9959	0.5882	**-0.0485***
HS*INCOME2_4	-1.4101	0.5577	**-0.0374**
CL*INCOME_2	1.5637	0.7323	**0.0228**

*** Significant in 0.01 level

**Significant in 0.05 level

* Significant in 0.1 level

The results indicate that in both the organic processed food buyer (PROC model) and frequent organic processed food buyer (HFPROC model) model. The explanatory variables significantly contribute to the change in the dependent variable. However, the models indicate that the demographic variables did not have much explanatory power compared to organic food buyers' purchasing habits variables, and awareness of organic foods variables. Most of the interaction terms were significant in both the models.

The results indicate that organic food buyers' purchasing habits variables had more significant variables in the HFPROC model than PROC model. The respondents who look for organic options in restaurants are 5.2% more likely to purchase processed organic foods and 15.3% more likely to be frequent processed organic foods buyer, compared to those who do not look for organic options in restaurants. The respondents who switch supermarkets to purchase the organic product are 5.7% more likely to purchase processed organic foods and 25.5% more likely to be frequent processed organic foods buyer, compared to those who do not switch supermarket for organic products.

The respondents who pay 1-15 cents more for organic certified products are 6.1% more likely to purchase processed organic foods, meanwhile, those who pay above 16 cents premium price are 4.9% more likely than the respondents who do not like to pay any premium for organic certified products. The respondents who pay 16 cents or more for organic certified products are 10.1% more likely to be a frequent buyer of organic processed food, compared to those who pay less than 16 cents premium price.

In the PROC model, among agricultural product consumption habits, there is one significant variable out of 4, on the other hand, HFPROC model has all the 4 variables significant. The respondents who buy agricultural produce at supermarkets over 9 times per month are 6.7% more likely to be frequent processed organic foods buyer, compare to those who purchase agricultural produce less than 9 times per month at supermarkets. The respondents who buy agricultural produce over 3 times per month through online purchases are 3.7% more likely to be frequent processed organic foods buyer, compared to those who purchase agricultural produce 3 times or less per month through online purchase. The respondents who buy agricultural produce over 3 times per month from local farmers markets are 7.4% more likely to be frequent processed organic foods buyer, compare to those who purchase agricultural produce 3 times or less per month from local farmers markets. The respondents who buy agricultural produce from the farm-direct market over 3 times per month are 8.7% more likely to be frequent processed organic foods buyer, compared to those who purchase agricultural produce from farm-direct market 3 times or less per month. The only purchase frequency and location variable that is significant in the PROC model is the respondents who buy agricultural produce from community supported agriculture over 3 times per month. These respondents are 1.2 % more likely to be a processed organic foods buyer when compared to those who purchase agricultural produce from community supported agriculture 3 times or less per month.

Availability variable is significant only in HFPROC model, indicating those who think that organic products are available from their most often visited grocery stores are 76.5% more likely to purchase organic processed food in high frequency compared to those who think otherwise. The respondents who consume organic juice and sauce are 44% more likely to be high-frequency organic processed food buyers, compared to those who consume other organic processed food.

In terms of the respondents' awareness of organic foods, most variables are significant in both the models. The respondents who get organic product information from the Internet are 5.5% more likely to become an organic processed food' consumer and 32.2% more likely to be a frequent organic processed food buyer, compared to those who get organic product information from other channels such as TV/news/radio, friends, and newspapers. The respondents who think residues from pesticides or herbicides are a serious hazard are 22.1% more likely to be an organic processed food' consumer than those do not recognize such residue as a hazard. Those who think pesticides or herbicides are somewhat a hazard are 7.4% more likely to consume organic processed food. However, the results are different in the HFPROC model. The respondents who think residues from pesticides or herbicides is a serious hazard is 87.2% less likely to become a frequent organic processed food' consumer compared to those do not recognize such residue as a hazard. Those who think pesticides or herbicides are somewhat a hazard is also 30% less likely to consume organic processed food in high frequency.

The respondents who purchase organic products for health reasons are 37.8% more likely to become a frequent organic processed food' consumer compared to those who do not purchase organic products due to health reasons.

The respondents who believe organically grown fruits and vegetables are priced higher compared to conventionally grown products are 10.9% less likely to consume organic processed food compare those believe otherwise.

Those who believe a larger variety of organically grown fruits and vegetables are available compared to conventionally grown products are 11.2% more likely to be a frequent organic processed food consumer compared to those who think otherwise.

There is number of demographic variables are significant in the PROC model compared to the HFPROC model. Demographic variables included in both the models were the community, gender, education level, primary occupation, ethnicity, family size, primary resident State, and age. To maintain a higher correct prediction rate and the number of significant variables, the demographic variables in HFPROC model were further revised while taking into account the errors due to an omission of relevant variables and inclusion of irrelevant variables. Interaction terms were added in both the models to capture the multicollinearity among demographic variables.

Compared to those who live in the rural community, urban respondents are 2.2% more likely to purchase organic processed food. The respondent who received 2-year college or higher education is 8.9% more likely to purchase processed organic foods, compared to those who only have up to high school education. Self-employed respondents are 1.1% less likely to purchase processed organic foods, and those who are employed by others are 3.3% less likely to purchase processed organic foods compared to those who are retired, homemakers, farmers, and others.

African Americans are 2.3% less likely to purchase processed organic foods compared to others. Meanwhile, respondents who are Caucasian and purchase organic food 3-4 times per month or

more are 28.9% less likely to purchase processed organic food compared to those with other backgrounds.

The respondents whose household annual income before taxes is $80K or above are 3.4% less likely to purchase processed organic foods compared to respondents whose annual household income is less than $80K. In the case of HFPROC model, respondents whose annual household income before taxes is between $20K to $40K are 11.1% more likely to purchase processed organic foods compared to those with an annual income of more than $40K.

Families with 3 or more members of the household are 3.5% more likely to purchase processed organic foods, compared to those with less than 3 members in the family.

New Jersey residents are 2.4% less likely to purchase processed organic foods compared to the respondents from Maryland. Also, respondents from New Jersey State are 6.6% less likely to purchase processed organic food at high frequency, compared to the respondents from Maryland. Delaware residents are 0.60% less likely to purchase processed organic foods compared to the respondents from Maryland. Also, they would be 1.5% less likely to purchase processed organic foods in high frequency compared to the respondents from Maryland. The respondents from New York are 14.3% less likely to purchase processed organic foods in high frequency compared to the respondents from Maryland.

Results indicate that those in the age group 57-89 are 3.1% less likely to be a processed organic foods buyer compare to those in the age group 18-56. And for interaction terms, respondents who are African American and have 2-year college or higher level of education, are 0.8% more likely to purchase processed organic foods, compare to those who are non-African American and do not have a 2-year college or higher-level education. Those in the age group of 57-89 with an annual household income before taxes of between $20K and $40K are 4.9% less likely to

purchase processed organic foods in high frequency, compare to those in the age group of less

than 57 with an annual household income before taxes of more than $40K.

The respondents who have a high school education with a household annual income before

taxes of between $20K and $40K are 3.7% less likely to be frequent organic processed food

buyers, compared to those with an education of and above high school level with an annual

household income before taxes of more than 40K.

Results indicate that the respondents with a 2-year college education and household annual

income before taxes of between $20K and 40K are 2.28% more likely to be frequent organic

processed food buyers, compared to those with above 2-year college level education and an

annual household income before taxes of greater than $40K.

Information resources

Data profile

According to the statistics, more than 75% of the respondents choose The Internet as the major

resource to receive organic product information, followed by TV/News/Radio, Relatives/Friends,

and the Universities/Extension Specialists. The Internet is also the most popular resource for the

respondents to receive food safety and nutritional information, followed by Newspaper/Articles,

TV News and Radio.

Table 11 Information resource for the respondents to get food information

	Frequency	Percentage (of total)
Where to get information about organic produce		
TV/News/Radio	554	50.4%
The Internet	827	75.2%
Relatives/Friends	464	42.2%
The Universities/Extension Specialists	169	15.4%
None	106	9.6%

	Frequency	Percentage (of total)
Where to get food safety and nutritional information		
TV News	529	48.10%
The Internet	876	79.60%
Radio	145	13.20%
Newspaper/Articles	657	59.70%
None	78	7.10%

More than half of the consumers are female from a suburban community, regardless of which resource are they getting organic produce information from. The organic consumers usually received 4-year college education or higher education, and with annual household income before tax more than $80,000. Especially, the respondents who choose TV/News/Radio as their major information source for organic produce has the largest portion of whose annual household income before tax is more than $80,000. Generally, the consumers are mostly from New York State, followed by Pennsylvania and New Jersey. More than 80% of the organic consumers are with the White background, followed by a similar sharing of Asian, American African and Hispanic/Latino. Nearly half of the respondents are employed by others, but about a quarter of the respondents who use TV/News/Radio to received organic food information are retired, much larger portion than respondents uses the other two methods.

Apparently, the respondents who were considered as the elder generation (age 57-89), are more intended to use TV/News/Radio to received organic food information. On the contrary, the respondents who were considered as the younger generation (age 18-36), are more intended to use the Internet as their approach to information. More than half of the respondents whose family have more than two members would like to get organic information

via the Internet, and the percentage is lower for respondents receive organic information from

TV/News/Radio.

Table 12 Demographic profile for organic consumers by their information source for organic produces

	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)
Living community			
Urban	27.98%	26.84%	25.22%
Suburban	58.48%	55.86%	57.97%
Rural	13.54%	17.29%	16.81%
Gender			
Female	74.55%	73.88%	79.09%
Male	25.45%	26.12%	20.91%
Education			
Up to highs cool	17.87%	18.02%	17.85%
2 year college	20.40%	17.65%	20.43%
4 year college	36.10%	41.84%	38.71%
Graduate degree	25.63%	22.49%	23.01%
Household annual income before tax			
<$20,000	5.23%	5.68%	6.03%
$20,000-$39,999	14.62%	14.15%	14.01%
$40,000-$59,999	17.15%	17.05%	17.03%
$60,000-$79,999	16.06%	18.26%	17.03%
$80,000-$99,999	13.36%	14.51%	15.09%
$100,000-$249,999	30.69%	27.45%	27.16%
>$250000	2.89%	2.90%	3.66%

	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)
Primary residence			
New Jersey	18.05%	17.65%	17.46%
New York	41.88%	40.63%	40.30%
Pennsylvania	25.45%	27.57%	28.02%
Delaware	2.17%	2.42%	2.37%
Maryland	12.45%	11.73%	11.85%
Age			
Young (18-36)	27.08%	36.76%	32.97%
Middle age (37-56)	33.94%	34.95%	33.41%
Elder (57-89)	38.99%	28.30%	33.62%
Ethnicity			
White	81.05%	80.77%	82.33%
African American	6.50%	5.93%	4.53%
Hispanic/Latino	5.05%	5.20%	5.39%
American Indian and Alaska native	0.72%	0.36%	0.22%
Asian	5.96%	6.89%	6.90%
Others	0.72%	0.85%	0.65%
Primary occupation			
Retired	24.37%	17.29%	19.40%
Self-employed	10.47%	11.85%	10.78%
Employed by others	45.67%	49.82%	48.71%
Homemaker	13.36%	14.03%	14.44%
Farmers	0.18%	0.12%	0.22%
Others occupation	5.96%	6.89%	6.47%

	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)
More than 2 persons in the household			
	45.13%	50.54%	48.92%

Generally, among the three major resources for respondents to get organic food information, about 20% of the organic consumers confirmed they were always influenced by advertisements and promotion for their grocery decision. The percentage of respondents, not always, but still usually affected by advertisements is just one-fourth of the former. On the other hand, more respondents usually check the food ingredient label when doing their grocery shopping, about half of them. Twenty percent more than the respondents who frequently check the ingredient label on foods. "Certified Organic" and "Pesticide Free" are the top two labels which respondents treat as the most influential label. But for "Relatives and Friends" learners, "Natural" is also a dominant label. For respondents to get organic information from "TV/News/Radio" and "The Internet", "Locally Grown" label is more powerful over "Natural".

Despite the information approaches, more than 80% of the total respondents shop at more than one grocery store for purchase their diet, and more than fifty percentage of the respondents look for organic options in a restaurant, though people who get organic information via their relatives and friends have a higher percentage of this option.

We can say that for people mainly approach organic information via the Internet are apparently having much higher willingness to buy organic fruits and vegetables if more readily available than the other two information resources, though almost all the respondents have organic foods access via their most often visited grocery store. Also, respondents who mainly approach

organic information via the Internet showing slightly higher willingness to buy the same quantity

of organic foods even sold for premium prices. However, when chosen for the detailed premium

price's willingness to pay, people who get organic information from their relatives and friends

have the highest willingness to pay over 10 cents per pound premium.

When doing grocery shopping, the respondents are all looking for "Fresh", "Pesticide Free" and

"Local" food, regardless of their organic food information approaches. Usually, respondents

shop at supermarket and community farmers market. People who gaining organic information

from their social network shop much less frequent at small local grocery stores, where for

respondent prefer to use public media is also a frequent shopping location.

More than 80% of the respondents purchase the organic foods that listed in the questionnaire

at least one time per year. The most frequently consumed organic foods are organic vegetables

and fruits, despite of their organic foods' information approaches. But in the case of frequent

consumed organic foods, things are different. Although almost all the consumers still purchase

organic fruits and vegetables frequently, the percentage of consumers who often purchase

organic milk/yogurt, organic meat, organic egg, and organic processed foods are much lower.

Also, the consumers who use their social network to gain organic food information, are showing

more intend to consume organic milk/yogurt and organic meat than the other two information

approaches. For the respondents who use traditional media to access to organic food

information, they have the smallest portion to frequent consume all the listed categories.

Table 13 Organic food consumers' purchasing habits by their information source for organic
produces

	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)
The frequency that advertisements influence the grocery decision			
Always	20.76%	19.83%	18.97%

Usually	5.05%	3.99%	4.53%
	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)

The frequency to check the food's ingredient label

Always	30.69%	30.11%	28.45%
Usually	47.83%	50.79%	51.51%

Shop at multiple stores for foods

	82.31%	84.40%	84.48%

Looking for organic options in restaurant

	53.61%	57.07%	59.48%

The most often visited groceries store is organic foods available

	97.11%	96.74%	96.98%

Buy organic fruits and vegetables if more readily available

	38.60%	58.80%	33.20%

Buy same quantity organic foods for premium price

	67.15%	70.98%	67.46%

Premium price (fresh fruit or vegetable costs $1 per pound, how slightly more for organic certified produce)

No premium	5.23%	4.47%	2.59%
1-5 cents	20.40%	17.65%	20.26%
6-10 cents	19.68%	20.92%	19.18%
11-15 cents	14.98%	14.51%	14.22%
16-20 cents	13.18%	13.66%	13.15%
Over 20 cents	26.53%	28.78%	30.60%

	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)
The labeling or advertising influence the decision to purchase food products			
Locally Grown	85.56%	85.01%	85.99%
Certified Organic	88.45%	89.84%	90.09%
Natural	81.23%	81.98%	86.85%
Conventional	36.64%	34.22%	35.34%
Eco-Friendly	62.64%	61.91%	65.95%
Country of Origin	71.12%	67.35%	70.47%
Pesticide Free	87.18%	86.82%	88.36%
Very important quality when purchasing grocery			
Ripeness	54.33%	51.63%	56.03%
Freshness	92.06%	89.84%	92.46%
Country where produce is grown	33.03%	30.47%	33.19%
Absence of pesticide residues	73.47%	69.77%	71.98%
Locally produced	31.23%	29.38%	30.17%
Low price	33.57%	31.44%	30.39%
Packaging	14.62%	14.27%	14.22%
	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)
Purchase frequency per month (at least once)			
Supermarkets	98.74%	98.43%	99.57%
Online purchase	17.87%	18.26%	16.81%
Small/local grocery	77.44%	75.45%	33.50%
Farm direct market	52.53%	51.03%	55.17%
Farmers market	75.81%	75.82%	79.31%
Community supported agriculture	42.06%	39.06%	42.67%

Pick your own	43.32%	43.29%	45.91%
Roadside stand	55.42%	56.35%	57.97%

	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)
Purchased organic food category (at least one time per year)			
Organic fruits	98.56%	98.67%	98.71%
Organic vegetables	98.19%	98.79%	99.14%
Organic milk/yogurt	82.49%	84.16%	85.56%
Organic meats	81.95%	84.64%	85.34%
Organic eggs	85.74%	89.24%	88.79%
Organic processed foods	82.49%	82.47%	82.76%
Purchased organic food category (at least one time per month)			
Organic fruits	92.96%	94.80%	95.26%
Organic vegetables	92.96%	95.28%	96.34%
Organic milk/yogurt	66.79%	69.04%	73.28%
Organic meats	66.43%	69.89%	72.20%
Organic eggs	69.86%	74.49%	75.00%
Organic processed foods	62.64%	63.85%	63.79%

Regardless of the consumers' information approaches, they usually believe pesticides and herbicides residue are hazardous to people's health and the environment, and around 70% of the consumers believe the hazard is serious. However, even though still more than 80% consumers, among all the three organic information approaching methods, believe food products grown in foreign countries are hazardous to people's health and the environment, not a large part of them think the hazard is serious, they are more preferring the hazard is relatively moderate.

People get organic information from their relatives and friends are the group which the consumers have the greatest feeling that eating organic fruits and vegetables would help their health. They are also the group of people who have the largest portion of organic produce preference over conventionally grown food.

Consumers show consistency for their information approaches. Although the Internet is the most popular method for the respondents to get food safety and nutritional information, we can see among the respondents who use TV/News/Radio to get organic food information, the number of respondents using newspaper and articles to learn food safety and nutritional information is larger than the respondents using the Internet. Also, within this group, the portion of respondents to use TV to receive food safety and nutritional information, are significantly higher than other groups. Other than that, for the respondents that choose the Internet as their major access to organic food information, more than 90% of them also use The Internet to get food safety and nutritional information. This percentage is greater than such respondents within the other two groups, for the respondents who use TV/News/Radio or Relatives/Friends for organic information.

Generally, a large part of the respondents has a positive opinion towards organic foods. They believe organic foods taste better than non-organic foods, they view organic agriculture as a way to support the local agricultural industry, and also, they would like to switch their often-visited supermarket to purchase organic foods. However, for the respondents who mainly use their social network to gain organic information, they have a relatively stronger and positive feeling for such a statement. On the other hand, people who use traditional media are showing a relatively weaker feeling.

The same thing happened to questions about comparisons between organic fruits and vegetables and conventional foods. Even though respondents show their recognition about organic foods have better quality, fresher and higher price. The social network learners have the strongest identification for organic foods' quality and freshness, and oppositely, they have the least concern about the price for the three groups. Traditional media learners, on the contrary, have the greatest portion of respondents who believe organic fruits and vegetables have a higher price over conventional foods.

Table 14 Awareness of Organic Foods and Food Safety

	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)
How to feel about residues from pesticides or herbicides			
Serious hazard	69.31%	67.96%	71.55%
Somewhat hazard	29.96%	31.08%	27.37%
How to feel about produce grown in foreign countries			
Serious hazard	23.65%	20.92%	20.91%
Somewhat hazard	59.39%	59.85%	61.85%
Buy organic fruits and vegetables for health	69.49%	72.67%	74.78%
Prefer organically grown produce over conventional	79.60%	80.17%	81.47%
Where to get food safety and nutritional information			
TV News	73.5%	50.1%	61.2%
The Internet	80.3%	94.9%	84.3%

Radio	22.6%	14.6%	19.2%
Newspaper/Articles	81.0%	61.7%	73.5%
	TV/News/Radio (N=554)	Internet (N=827)	Relatives/Friends (N=464)
Opinion following statements towards organic foods			
Test better than non-organics	63.90%	66.99%	68.32%
Support local agriculture	83.03%	83.07%	88.58%
Switch supermarkets to purchase	66.79%	72.91%	73.92%
Compare to conventionally grown produce, organically grown fruits and vegetables have:			
Better Quality	68.05%	71.34%	72.84%
Fresher	52.89%	53.08%	55.39%
Higher Price	91.70%	91.17%	90.73%

Organic food information approach likelihood

After reviewing the factors that have an influence on consumers' information approaches for organic foods, our selection the explanatory variables to put in the three logistic regression models. We tried to select the same or similar variable for the three separate models to compare the consumer's different characteristics among them, but when running the regression, to maintain a high prediction correction, and to achieve more significant variables at the same time, a few different variables were included.

The three logit regression models are:

1. TVNEWS model

Logit (TVNEWS) $=\ln\left(\frac{P_{\text{TVNEWS}}}{1-P_{\text{TVNEWS}}}\right)$

$= \alpha + \beta_1$ SAFETY_TV $+\beta_2$ SAFETY_INT $+\beta_3$ SAFETY_RAD $+\beta_4$ SAFETY_NEWS

$+\beta_5$ ADVERTISE $+\beta_6$ LABEL $+\beta_7$ MORELOCATION $+\beta_8$ C_ORG $+\beta_9$

L_NATURAL $+\beta_{10}$ L_ORIGIN $+\beta_{11}$ RESTURANT $+\beta_{12}$ FOREIGN_HAZARD_1

$+\beta_{13}$ FOREIGN_HAZARD_2 $+\beta_{14}$ PREFER $+\beta_{15}$ CSA_0 $+\beta_{16}$ AVAILABILITY

$+\beta_{17}$ SWITCH $+\beta_{18}$ SAMEQUAN $+\beta_{19}$ OG_HEALTH $+\beta_{20}$ PREMIUM_0 $+\beta_{21}$

QUALITY $+\beta_{22}$ HIGHPRICE $+\beta_{23}$ BUYMORE $+\beta_{24}$ OG_JUICE$+\beta_{25}$SUBURBAN

$+\beta_{26}$COLLEGE $+\beta_{27}$EMPLOYED $+\beta_{28}$WHITE $+\beta_{29}$INCOME_6 $+\beta_{30}$NJ $+\beta_{31}$NY

$+\beta_{32}$PA $+\beta_{33}$MD $+\beta_{34}$YOUNG $+\beta_{35}$MID_AGE $+\mu$

2. INTERNET model

Logit (INTERNET) $=\ln\left(\frac{P_{\text{INTERNET}}}{1-P_{\text{INTERNET}}}\right)$

$= \alpha + \beta_1$ SAFETY_TV $+\beta_2$ SAFETY_INT $+\beta_3$ SAFETY_RAD $+\beta_4$

SAFETY_NEWS $+\beta_5$ADVERTISE $+\beta_6$ LABEL $+\beta_7$ L_ECO $+\beta_8$ RESTURANT $+\beta_9$

P_HAZARD_1 $+\beta_{10}$ FMK_1_3 $+\beta_{11}$ CSA_0 $+\beta_{12}$ Q_FRESHNESS $+\beta_{13}$

SUPPORT $+\beta_{14}$ SWITCH $+\beta_{15}$ SAMEQUAN $+\beta_{16}$ OG_HEALTH $+\beta_{17}$

PREMIUM_0 $+\beta_{18}$ FRESHNESS $+\beta_{19}$ QUALITY $+ \beta_{20}$ BUYMORE $+\beta_{21}$

OG_WINE $+\beta_{22}$ OG_SLICED $+\beta_{23}$ SUBURBAN $+\beta_{24}$ GENDER $+\beta_{25}$

GRADUATE $+\beta_{26}$ EMPLOYED $+\beta_{27}$ WHITE $+\beta_{28}$ INCOME_6 $+\beta_{29}$ FSIZE

$+\beta_{30}$NJ $+\beta_{31}$NY $+\beta_{32}$PA $+\beta_{33}$MD $+\beta_{34}$YOUNG $+\beta_{35}$MID_AGE $+\mu$

3. FRIENDS model

Logit (FRIENDS) $=\ln\left(\frac{P_{\text{FRIENDS}}}{1-P_{\text{FRIENDS}}}\right)$

$$=\alpha+ \beta_1 \text{SAFETY\_TV} +\beta_2 \text{SAFETY\_INT} +\beta_3 \text{SAFETY\_RAD} +\beta_4 \text{SAFETY\_NEWS}$$

$$+\beta_5 \text{ADVERTISE} +\beta_6 \text{LABEL} +\beta_7 \text{MORELOCATION} +\beta_8 \text{L\_NATURAL} +\beta_9$$

$$\text{RESTURANT} +\beta_{10} \text{SUPERMARKET} +\beta_{11} \text{FMK\_7\_9} +\beta_{12} \text{ROADSTAND\_0}$$

$$+\beta_{13} \text{ROADSTAND\_1\_3} +\beta_{14} \text{SUPPORT} +\beta_{15} \text{OG\_FRUIT\_4} +\beta_{16} \text{OG\_VEG\_4}$$

$$+\beta_{17} \text{OG\_MILK\_3} +\beta_{18} \text{OG\_MILK\_4} +\beta_{19} \text{SAMEQUAN} +\beta_{20} \text{OG\_HEALTH}$$

$$+\beta_{21} \text{PREMIUM\_6} +\beta_{22} \text{SHELFLIFE} +\beta_{23} \text{OG\_JAM} +\beta_{24} \text{URBAN} +\beta_{25}$$

$$\text{GENDER} +\beta_{26} \text{2\_COLLEGE} +\beta_{27} \text{COLLEGE} +\beta_{28} \text{RETIRED} +\beta_{29} \text{AFRICAN\_A}$$

$$+\beta_{30}\text{NJ} +\beta_{31}\text{NY} +\beta_{32}\text{PA} +\beta_{33}\text{MD} +\beta_{34}\text{YOUNG} +\beta_{35}\text{MID\_AGE} +\mu$$

Lists of all dependent variables and independent variables and explanations for the three models are provided below.

Table 15 Descriptive Statistics of Dependent and Independent Variables

Variable		N	Mean	Std. Deviation
Dependent variable				
TVNEWS	1= get information about organic products from TV/News/Radio, 0= otherwise	1100	0.50	0.500
Independent variable				
SAFETY_TV	1=get food safety and nutritional information from TV/news, 0=otherwise	1100	0.48	0.500
SAFETY_INT	1=get food safety and nutritional information from the Internet, 0=otherwise	1100	0.81	0.403
SAFETY_RAD	1=get food safety and nutritional information from radio, 0=otherwise	1100	0.13	0.338
Variable		**N**	**Mean**	**Std. Deviation**

		N	Mean	Std. Deviation
SAFETY_NEWS	1=get food safety and nutritional information from newspaper/articles, 0=otherwise	1100	0.60	0.491
ADVERTISE	1= good advertisements usually help to decide which agricultural food items to purchase, 0=otherwise	1100	0.04	0.183
LABEL	1=usually check the food's ingredient label, 0=otherwise	1100	0.48	0.500
MORELOCATION	1=shop at more than one food store to purchase agricultural products, 0=otherwise	1100	0.82	0.390
C_ORG	1= "Certified Organic" labeling or advertising influence the decision to purchase food products, 0=otherwise	1100	0.89	0.338
L_NATURAL	1= "Natural" labeling or advertising influence the decision to purchase food products, 0=otherwise	1100	0.81	0.396
L_ORIGIN	1= "Country of origin" labeling or advertising influence the decision to purchase food products, 0=otherwise	1100	0.67	0.477
RESTURANT	1= look for organic options in restaurants, 0= otherwise	1100	0.55	0.500
FOREIGN_HAZARD_1	1= think produce grown in foreign countries is a serious hazard, 0= otherwise	1100	0.21	0.406
FOREIGN_HAZARD_2	1= think produce grown in foreign countries is a somewhat hazard, 0= otherwise	1100	0.61	0.490
PREFER	1=prefer organically grown produce more than conventionally grown, 0= otherwise	959	0.87	0.340
Variable		**N**	**Mean**	**Std. Deviation**

CSA_0	1=never purchase agricultural products from community supported agriculture, 0=otherwise	1100	0.63	0.484
AVAILABILITY	1= organic produce available from the store that most often purchase groceries, 0= otherwise	1100	0.96	0.190
SWITCH	1= switch supermarkets to purchase organic product, 0= otherwise	1100	0.66	0.470
SAMEQUAN	1= Buy same quantity organic foods for premium price, 0=otherwise	1100	0.68	0.466
OG_HEALTH	1= buy organic fruits and vegetables for health reasons, 0= otherwise	1100	0.69	0.463
PREMIUM_0	1= favorite fresh fruit or vegetable normally costs $1 per pound, would like to pay no more for organic certified produce, 0=otherwise	1100	0.06	0.232
QUALITY	1= organically grown fruits and vegetables have better quality than conventionally grown produce in Supermarkets and other retail facilities, 0=otherwise	1100	0.68	0.468
HIGHPRICE	1= believe organically grown fruits and vegetables have higher price than conventionally grown produce in Supermarkets and other retail facilities, 0=otherwise	1100	0.91	0.290
BUYMORE	1= buy organic fruits and vegetables if more readily available, 0= otherwise	1100	0.74	0.441
OG_JUICE	1= purchase organic juice, 0=otherwise	1100	0.50	0.500
SUBURBAN	1= the respondent is from suburban community, 0= otherwise	1100	0.57	0.500
COLLEGE	1= the highest education level is 4 year college, 0=otherwise	1100	0.40	0.490

Variable		N	Mean	Std. Deviation
EMPLOYED	1= the respondent is employed by others, 0= otherwise	1100	0.42	0.500
WHITE	1= the respondent is White, 0= otherwise	1100	0.83	0.379
INCOME_6	1= the annual income of the household before taxes is $100K-250K, 0= otherwise	1100	0.28	0.451
NJ	1= the respondent is a residence from New Jersey state, 0= otherwise	1100	0.18	0.388
NY	1= the respondent is a residence from New York state, 0= otherwise	1100	0.41	0.482
PA	1= the respondent is a residence from Pennsylvania state, 0= otherwise	1100	0.26	0.441
MD	1= the respondent is a residence from Maryland state, 0= otherwise	1100	0.13	0.329
YOUNG	1= the respondent's age is between 18-37, 0= otherwise	1100	0.32	0.468
MID_AGE	1= the respondent's age is between 38-56, 0= otherwise	1100	0.34	0.473
Dependent variable				
THE INTERNET	1= get information about organic products from The Internet, 0= otherwise	1100	0.75	0.432
Independent variable				
SAFETY_TV	1=get food safety and nutritional information from TV/news, 0=otherwise	1100	0.48	0.500
SAFETY_INT	1=get food safety and nutritional information from the Internet, 0=otherwise	1100	0.81	0.403
SAFETY_RAD	1=get food safety and nutritional information from radio, 0=otherwise	1100	0.13	0.338
Variable		**N**	**Mean**	**Std. Deviation**

SAFETY_NEWS	1=get food safety and nutritional information from newspaper/articles, 0=otherwise	1100	0.60	0.491
ADVERTISE	1= good advertisements usually help to decide which agricultural food items to purchase, 0=otherwise	1100	0.04	0.183
LABEL	1=usually check the food's ingredient label, 0=otherwise	1100	0.48	0.500
L_ECO	1= "Eco-Friendly" labeling or advertising influence the decision to purchase food products, 0=otherwise	1100	0.58	0.494
RESTURANT	1= look for organic options in restaurants, 0= otherwise	1100	0.55	0.500
P_HAZARD_1	1= think residues from pesticides or Hebrides is a serious hazard, 0= otherwise	1100	0.31	0.47
FMK_1_3	1= in an average month, buy agricultural produce at community farmers market 1-3 times, 0= otherwise	1100	0.49	0.500
CSA_0	1=never purchase agricultural products from community supported agriculture, 0=otherwise	1100	0.63	0.484
Q_FRESHNESS	1= freshness is a very important quality when purchasing grocery, 0=otherwise	1100	0.90	0.298
SUPPORT	1= believe consume organic foods is a way to support for local farmers and agriculture, 0= otherwise	1100	0.83	0.377
SWITCH	1= switch supermarkets to purchase organic product, 0= otherwise	1100	0.66	0.470
SAMEQUAN	1= Buy same quantity organic foods for premium price, 0=otherwise	1100	0.68	0.466
OG_HEALTH	1= buy organic fruits and vegetables for health reasons, 0= otherwise	1100	0.69	0.463

Variable		N	Mean	Std. Deviation
PREMIUM_0	1= favorite fresh fruit or vegetable normally costs $1 per pound, would like to pay no more for organic certified produce, 0=otherwise	1100	0.06	0.232
FRESHNESS	1= organically grown fruits and vegetables are more fresh than conventionally grown produce in Supermarkets and other retail facilities, 0=otherwise	1100	0.51	0.500
QUALITY	1= organically grown fruits and vegetables have better quality than conventionally grown produce in Supermarkets and other retail facilities, 0=otherwise	1100	0.68	0.468
BUYMORE	1= buy organic fruits and vegetables if more readily available, 0= otherwise	1100	0.74	0.441
OG_WINE	1= purchase organic wine, 0=otherwise	1100	0.21	0.406
OG_SLICED	1= purchase organic sliced fruits and vegetables, 0=otherwise	1100	0.46	0.499
SUBURBAN	1= the respondent is from suburban community, 0= otherwise	1100	0.57	0.500
GENDER	1= the respondent is male, 0= otherwise	1100	0.25	0.43
GRADUATE	1= the highest education level is graduate school, 0=otherwise	1100	0.40	0.490
EMPLOYED	1= the respondent is employed by others, 0= otherwise	1100	0.42	0.500
WHITE	1= the respondent is White, 0= otherwise	1100	0.83	0.379
INCOME_6	1= the annual income of the household before taxes is $100K-250K, 0= otherwise	1100	0.28	0.451
FSIZE	1= number of persons in the household is 3 or more than 3, 0= otherwise	1100	0.46	0.5

Variable		N	Mean	Std. Deviation
NJ	1= the respondent is a residence from New Jersey state, 0= otherwise	1100	0.18	0.388
NY	1= the respondent is a residence from New York state, 0= otherwise	1100	0.41	0.482
PA	1= the respondent is a residence from Pennsylvania state, 0= otherwise	1100	0.26	0.441
MD	1= the respondent is a residence from Maryland state, 0= otherwise	1100	0.13	0.329
YOUNG	1= the respondent's age is between 18-37, 0= otherwise	1100	0.32	0.468
MID_AGE	1= the respondent's age is between 38-56, 0= otherwise	1100	0.34	0.473
Dependent variable				
FRIENDS	1= get information about organic products from friends/relatives, 0= otherwise	1100	0.42	0.494
Independent variable				
SAFETY_TV	1=get food safety and nutritional information from TV/news, 0=otherwise	1100	0.48	0.500
SAFETY_INT	1=get food safety and nutritional information from the Internet, 0=otherwise	1100	0.81	0.403
SAFETY_RAD	1=get food safety and nutritional information from radio, 0=otherwise	1100	0.13	0.338
SAFETY_NEWS	1=get food safety and nutritional information from newspaper/articles, 0=otherwise	1100	0.60	0.491

Variable		N	Mean	Std. Deviation
ADVERTISE	1= good advertisements usually help to decide which agricultural food items to purchase, 0=otherwise	1100	0.04	0.183
LABEL	1=usually check the food's ingredient label, 0=otherwise	1100	0.48	0.500
MORELOCATION	1=shop at more than one food store to purchase agricultural products, 0=otherwise	1100	0.82	0.390
L_NATURAL	1= "Natural" labeling or advertising influence the decision to purchase food products, 0=otherwise	1100	0.81	0.396
RESTURANT	1= look for organic options in restaurants, 0= otherwise	1100	0.55	0.500
SUPERMARKET	1=never purchase agricultural products from supermarket, 0=otherwise	1100	0.01	0.116
FMK_7_9	1= in an average month, buy agricultural produce at community farmers market 7-9 times, 0=otherwise	1100	0.05	0.214
ROADSTAND_0	1=never purchase agricultural products from road stand, 0=otherwise	1100	0.46	0.498
ROADSTAND_1_3	1= in an average month, buy agricultural produce at community farmers market 1-3 times, 0=otherwise	1100	0.43	0.495
SUPPORT	1= believe consume organic foods is a way to support for local farmers and agriculture, 0= otherwise	1100	0.83	0.377
OG_FRUIT_4	1= purchase organic fruits 3-4 timers per month, 0= otherwise	1100	0.43	0.495
Variable		N	Mean	Std. Deviation

		1100		
OG_VEG_4	1= purchase organic vegetables 3-4 timers per month, 0= otherwise	1100	0.43	0.495
OG_MILK_3	1= purchase organic milk/yogurt 1 or 2 timer per year, 0= otherwise	1100	0.23	0.420
OG_MILK_4	1= purchase organic milk/yogurt 3-4 timers per month, 0= otherwise	1100	0.28	0.448
SAMEQUAN	1= Buy same quantity organic foods for premium price, 0=otherwise	1100	0.68	0.466
OG_HEALTH	1= buy organic fruits and vegetables for health reasons, 0= otherwise	1100	0.69	0.463
PREMIUM_6	1= favorite fresh fruit or vegetable normally costs $1 per pound, would like to pay more than 20 cents for organic certified produce, 0=otherwise	1100	0.25	0.435
SHELFLIFE	1= does not believe organic foods have shelf-life, 0=otherwise	1100	0.31	0.462
OG_JAM	1=purchase organic jam/jelly/marmalade	1100	0.38	0.486
URBAN	1= the respondent is from urban community, 0= otherwise	1100	0.26	0.440
GENDER	1= the respondent is male, 0= otherwise	1100	0.25	0.430
2_COLLEGE	1= the highest education level is 2 year college, 0=otherwise	1100	0.17	0.377
COLLEGE	1= the highest education level is 4 year college, 0=otherwise	1100	0.40	0.490
RETIRED	1= the respondent is retired, 0= otherwise	1100	0.20	0.401
AFRICAN_A	1= the respondent is African American, 0= otherwise	1100	0.05	0.227
INCOME_5	1= the annual income of the household before taxes is $80K-100K, 0= otherwise	1100	0.13	0.340
NJ	1= the respondent is a residence from New Jersey state, 0= otherwise	1100	0.18	0.388

Variable		N	Mean	Std. Deviation
NY	1= the respondent is a residence from New York state, 0= otherwise	1100	0.41	0.482
PA	1= the respondent is a residence from Pennsylvania state, 0= otherwise	1100	0.26	0.441
MD	1= the respondent is a residence from Maryland state, 0= otherwise	1100	0.13	0.329
MID_AGE	1= the respondent's age is between 38-56, 0= otherwise	1100	0.34	0.473

Except the TVNEWS use 959 out of 1100 total observations, the INTERNET and FRIENDS models use 1100 observations.

The TVNEWS model has 80.2% correct prediction, Pseudo R-squared 0.37. Among the 35 independent variables, 17 of them are significant. Only 1 variable is at 10% significance level, 10 variables are at 5% significance level, and 6 variables are at 1% significance level.

The INTERNET model has 88.9% correct prediction, Pseudo R-squared 0.45. The model has 16 significant variables out of the total 35 independent variables. Among the 16 significant variables, 5 of them are at 10% significance level, 8 variables are at 5% significance level and 3 are at 1% significance level.

The FRIENDS model has 70.3% correct prediction, Pseudo R-squared 0.15. 18 variables are significant out of the total 35 independent variables. Among the 18 significant variables, only one of them is at 10% significance level, 9 variables are at 5% significance level and 8 are at 1% significance level.

Three tables on predictive accuracy and coefficient estimations are listed in Table 16.

Three tables on predictive accuracy and coefficient estimations are listed in Table 16.

Table 16 Logistic Regression Results for Logistic model

	TVNEWS Model	INTERNET Model	FRIENDS Model
Where to get food safety and nutritional information			
SAFETY_TV	**0.4461***** (**0.188**)	0.0228 (0.222)	**0.2199***** (**0.149**)
SAFETY_INT	**-0.1644*** (**0.230**)	**0.6663***** (**0.244**)	0.0589 (0.184)
SAFETY_RAD	**0.0612***** (**0.331**)	-0.0010 (0.325)	**0.0345**** (**0.215**)
SAFETY_NEWS	**0.5016 ***** (**0.191**)	-0.0060 (0.222)	**0.2662***** (**0.150**)
Organic Food Consumers' purchasing Habits			
ADVERTISE	.0107 (0.602)	-0.0021 (0.625)	-0.0005 (0.381)
LABEL	-0.0530 (0.187)	0.0072 (0.216)	0.0004 (0.215)
MORELOCATION	**-0.1777*** (**0.245**)	-	-0.0216 (0.192)
C_ORG	**0.2740**** (**0.330**)	-	-
L_NATURAL	-0.0824 (0.232)	-	**0.2801***** (**0.189**)
L_ECO	-	0.0324 (0.217)	-
L_ORIGIN	**0.2240***** (**0.205**)	-	-
RESTURANT	-0.0627 (0.211)	**0.0373*** (**0.252**)	**0.0886*** (**0.159**)
SUPERMARKET	-	-	0.0226

	TVNEWS Model	INTERNET Model	FRIENDS Model
			(0.239)
FMK_1_3	-	**0.0388**** **(0.208)**	-
FMK_7_9	-	-	0.0232 (0.243)
CSA_0	**-0.1231**** **(0.196)**	**0.0433*** **(0.228)**	-
ROADSTAND_0	-	-	0.0979 (0.231)
ROADSTAND_1_3	-	-	**0.1184**** **(0.228)**
OG_FRUIT_4	-	-	**-0.131***** **(0.194)**
OG_VEG_4	-	-	**0.1212**** **(0.191)**
OG_MILK_3	-	-	**0.0698***** **(0.175)**
OG_MILK_4	-	-	**0.0983***** **(0.173)**
AVAILABILITY	-0.2819 (0.504)	-	-
PREMIUM_0	0.0130 (0.437)	0.0038 (0.422)	-
PREMIUM_6	-	-	**0.068***** **(0.164)**
OG_JUICE	**0.1471**** **(0.192)**	-	-
OG_WINE	-	**0.0385**** **(0.227)**	-
OG_SLICED	-	0.0213 (0.221)	-
OG_JAM	-	-	**0.0851****

			(0.146)
	TVNEWS Model	INTERNET Model	FRIENDS Model
Awareness of Organic Foods and Food Safety			
P_HAZARD_1	-	**-0.0532** **(0.234)**	-
FOREIGN_HAZARD_1	-0.0186 (0.311)	-	-
FOREIGN_HAZARD_2	**-0.1502** **(0.256)**	-	-
PREFER	**0.2794** **(0.332)**	-	-
Q_FRESHNESS	-	0.0658 (0.360)	-
SUPPORT	-	**-0.1068*** **(0.303)**	**0.2249** **(0.202)**
SWITCH	-0.0744 (0.231)	**0.0857*** **(0.250)**	-
SAMEQUAN	-0.0657 (0.210)	0.0250 (0.227)	**-0.1506** **(0.160)**
OG_HEALTH	-0.1096 (0.213)	**0.0451*** **(0.224)**	**0.1295** **(0.157)**
FRESHNESS	-	**-0.0304*** **(0.232)**	-
QUALITY	**-0.1874*** **(0.225)**	0.1011 (0.330)	-
HIGHPRICE	**0.3212** **(0.331)**	-	-
BUYMORE	**0.1774** **(0.225)**	**0.065** **(0.241)**	-
SHELFLIFE	-	-	**0.0388*** **(0.237)**

	TVNEWS Model	INTERNET Model	FRIENDS Model
Demographic Information			
URBAN	-	-	-0.0175 (0.172)
SUBURBAN	-0.0161 (0.187)	-0.0120 (0.217)	-
GENDER	-	**0.0157*** **(0.254)**	**-0.051**** **(0.165)**
2_COLLEGE	-	-	0.0241 (0.197)
COLLEGE	-0.0522 (0.183)	-	0.0264 (0.153)
GRADUATE	-	0.0062 (0.259)	-
RETIRED	-	-	-0.0144 (0.184)
EMPLOYED	-0.0360 (0.195)	0.0074 (0.225)	-
WHITE	-0.0161 (0.241)	-0.0214 (0.305)	-
AFRICAN_A	-	-	**-0.0228**** **(0.315)**
INCOME_5	-	-	0.0263 (0.200)
INCOME_6	**0.0593**** **(0.204)**	-0.0092 (0.238)	-
FSIZE	-	0.0173 (0.234)	-
NJ	-0.0450 (0.629)	**-0.1005**** **(1.180)**	-0.0749 (0.505)
NY	-0.0738 (0.610)	**-0.1783**** **(1.172)**	-0.1338 (0.493)
PA	-0.0692	**-0.1348****	-0.0781

	TVNEWS Model	INTERNET Model	FRIENDS Model
	(0.621)	**(1.177)**	(0.497)
MD	-0.0387	**-0.0795****	-0.0518
	(0.645)	**(1.188)**	(0.523)
YOUNG	**-0.0953****	0.0218	-
	(0.256)	(0.312)	
MID_AGE	**-0.0818****	0.0200	-0.0260
	(0.229)	(0.278)	(0.152)
Overall Model Fitness Information			
Pseudo R-squared	0.37	0.45	0.15
Chi squared	491.5247	549.7463	223.2364
Prob[ChiSqd > value] =	0.0000	0.0000	0.0000
Degrees of freedom	35	35	35
Correct Prediction	80.2%	88.9%	70.3%

*** Significant in 0.01 level

**Significant in 0.05 level

We can be told that compared to the respondents who do not use any of the listed approaches (TV, the Internet, Radio and News) to gaining food safety and nutritional information, organic foods consumers who mainly watch TV, listen to the radio and read news are significantly likely to choose TV/News/Radio to be their method to approach to organic food information. The same thing happens in the case of people learning organic food information from their relatives and friends. But things go to the opposite for people getting organic food information online. For the respondents under this group, their major information approach is consistent. Compare to the consumers who don't use any of the listed approaches, respondents who use the Internet to learn about food safety and nutritional information would use the same method to approach the organic food information.

Not in line with research concerns about children were exposed to high volumes of television advertising (Kelly et al., 2010), whether the consumers would be frequently influenced by foods advertising or promotion event, and whether the consumers usually check the labels on food when doing their grocery is not significantly related to their information approaches, consumers' opinions toward specific food label are important factors. The respondents who treat "Certified Organic", and "Country of Origin" labeling or advertising as influential information to their grocery decision, are more than 20% more likely to use TV/NEWS/Radio to learn organic food information than the respondents who hold that opinion. The respondents who concern "Natural" labeling or advertising when doing their grocery, are close to 30% more likely to use their social network to learn organic food information than the respondents who hold that opinion.

The respondents who shop at more than one location for their grocery are close to 20% less likely to be a traditional media learner for organic food information. Meanwhile, the consumers who look for organic options at a restaurant are more tend to be on the Internet learner or a social network learner.

Compared to other visit frequencies, the respondents who shop their grocery at community farmer's market 1-3 time per month, and who never shop at community support agriculture would be more likely to use the Internet to get organic information. However, the respondents who never use community support agriculture would be less likely to use traditional media for organic information than people shop at CSA. But if the respondents shop from road stand 1-3 time per month, they would be 12% more likely to become a social network learner than who goes to road stand more than 3 timers in an average month.

Especially, the shopping frequency for different categories of organic foods is significantly related to consumers' choice to use relatives and friend to learn organic food information. The consumers who buy organic fruits around 3-4 times per month, would be 13% less likely to be Relative/Friends learners than whom consume organic fruits in other frequency. Oppositely, if consumed organic vegetables around 3-4 times per month, such people would be 12% more likely to become Relative/Friends learners. Other than that, the respondents who buy organic milk one time per month would be 7% more likely, and who buy organic milk 3-4 times per month would be 10% more likely to use their social network to get organic food information than consumers buy organic milk, in an average month, less than one time or more than 4 times.

Respondents look for organic food information from different methods are also having their different preference towards organic processed foods. Organic juice consumers are 15% more likely to get organic food information from TV/News/Radio than non-organic juice consumers. Organic wine consumers, instead, are 4% more likely to get organic food information from online tools than non-organic wine consumers. Organic jam/jelly/ marmalade consumers turn out to be 9% more likely to learn such information from their social network than respondents who don't buy organic jam/jelly/ marmalade products.

Consumers who believe the residue from agrichemicals is a serious concern to the environment and people's health are 5% less likely to use the Internet to gain organic food information than those people who don't hold such belief. But for the consumers who think food products come from foreign countries is a moderate hazard to the environment and people's health, they would be 15% less likely to get information from TV/News/Radio than those consumers who don't believe in foreign products are hazardous.

If the respondents prefer organically grown foods rather than conventional foods, they would be nearly 30% more likely to receive organic food information from traditional media than those who don't have such preference.

Respondents who believe consume organic foods is a way to support their local agriculture are 22% more likely to become social network learner for organic food information, but 11% less likely to use The Internet. Instead, the consumers who switch their most visited grocery for organic products are 9% more likely to use the Internet for organic food information. Consumers who recognize themselves buy organic foods for health reason would be 5% more likely to use the Internet for organic food information. They are also 13% more likely to use their social network than consumers who don't think they purchase organic food for health issues.

If the consumers would still like to buy the same quantity organic food at a premium price, they would be 15% less likely to get organic food information from relatives and friends. However, when asked organic food consumers how the slightly premium price they would like to pay for organic foods, the respondents who choose over 20% premium would be 7% less likely to become social network learners, than those who do not want to pay over 20% premium. Although the premium questions don't show impact on TV/News/Radio learns and The Internet learns, the consumers who confirm they would like to buy organic foods if such products sold at a lower price, would be 18% more likely to get organic food information from traditional media and meanwhile 7% more likely to get that information from online tools, than the consumers who would still not buy organic food even the price is lower.

Respondents' opinions for differences between organically grown fruits and vegetables and conventional fruits and vegetables are showing the influence for their information approaches. If they think organic fruits and vegetable are fresher than conventional ones, they are 3% less

likely to get organic information by using the Internet. If they believe organic fruits and vegetables have better quality than conventional produce, they are 19% less likely to get organic information from traditional media. Contrarily, if they believe organic fruits and vegetables holds higher price over conventional produce, those people are 32% more likely to get organic information from traditional media.

Moreover, the consumers who stated the reason for not buy organic foods are 4% less likely to use the social network for organic food information.

The demographic profile of the consumers is important factors for the consumers to decide their information accessed to organic food information. Female is 2% more likely to use The Internet as approach to such information, but 5% less likely to get such information from their relatives and friends. The consumers with African American background would be 2% less likely to use social network than consumers with other ethnicities. If the respondent's household annual income before tax is between $100,000 and $249,999, they are 6% more likely to get organic information from TV/News/Radio than respondents with other household income level.

Respondents' residency only has an effect on the Internet learner group. We use Delaware State as the baseline, New Jersey people are 10% less likely; New York people are 18% less likely, Pennsylvania people are 14% less likely; Maryland people are 8% less likely to use The Internet to approach the organic food information. Compare to findings from previous research, which indicate the Internet has significant influence on children's health food choice (Weber, Story, & Harnack, 2006), or younger participant are more engaged to use Internet as their information searching tool (Kuttschreuter et al., 2014), respondent's age only impacts the traditional media users. Compare to elder generation (57-89 years old), the younger generation (18-36 years old)

are 10% less likely and middle age generation (37-56 years old) are 8% less likely to use TV/News/Radio to access to organic food information.

Education level, Primary profession, and Family size are not significant impacts to differ consumers into different information method learners.

Segmenting the attributes and acceptance

Consumption Pattern of Organic Foods

Table 17 presents the mean, the standard deviation, and vectors attaining from the principal component analysis, loading after a Varimax rotation of organic shoppers' 18 question about their purchasing pattern. Each component was named based on the latent motivation underlying the consumption habit. The mean scores and factor loadings from factor analysis are used simultaneously to interpreting the consumption pattern. In this study, factor loadings of >.5 are treated as a successful indication of a reliable factor. According to Table 17, the PCA extracted five components, "Organic Driven", "Direct Market Driven", "Food Quality Driven", "Local Driven", "Price Driven" which together explained nearly 60% of the total variance, details are summarized in the discussion below.

Table 17 Varimax Rotated Factor Loading Respondents' Consumption Pattern of Organic Foods

Description	Mean (Std. Dev.)	Factor				
		1	2	3	4	5
Organic Driven						
Purchase Organic Egg	3.03 (1.26)	0.791				
Purchase Organic Meat	2.90	0.765				

	(1.23)			
Purchase Organic Milk and Yogurt	3.01	0.761		
	(1.34)			
Purchase Organic Fruit	3.84	0.758		
	(0.95)			
Purchase Organic Vegetables	3.88	0.736		
	(0.93)			
Purchase Organic Processed Foods	2.70	0.694		
	(1.19)			
Direct Market Driven				
Buy from Direct Market at Farm	1.69		0.817	
	(0.89)			
Buy from Roadside Stand	1.71		0.775	
	(0.82)			
Buy from Community Supported Agriculture	1.53		0.74	
	(0.82)			
Buy from Pick You Own	1.71		0.738	
	(0.82)			
Buy from Community Farmers Market	2.06		0.698	
	(0.91)			
Food Quality Driven				
Freshness is important when shopping grocery	4.87			0.712
	(0.43)			
Pesticide Free is important when shopping grocery	4.54			0.657
	(0.80)			
Local Driven				
Country of Origin is important when shopping grocery	3.58			0.698
	(1.25)			
Local Produce is important when shopping grocery	3.81			0.659
	(1.05)			
Buy from Supermarket	3.07			-0.611

	(1.04)				
Price driven					
Low Price is important when shopping grocery	3.83				0.732
	(1.05)				
Ripeness is important when shopping grocery	2.23				-0.666
	(1.36)				
Percent of total variance explained (%)		19.6	17.3	8.2	7.8	6.8
Total Variance Explained (%)	59.8				

Factor 1: Organic Driven

This component represents, with nearly 20% of total variance explained, the how organic foods (fruits, vegetables, eggs, meat, milk and yogurt, and processed foods) weights in the respondents' routine grocery shopping. The factor score indicates the frequency of the respondent's consumption of the six categories of organic foods: 1=Never, 2= Rarely (1 or 2 times/year), 3=Sometimes (1 time/month), 4= Often (3-4 times/month), 5= Frequently (more than 1 time/week). The mean scores range from minimum 2.70 to maximum 3.88, which reveal the respondents are organic foods frequent shoppers and looking for organic foods, it's a major driven for their grocery.

Factor 2: Direct Market Driven

This dimension, counted for 17% of the total explained variance, captures the organic consumers' frequency of visit direct distribution channels (Direct Market, Roadside stand, Community Supported Agriculture, Pick You Own, and Community Farmers Market) for their grocery. The factor score indicates the frequency of the respondent's visit to those markets, within one average month: 1=Never, 2= Rarely (1-3 times), 3=Sometimes (4-6 times), 4= Often

(7-9 times), 5= Frequently (more than 9 times). Via such direct market, as what we discussed in the literature review session, the consumers would have access to the producers and growers of those foods they are buying. The mean scores reveal the respondents are not frequently visiting those direct market for their grocery.

Factor 3: Food Quality Driven

About 8% of the total variance could be explained by this factor. The vectors in this dimension show the respondents 'attention to food quality include "Freshness" and "Pesticide Free" (1= Not important, 2= Less important, 3= Important, 4= Somewhat important, 5= Very important). Throughout the mean score, we can get to know the consumers care about the foods' quality very much.

Factor 4: Local Driven

This motivating component reflects how much the respondents pay attention to the where the foods they purchased are come from. The factor's mean reveals the degree of the consumers' commitment to local foods: 1= Not important, 2= Less important, 3= Important, 4= Somewhat important, 5= Very important. They not only care if the foods are locally produced, more than that, the consumers also feel the origin country of foods is important. This factor can explain about 8% of the total variance. Consider the respondent's visit frequency to a supermarket for grocery is making the negative contribution to this factor, we can recognize this vector as the respondent's negative attitude to shop at the supermarket, therefore as a support for their caring of local foods.

Factor 5: Price Driven

This component explains about 7% of the total variance and captures the price's impact on consumers' organic foods purchasing pattern. The mean score represents "low price" is an important motivation for their grocery decision (1= Not important, 2= Less important, 3= Important, 4= Somewhat important, 5= Very important), and on contrary, because of the negative factor score, the ripeness of foods is not a critical concern for them during their grocery shopping

Cluster Analysis

The result for K-Mean Cluster is shown in Table 18. For the means and standard deviations of the standardized factor scores and the number of respondents in each cluster. The number of clusters was determined with interpretability and external validation using the criteria of increases in cluster coefficients as clusters merge. Four clusters were captured based on the motivations driven the organic foods consumers' grocery purchasing pattern. The ANOVA tests show the four cluster groups are reliable at 1% significant level, which represents each group is significantly different from the other three clusters. By the relatively higher mean score on different motivations compared to the other clusters, we named the four groups per their characteristics.

Organic supporter

More than 30% of the total respondents could be called as "Organic supporter". Organic food, include fruits, vegetables, dairy products, eggs, protein, and processed foods, play an important role in those respondent's grocery. To purchase organic products, and purchase them frequently, are those respondent's character and preference.

Thrift domestic consumer

Almost 30% of the total respondents are recognized as "Thrifty domestic consumer" because they concern about food's origin issue and price concurrently. Such respondents pay attention to whether the food they consumed is local products, moreover, they care about the foods' origin country. Also, when making their purchasing decision, the price is a critical factor for them since a relatively lower price product would be more attractive to them.

Quality follower

Those respondents who are aware of the foods' qualities when doing their grocery shopping weights nearly 30% of the total sample size. When making grocery decision, they are looking for fresh and health (pesticide free) products, therefore they are "Quality follower".

Direct channel buyer

Comprising only less than 15% of the total respondents, the consumers who frequently visit direct distribution channels for their grocery shopping are called "Direct channel buyer". Such consumers regularly or frequently go to direct market at the farm, CSA, Roadside Stand, Farmers' market and Pick your own (PYO) for their grocery.

Table 18 Organic foods consumers' segmentation through Cluster Analysis

Cluster \ Factors	Thrifty domestic consumer	Quality follower	Direct channel buyer	Organic supporter	F-Statistics
	N=321	N=296	N=147	N=334	
	29.23%	26.96%	13.39%	30.42%	
Organic Driven	-0.945	-0.125	0.308	**0.883**	388.14*
	(0.704)	(0.750)	(0.765)	(0.603)	
Direct Market Driven	-0.205	-0.217	**1.919**	-0.455	507.28*
	(0.624)	(0.585)	(0.894)	(0.592)	

Food Quality	-0.468	**0.516**	-0.060	0.020	57.62*
Driven	(1.070)	(0.773)	(1.168)	(0.785)	
Local Driven	**0.302**	-0.678	-0.137	0.371	88.26*
	(0.945)	(0.914)	(0.902)	(0.835)	
Price driven	**0.299**	-0.745	0.184	0.292	94.91*
	(0.913)	(0.890)	(0.969)	(0.836)	

*denotes significance at the 1% level

Multinomial Logistic Regression

We carried out a Multinomial Logistic Regression for the four clusters to identify the

characteristics and socioeconomic variables among those groups. The dependent variable is a

nominal variable which the number represents each cluster: 1= Thrifty domestic consumer, 2=

Quality follower, 3= Direct channel buyer, 4=Organic supporter (Table 19). Consider the direct

channel buyer is the smallest consumer segmentation among the four groups, we set this cluster

(number "3") as the reference category for the regression model.

Table 19 The dependent variable descriptive information

Cluster	N	Name
1	321.000	Thrifty domestic consumer
2	296.000	Quality follower
3	147.000	Direct channel buyer
4	334.000	Organic supporter
Valid	1098.000	
Missing	.000	

Lists of all dependent variables and independent variables and explanations for the regression

model are provided below (Table 20).

Table 20 Descriptive Statistics of Dependent and Independent Variables

Name	Description	N	Mean	Std. Deviation
Dependent Variable				
CLUSTER	The respondents' segmentation 1= Thrifty domestic consumer, 2= Quality follower, 3= Direct channel buyer, 4=Organic supporter	1098	2.45	1.200

Name	Description	N	Mean	Std. Deviation
Independent Variables				
ADVERTISE	1= good advertisements always help to decide which agricultural food items to purchase, 0=otherwise	1098	0.17	0.380
LABEL	1=usually check the food's ingredient label, 0=otherwise	1098	0.48	0.500
C_ORG	1= "Certified Organic" labeling or advertising influence the decision to purchase food products, 0=otherwise	1098	0.89	0.338
RESTURANT	1= look for organic options in restaurants, 0= otherwise	1098	0.55	0.500
INTERNET	1= get information about organic products from Internet, 0= otherwise	1098	0.75	0.432
AVAILABILITY	1= organic produce available from the store that most often purchase groceries, 0= otherwise	1098	0.96	0.190
LOCAL_STORE	1=never purchase agricultural products from local store, 0=otherwise	1098	0.26	0.437
Q_FRESHNESS	1= freshness is a very important quality when purchasing grocery, 0=otherwise	1098	0.90	0.298

Q_ABSENCE	1= absence of pesticide residues is a very important quality when purchasing grocery, 0=otherwise	1098	0.69	0.461
Q_LOCAL	1= locally produced is a very important quality when purchasing grocery, 0=otherwise	1098	0.30	0.458
Q_PRICE	1= low price is a very important quality when purchasing grocery, 0=otherwise	1098	0.32	0.466
OG_MEAT	1= never buy organic meats, 0=otherwise	1098	0.18	0.388
Name	**Description**	**N**	**Mean**	**Std. Deviation**
OG_PROC	1= never buy organic processed foods, 0=otherwise	1098	0.22	0.412
NO_GMO	1= believe organic foods does not contain GMO's, 0=otherwise	1098	0.83	0.379
SWITCH	1= switch supermarkets to purchase organic product, 0= otherwise	1098	0.66	0.470
OG_HEALTH	1= buy organic fruits and vegetables for health reasons, 0= otherwise	1098	0.69	0.463
NO_DIFF	1=think basically no difference between the safety of conventional and organics, 0=otherwise	1098	0.12	0.331
BUY_CHEAP	1=buy organics if cheaper, 0=otherwise	1098	0.82	0.385
OG_JAM	1=purchase organic jam/jelly/marmalade	1098	0.38	0.486
OG_JUICE	1= purchase organic juice，0=otherwise	1098	0.50	0.500
EMPLOYED	1= the respondent is employed by others, 0= otherwise	1098	0.42	0.500
AFRICAN_A	1= the respondent is African American, 0= otherwise	1098	0.05	0.227
GENDER	1= the respondent is male, 0= otherwise	1098	0.25	0.430
KIDS	1= the respondent's family has member under 17 years old, 0=otherwise	1098	0.19	0.389

STATES	the respondent lives in 1=Delaware, 2= Maryland, 3=New Jersey, 4=New York, 5=Pennsylvania	1098	3.78	1.032
PREMIUM	favorite fresh fruit or vegetable normally costs $1 per pound, how slightly more for organic certified produce, 1=no premium, 2= 1-5 cents, 3=6-10 cents, 4=16-20 cents, 5=over 20 cents	1098	3.84	1.628
Name	**Description**	**N**	**Mean**	**Std. Deviation**
INCOME	annual income of the household before taxes 1=<$20,000, 2=$20,000-$39,999, 3=$40,000-$59,999, 4=$60,000-$79,999, 5=$80,000-$99,999,6=$100,000-$249,999, 7=>$250000	1098	4.19	1.688

The overall model fitting is significant at 1% level which reveals this multinomial logistics regression model is reliable at 1% significant level. Pseudo R-Square is 0.596, represents this model explained 59.6% of total variance. Total percentage of correct prediction is 63.8%. All observed results are detailed in Table 21. The baseline for each independent variable is the largest category. Therefore for binary variables, the benchmark is variable =1, and for nominal and ordinal variables, the benchmark is the largest number for each variable.

Table 21 Multinomial regression results

	Thrifty domestic consumer		**Quality follower**		**Organic supporter**	
	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)
Intercept	-0.598		-1.547		-0.691	

	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)
	1.309		1.323		1.233	
ADVERTISE	**1.168***	**3.214**	**0.894***	**8.382**	**0.769***	**2.158**
	0.326		**0.309**		**0.269**	
LABEL	0.438	1.549	-0.073	0.929	-0.38	0.684
	0.27		0.26		0.248	
C_ORG	0.099	1.104	-0.427	0.652	**-1.386***	**0.25**
	0.41		0.444		**0.503**	
RESTURANT	**1.274***	**3.574**	**0.982***	**2.67**	**0.978***	**2.66**
	0.303		**0.301**		**0.29**	

	Thrifty domestic consumer		Quality follower		Organic supporter	
	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)
INTERNET	0.275	1.317	0.03	1.03	-0.5	0.606
	0.315		0.318		0.315	
AVAILABILITY	-0.786	0.456	**-1.239**	**0.29**	**-2.727***	**0.103**
	0.52		**0.586**		**0.741**	
LOCAL_STORE	**-2.247***	**0.106**	**-2.111***	**0.121**	**-2.055***	**0.128**
	0.473		**0.467**		**0.463**	
Q_FRESHNESS	0.577	1.78	**-1.408***	**0.245**	-0.477	0.621
	0.396		**0.448**		0.389	
Q_ABSENCE	**0.666**	**1.946**	0.003	1.003	0.103	0.612
	0.312		0.313		0.303	
Q_LOCAL	0.223	1.249	**1.621***	**5.056**	0.274	1.315
	0.275		**0.287**		0.246	
Q_PRICE	-0.23	0.977	**1.48***	**4.391**	0.034	1.035
	0.295		**0.313**		0.268	
OG_MEAT	**-1.919***	**0.147**	**-1.298***	**0.273**	0.258	1.294
	0.466		**0.472**		0.53	
OG_PROC	-0.438	0.645	**-0.839**	**0.432**	**1.76***	**5.815**
	0.364		**0.359**		**0.435**	

	Thrifty domestic consumer		Quality follower		Organic supporter	
NO_GMO	**0.62***	**1.859**	0.138	1.147	-0.468	0.626
	0.354		0.362		0.369	
SWITCH	0.375	1.455	-0.393	0.675	**-0.683***	**0.505**
	0.322		0.337		**0.331**	
OG_HEALTH	1.177	3.245	**1.007***	**2.738**	0.339	1.404
	0.309		**0.311**		0.303	
NO_DIFF	1.485	4.417	**1.44***	**4.222**	**0.972***	**2.643**
	0.385		**0.408**		**0.36**	
	Thrifty domestic consumer		**Quality follower**		**Organic supporter**	
	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)
BUY_CHEAP	**-1.092***	**0.336**	**-0.851***	**0.427**	**-0.977***	**0.376**
	0.332		**0.299**		**0.277**	
OG_JAM	-0.246	0.782	-0.415	0.661	**-0.908***	**0.403**
	0.283		0.268		**0.251**	
OG_JUICE	0.433	1.541	**0.498***	**1.646**	-0.175	0.84
	0.279		**0.271**		0.258	
EMPLOYED	**0.501***	**0.98**	**0.737***	**2.089**	0.302	1.353
	0.266		**0.259**		0.242	
AFRICAN_A	-0.286	0.752	1.011	2.747	-0.238	0.788
	0.513		0.634		0.458	
GENDER	**-0.745***	**0.475**	-0.361	0.697	0.179	1.196
	0.297		0.391		0.279	
KIDS	**0.826***	**2.285**	**0.872***	**2.391**	**0.915***	**2.496**
	0.317		**0.3**		**0.267**	
STATES						
Delaware	0.464	1.59	-0.761	0.467	-1.16	0.313
	0.851		0.873		1.02	
Maryland	0.163	1.177	-0.54	0.583	0.031	1.031
	0.401		0.408		0.375	

	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)
New Jersey	-0.099	0.906	-0.079	0.924	**0.596***	**1.814**
	0.398		0.381		**0.36**	
New York	0.116	1.123	0.067	1.069	0.453	1.573
	0.316		0.305		0.289	
PREMIUM						
No premium	**1.653****	**5.221**	0.091	1.063	**1.774****	**5.895**
	0.82 1		0.941		**0.876**	
1-5 cents	**1.237****	**3.444**	**0.88****	**2.411**	**1.095*****	**2.988**
	0.421		**0.419**		**0.394**	
	Thrifty domestic consumer		**Quality follower**		**Organic supporter**	
	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)	Coefficient (Std. Error)	Exp (B)
6-10 cents	0.565	1.76	0.155	1.167	0.441	1.554
	0.375		0.36		0.334	
11-15 cents	0.6	1.822	0.42	1.523	0.296	1.345
	0.43		0.408		0.391	
16-20 cents	-0.094	0.91	0.55	1.734	**0.917****	**2.502**
	0.491		0.406		**0.377**	
INCOME						
<$20,000	**2.064****	**7.875**	0.3	1.35	0.235	1.266
	0.982		0.93		0.884	
$20,000-$39,999	0.453	1.573	-0.482	0.618	-0.914	0.401
	0.8		0.709		0.687	
$40,000-$59,999	0.271	1.312	**-1.1245***	**0.288**	-1.046	0.351
	0.789		**0.7**		0.673	
$60,000-$79,999	0.885	2.424	-0.599	0.549	-0.492	0.612
	0.791		0.702		0.677	
$80,000-$99,999	0.302	1.352	-0.422	0.656	-0.996	0.369
	0.805		0.702		0.688	
	0.606	1.834	0.218	1.244	-0.021	0.979

| $100,000-$249,999 | 0.774 | | 0.672 | | 0.655 | |

*** Significant in 0.01 level

**Significant in 0.05 level

* Significant in 0.1 level

Table 22 Correct Prediction for Multinomial Regression

Observed	Predicted				
	1	2	3	4	Percent Correct
1	226	44	12	39	70.4%
2	57	169	13	57	57.1%
3	14	21	65	47	44.2%
4	29	41	23	240	72.1%
Overall Percentage	29.7%	25.1%	10.3%	34.9%	63.8%

From the results we can see, each segment of organic foods consumers is showing distinct characteristics with significant factors impacting those four dimensions:

Thrift domestic consumer

Compared to the "Direct channel buyer", this group of respondents is more than 3 times not as likely to always be influenced by advertisements for their grocery purchasing decision. They also over 3 times than "Direct channel buyer" do not look for organic options when eating at a restaurant. The thrift domestic consumers are about 2 times over direct channel buyers to hold the opinion that organic products may still contain GMOs. Such respondents are about 1.5 times more than the baseline not to switch their frequently visited grocery store to pursue organic foods, they neither don't think they consume organic foods for a reason concerning their health

more than 3 times over the benchmark. For those respondents who are not employed by others, their probability to become thrifty domestic consumers are 1.6 times more than to become direct channel buyer. For those choosing to buy organic foods if it sold at a lower price, their probability to be counted into "Thrifty domestic consumer" is 3 times more than the baseline. For respondents who think organically grown food and conventional food has difference between there, their possibility to become thrifty domestic consumers, rather than become direct channel buyer is more than 4 times.

Compared to the respondents who want to spend over 20 cents premium to buy organic foods, those who have the willingness to pay no price premium and 1-5 cents are more likely to become a thrifty domestic consumer rather than become a direct channel buyer, respectively 5 times and more than 3 times. Differently with the respondents whose annual household income before tax is over $250 thousand, lower income respondents (annual household income less than $20 thousand) are nearly 8 times more to be classified into this segment than direct channel buyer.

However, the probability of respondents who buy organic meat to become thrifty domestic consumer is only 15% of the opportunity for them to become direct channel buyer. Male respondents are about 50% probability to be classified in this segment than direct channel buyer. If the respondents have family member younger than 17 years old, they would be only about 40% possibility to be grouped into "Thrifty domestic consumer" segment than in the "District channel buyer" segment.

Quality follower

The quality follower group members are more than 8 times not to be always influenced by advertisements for their grocery purchasing decision compare the "Direct channel buyer". When

eating at a restaurant, this group of respondents would be nearly 3 times than "Direct channel buyer" do not look for organic options. For the respondents who have access to organic food from their most frequently visited grocery store, they would be 3 times more to become a quality follower rather than the benchmark. When doing grocery shopping, the respondents who pay attention to the products' freshness, the possibility to count them as a quality follower is more than 4 times over the baseline.

Meanwhile, if the respondent does not visit the local store for grocery shopping, they would have merely about 10% possibility to become this segment's member, compare to "Direct channel buyer" segment. To purchase locally grown products, if the respondents think it's very important then they are only 20% probability to become this segment's member rather than the "Direct channel buyer". If the respondent when shopping for grocery, think the price is very important, they would be only about 20% probability to be counted into this segment's member compare to the benchmark.

The probability of respondents who buy organic meat to become a quality follower is about 25% of the opportunity for them to become direct channel buyer. At the same time, respondents who buy organic processed foods, have around 2.5 times the possibility for to become thrifty domestic consumer they compare "direct channel buyer". If the respondents buy organic juice, their probability to be counted into this group would be only 60% compare to the probability to be counted into the baseline group.

For those respondents who do not employ by others, they have over 2 times to be put into the "Quality follower" catalog rather than "Direct channel buyer". If the respondents do not have family member younger than 17 years old, they would be only about over 200% possibility to be grouped into this segment than in the "District channel buyer".

Compare to the respondents who want to spend over 20 cents premium to buy organic foods, those who have the willingness to 1-5 cents are more likely to become a quality follower rather than become a direct channel buyer, around 2.5 times. Differently, with the respondents whose annual household income before tax is over $250 thousand, middle-level income respondents (annual household income around $40,000-$59,999) are only 30% probability to be classified into this segment than "Direct channel buyer".

Organic supporter

Organic supporters show more than 2 times not to be always influenced by advertisements for their grocery decision compare the "Direct channel buyer". For respondents who treat "Certified Organic" as an influential label for their grocery shopping have 4 times higher possibility to be grouped into this segments rather than the baseline group. When eating at a restaurant, this group of respondents would be nearly 3 times than "Direct channel buyer" do not look for organic options. For the respondents who have access to organic food from their most frequently visited grocery store, they are 10 times more to become an organic supporter rather than the benchmark. If the respondent does not visit a local store for grocery shopping, they would have about 10% possibility to become this segment's member, compare to "Direct channel buyer" segment. Respondents who buy organic processed foods would have about 600% of the possibility for to become organic supporter compare to "Direct channel buyer".

Such respondents, if switch their frequently visited grocery store to pursue organic foods, are about 2 times to be counted as an organic supporter rather than the baseline. For respondents who think organically grown food and conventional food has a difference, their possibility to become organic supporters is around 3 times more than the possibility to become a direct channel buyer. When considering if they would buy organic foods for a lower price, organic

supporters are showing 3 times willingness than the benchmark group. If the respondents buy organic jam/jelly/marmalade, their probability to be counted into this group would be around 250% compared to the probability to be counted into the "Direct channel buyer" group. If the respondents do not have family member younger than 17 years old, they would be 2.5 times possibility to be grouped into "Organic supporter" segment than in the "Direct channel buyer" segment.

Compare to Pennsylvania State's respondents, those who come from New Jersey are 1.8 times more likely to become an organic supporter than become a direct channel buyer. For different willingness to pay for price premium specific for organic fruits and vegetables, those who do not have the willingness to pay, compare to over 20 cents premium, are nearly 6 times to be grouped into "Organic supporter" segment than in the "Direct channel buyer" segment; those who would like to pay 1-5 cents, compared to over 20 cents premium, are nearly 3 times to be grouped into "Organic supporter" segment than in the "Direct channel buyer" segment; and those who would like to pay 15-20 cents, compare to over 20 cents premium, are about 2.5 times to be grouped into "Organic supporter" segment than in the baseline segment.

Discussion and Conclusion

Organic processed food

Only a few studies on consumer preference about organic processed food in the Mid-Atlantic region have been conducted in the past. This study provides empirical insights to both the industrial and academic audience. Considering the rapid growth of the organic food industry, the organic foods market in the Mid-Atlantic region, and especially, organic processed food, have huge market potential. Therefore, consumer behavior studies are necessary to help producers understand the market and develop their business strategies.

Results from the survey's descriptive statistics indicate that nearly 80% of the respondents consume organic processed food, but less than 35% of those are frequent buyers. Organic juice and sauce are the most common organic processed food (vegetables and fruits) among the respondents, followed by sliced fruits and vegetables, dried/chips fruits and vegetables, and jam/jelly/marmalade.

The consumers who are looking for organic options in the restaurant, who believe organic produce is available from the store that they most often visit for groceries and those who would like to switch supermarkets to purchase organic products are the major participants of organic processed food. Organic processed food consumers and frequent buyers both would like to pay a premium price to consume organic products. However, previous study stated consumer's willingness to pay for organic multi-ingredient processed food varied significantly among consumer groups("Multinomial logistic regression," 2018). Their most common purchasing location for agricultural products is the supermarket, and they visit those markets more than 3 times per month.

For both organic processed food buyers and frequent buyers, the Internet is their most common source for accessing organic product information, followed by TV/news/radio and

Relatives/friends. Although a very large part of them do not believe organic foods have more variety compared to conventionally grown products and feel sure organic foods cost more than conventional foods, they still would like to buy organic fruits and vegetables for health reasons. Other researches shown the health concern is not a significant factor to impact the consumers' preference for organic processed foods(Batte et al., 2007). The reason behind their selection is related to their opinions about residues from pesticides or herbicides as they generally presume such chemicals are a hazard to human beings and to the environment.

The results of the two logistic regression models contain explanatory variables that significantly influence consumers' willingness to purchase organic processed foods and the frequency of purchases.

The differences between consumers of organic processed foods and high-frequency consumers are obviously and worthy of further discussion. The respondents who treat residues from pesticides or herbicides as a serious or somewhat hazardous are more likely to consume organic processed food, but they are highly unlikely to become frequent buyers. Such a difference might be related to the consumers' attitude towards organic food price, organic food variety, and their demographic characteristics.

For the studies that focus on generally organic foods, age, education level, gender, and income level are the characteristics that have been widely investigated for the consumers' willingness to pay (Govindasamy & Italia, 1999; He & Bernard, 2011; He & Bernard, 2011; Krystallis, Fotopoulos, & Zotos, 2006; Lin, Smith, & Huang, 2008; Loureiro & Hine, 2002; Yiridoe, Bonti-Ankomah, & Martin, 2005).However the willingness of consumers did not translate from consistent demographic variables among those studies

Even more, the demographic profiles of the organic processed food consumers showing in our results are not consistent with previous studies focus on organic processed food (Batte et al., 2007; Bernard, Zhang, & Gifford, 2006; Na He & John C Bernard, 2011).Such differences could be due to the variation among data collection and geographic areas.

The respondents who live in a suburban community, female, has a 2-year college or higher-level education, from New York, aged between 19-56 years, and the Caucasian background is the primary consumer of organic processed food. The respondents with high household annual income (more than $79,999) are the major participants for organic processed food frequent buyers.

Interaction terms also help us to explain the relationships between the variables. For example, as shown in the PROC model, we know respondents with African American background lack the motivation to become an organic processed food buyer compare to non-White and non-African American respondents. Among African American respondents, those with higher level education show more possibility of becoming an organic processed food buyer. However, African American respondents with higher household income are less likely to become an organic processed food buyer. African American respondents with household annual income from $20,000 to $39,999 are more likely to consume organic processed food frequently compared to higher income African American respondents. On the other hand, if only receive up to high school education, the African American respondents become less positive towards organic processed food. At what we discussed earlier, the PROC model indicates that higher level education is the main factor that is impacting the consumer's decision for organic processed food, but income level has a negative relationship with the organic food consumers' preference to organic processed foods. Therefore, we can conclude that a combination of different demographic characteristics will lead to different consumption decisions.

Information resources

Based on the analysis of the Result section, we can tell the consumers' characteristics and their preference towards organic foods are significantly different, by their primary information getting approach for organic foods.

The Internet is the most popular for the respondents to getting information about organic foods, and also the approach to food safety and nutritional information, followed by traditional Media such as TV/News/Radio, the respondents' social network. Respondents show information approach's consistency in getting both organic information and food safety information.

Those respondents who mainly use The Internet to access to food information are female and live in Delaware State, they would like to look up organic options in restaurant, purchase organic wine, shop their grocery at the community foods market 1-3 timers per average month and they usually not prefer to shop at community support agriculture because they do not think to buy organic foods is a method to support local agriculture. Such people don't think agricultural chemical abuse is a serious concern for people's health and the environment, they neither looking for fresher food than conventional products when consumes organic produce, however, they would like to buy organic foods for health reason. Also, this group of respondents would like to buy more organic foods if the price was set up lower.

The consumers who prefer TV, News, Radio and other traditional Media are people whose age over their late 50s, and with a household income between $100,000-$249,999. They prefer organic products over conventionally grown products, but they don't hold the opinion that organic food has better quality. When shopping their grocery, "Certificated Organic" label would catch those respondents' eyes, meanwhile, such people don't think foods imported from other countries are hazardous to people's health and our environment. Traditional media learners

would like to consume organic products in community support agriculture and they would like to buy organic juice, but they don't like to shop at multiple locations to search for organic foods. Those consumers believe organic foods, compared to conventional foods are at a higher price, and on the other hand, they have the willingness to buy more organic product if sold at a lower price.

Last but not least, the respondents who use their social network to get organic food information from their relatives and friends, are people who are mostly male and non-African Americans. They look for "Natural" food label when doing their grocery and they would like to shop at more than one location to purchase organic foods. Such respondents hold the opinion that purchase organic foods are their way to support local agriculture, however, they are more likely to shop from a road stand on average from 1-3 times per month. They are also more likely to ask for the organic option at a restaurant. Social network learners don't frequently purchase organic fruits but vegetables and milk, but they like to purchase organic jam, marmalade, or jelly, which are organic processed foods. Even they don't have the willingness to purchase the same quantity organic produces as conventionally grown foods, they would like to pay over 20% premium price, compared to conventional food, to purchase organic foods. Those people buy organic foods for health concern and the reason for them not to buy organic foods include they are afraid of such products don't have a shelf life.

Since the data was collected online, therefore the Internet should be the mainstream communication tool for all the participants. Such data collection method may neglect some organic foods consumers who don't have access to the Internet and use other information approaches to get to know organic foods' information. Also, for the three individual logistic regression models, the independent variables are different within each model. Selection bias is needed to be considered.

Segmenting the attributes and acceptance

After reviewing the results, we can summarize the four groups' attributes as below:

Thrift domestic consumer

This group's members are relatively low-income level organic foods consumers, mainly female

respondents and the price is a great concern in their purchasing pattern. Generally, they do not

have a strong faith in organic foods, not showing big willingness to pay a price premium for

consuming organic products and the greatest reason for them to purchase more organic foods is

"lower price".

Quality follower

The major factors for this group are ability to access to organic foods and the freshness of

products they are buying for grocery. Organic foods, both raw foods and organic foods attract

this group of consumers for health reason. But they also concerned about price issue for organic

products.

Direct channel buyer

The attributes and acceptance of organic foods consumption for this dimension are determined

based on comparisons between it and the other three dimensions. We can tell advertisement is

an influential tool for this group of respondents for their grocery decision. They look for organic

options in a restaurant and they go to a local store to purchase their foods, also they think

organic foods are quite different from conventionally grown products. Usually, these dimension

members are respondent who has a young kid at their household.

Organic supporter

Organic supporters pay the greatest attention among the four group of respondents to "Certified Organic" label for shopping for grocery. They are more likely from the New Jersey area and have a great interest in looking for organic foods. To complete that, they would like to switch from a grocery store to get organic products even generally they have access to organic foods already. They try organic processed foods, and they believe organically grown foods are different from conventional foods. Even though, they still care about the money they pay for organic foods. But they would like to pay a higher price premium, compare to other groups, to obtain organic foods.

Previous researches which applied consumer segmentation and cluster analysis to analyze the food consumption patterns are majorly focus on the relationship between food choice and sustainability, healthiness, morality and nutritional concerns (Dumortier et al., 2017; Verain et al., 2016). Those findings also indicate consumers' product knowledge, their attitude towards organic food, and socio-demographic profile also captured the classification of consumer types (Baudry et al., 2017; Verain et al., 2016).

Our research classified the organic food consumers by the food distribution channel, purchase frequency, food category, and the most influential factors when doing grocery. And in the multinomial regression analysis, we use their information approach about organic foods, their premium price willingness, their attitude toward organic food and socio-demographic information to have an in-depth assessment of the differences among different groups of consumers.

Business planners and operators can use our analysis to capitalize on their business strategy. The profiles for different organic foods consumer groups provide valuable information for their

patronage and preference in their purchase pattern. Also, the multinomial regression results show the consumers' demographic characteristics.

However, limitations still exist in our study. First of all, the level of organic product knowledge and also processed food knowledge of the respondents could be critical when measuring the consumer's willingness to pay organic foods. Secondly, since the data was collected online, therefore the Internet should be the mainstream communication tool for all the participants. Such data collection method, may neglect some organic foods consumers who don't have access to the Internet, and use other information approaches to get to know organic foods' information. Moreover, because of the questionnaire filter, all the participated respondents are organic consumers, therefore their awareness of organic foods and organic information should be higher than those who don't buy organic products. Likewise, another possible limitation in the questionnaire is the variables only account for the time to visit, both location and food category, rather than the quantity that the respondents actually bought. According to previous studies, we assume high purchase frequency is related to high consumption ("Multinomial logistic regression," 2018), a more accurate questionnaire could help to improve the reliability for the information that we are looking for.

The study was also limited to New Jersey, New York, Pennsylvania, Delaware, and Maryland. It's unknown whether these results translate to a broader region. Future studies should continue exploring the other areas in the United States and provide a comprehensive profile of the potential organic food buyers and compare the effectiveness of organic food marketing channels.

Policy implications

Since the processed food products expand in the organic food market, we are expecting our research could contribute to businessmen and policy makers' product development strategies attract more consumers with willingness to pay premium price for organic processed foods. Evidence from previous studies suggest the differences between fresh and processed food varied among food categories(Baudry et al., 2017). Also, researchers are looking for an increased range of production and pricing strategies for producers of multi-ingredient organic foods(Na He & John C. Bernard, 2011). Our research provides a profile for consumers of processed foods made with organic fruit and vegetables, and shows a positive relationship between organic juice/sauce and high willingness to pay extra money to buy consume such products. Our findings could help further research or business plan to investigate more consumers' demographic information for the, and use the same method to develop consumer insight for other organic processed foods, such as dairy food, snack food and other processed products made by fruits and vegetables.

The analysis also illustrates the relationship between organic food consumers' preference and their objective information sources. Therefore, we provide useful insights for policy makers, food growers and business marketers about how information provision can affect their product demand. The results from our research support previous study, as several barriers for the consumption of organic food such as relatively high price premiums and the real or perceived lack of availability are well known(Batte et al., 2007). Our research goes further to discuss how objective information provision can impact the consumers' purchasing behavior of consume organic foods. The research could help the food communicator to adjust their information supply method to improve the personalized intercourse with consumers to make food choice.

From a public perspective, the policy makers could promote organic knowledge by certain sources to engage to consumers with different preference and characteristics.

Our findings also underscored important implications for the business planners by conducting the segmentation of attributes toward organic consumers' preference and analysis. Such an approach provides a foundation of valuable information to accelerate expanding of organic food market. Foremost, they could use our analysis to tailor their advertising information, and to underline specified business strategies for each group of consumers, based on the different characteristics of each segment. For instance, we provide an approach for the marketers to attract individual consumers by using the predicted purchasing pattern. In this way, the marketers could target on more consumers with varied preference or demand by increasing their motivation and shop more frequently. Secondly, same as other researchers stated(Rousseau & Vranken, 2013), by recognizing regularities in how the purchasing pattern differed across product categories, retailers can get information about the probable size of customer groups with given organic purchasing patterns. And furthermore, to develop cross-selling strategies for their future plan.

Appendices

1. Copy of the organic food consumers survey

BASELINE SURVEY ON THE STATUS OF THE ORGANIC FRUITS, VEGETABLES MARKETING OPPORTUNITIES IN THE MID-ATLANTIC REGION OF UNITED STATES

SURVEY QUESTIONNAIRE FOR CONSUMERS - ORGANIC PRODUCE AND MARKETING

Important Terms:

Certified Organic: An ecological farming system that uses no synthetic pesticides, no hormones or antibiotics, no irradiation, no genetically modified (GM) ingredients, no sewage bio solids and no chemical fertilizers. Organic produce includes fruits and vegetables and tree nuts. These products are inspected and certified by the USDA, and must be at least 95% organic. These products have been produced (grown) and handled (stored, packaged, or processed) in accordance with the USDA's regulations. Third party agents accredited by the USDA perform inspections of farms and food handlers. Organic farms must use management and cultural techniques to maintain or improve soil organic matter and soil health. Any materials used for organic production must be natural (and not on the prohibited naturals list), or must be provided for in the regulation.

Natural: The official USDA definition of natural refers to products that have been minimally processed and contain no additives, which means no artificial flavors, colors, or preservatives. This definition applies to all products that do not have an ingredient label

(a label is added if the product includes a marinade or solution). Then, if there is no ingredient label on it, then it can be assumed as natural.

Conventional: *Produce may be grown using synthetic chemicals including fertilizers and pesticides within the government's standards and limits. Also, these products are not certified as organic, may be irradiated, and may contain GM ingredients.*

Community Supported Agriculture (CSA): *Consists of a community of individuals who pledge support to a farm operation where the growers and consumers share the risks and benefits of food production. CSAs usually consist of a system of weekly delivery or pick-up of vegetables and fruits in a vegetable box scheme.*

Local: *It is often determined by distance travelled from where it was grown, produced or processed. Some can conclude local to mean a very small area (city and its surrounding area) while others conclude that local means to the borders of their state and/or regions.*

Eco Friendly**:** *Eco-friendly products are products that do not harm the environment, whether in their production, use or disposal.*

Please Indicate Your Eligibility to Participate in this Survey:

1. Location: ☐ New Jersey ☐ New York ☐ Pennsylvania ☐ Delaware
   ☐ Maryland
   Postal zip code _____

2. Are you at least 18 years of age and consent to participate in this survey?
   ☐ Yes ☐ No

3. Please indicate if you purchased organic produce in the last 12 months?
   ☐ Yes ☐ No

4. Are you the primary grocery shopper?

☐ Yes ☐ No

If yes, to questions 1 – 4 continue the survey, if no, do not continue

General Questions:

5. Do you consciously look for healthy food for your family?

☐ Yes ☐ No

6. Where do you get food safety and nutritional information (select all that apply)?

☐ TV News ☐ Internet ☐ Radio ☐ Newspaper/Articles

7. How often do food advertisements help you to decide which agricultural food items to purchase?

☐ Usually ☐ Always

8. Do you grow fruits or vegetables for consumption at your home?

☐ Yes ☐No

9. How frequently do you check the food's ingredient label that you purchase?

☐ Usually ☐ Always

10. Do you regularly shop at more than one food store in order to purchase agricultural products?

☐ Yes ☐ No

11a. Which of the following labeling or advertising influence your decision to purchase food products?

	Yes	No
Locally grown	☐	☐

Certified organic	☐	☐
Natural	☐	☐
Conventional	☐	☐
Eco-Friendly	☐	☐
Country of orgin	☐	☐
Pesticide Free	☐	☐

11b. Which is the most important factor when purchasing food products?

11c. Please rank the following labels/advertising from 1 "Most Influential" to 7 "least Influential" when purchasing food products.

Locally grown

Certified organic

Natural

Conventional

Eco-Friendly

Country of orgin

Pesticide Free

12.Do you look for organic options in restaurants ?

☐ Yes   ☐ No

13. What do you feel about the following?

	Serious hazard	Somewhat of a hazard	Not a hazard at all
Residues from pesticides or herbicides	☐	☐	☐
Genetically modified crops (GMO)	☐	☐	☐

Foodborne-illness	☐	☐	☐
Produce grown in foreign countries	☐	☐	☐

14. Please select the preferred choice of fresh produce which would you like to buy?

☐ Conventionally grown but local produce ☐ Organically grown but not local produce

☐ Both ☐ Don't want to answer this questions

Specific Questions Related to Organic:

15. Do you prefer organically grown produce more than conventionally grown?

☐ Yes ☐ No ☐ Unsure

16. Where do you get information about organic produce?

☐ TV/ Newspaper / Radio ☐ Internet

☐ Relatives/Friends ☐ Universities/Extension Specialists

17. How often in an average month do you purchase agricultural products from the following locations? (Select one from each category)

	Never	1 to 3 times	3-6 times	6-9 times	Over 9 times
Super markets	☐	☐	☐	☐	☐
Online purchase	☐	☐	☐	☐	☐
Small/local grocery store	☐	☐	☐	☐	☐
Direct market at the farm	☐	☐	☐	☐	☐
Community farmers market	☐	☐	☐	☐	☐

Community supported agriculture	☐	☐	☐	☐	☐
Pick your own	☐	☐	☐	☐	☐
Roadside Stand	☐	☐	☐	☐	☐

18. Is organic produce available from the store that you most often purchase groceries?

☐ Yes   ☐ No   ☐ Unsure

19. How important are the following to you when purchasing organic produce?

	Very Important	Somewhat Important	Less Important	Not Important	
Ripeness	☐	☐	☐	☐	☐
Freshness	☐	☐	☐	☐	☐
Country where produce is grown	☐	☐	☐	☐	☐
Absence of pesticide residues	☐	☐	☐	☐	☐
Locally produced	☐	☐	☐	☐	☐
Low Price	☐	☐	☐	☐	☐
Packaging	☐	☐	☐	☐	☐

20. How do you feel about the following statements when purchasing organic produce?

	Yes	No
Organic food tastes better than non-organic food	☐	☐
Organic produce does not contains GMO's	☐	☐
Support for local farmers and agriculture	☐	☐
Buying organic food is a waste of money	☐	☐
Would you switch supermarkets to be able to purchase organic produce?	☐	☐

21. How often do you shop for each of the following products?

	Never	Rarely (1 or 2times/year)	Sometimes (1time /month)	Often (3-4 times /month)	Regularly (more than 1 time /week)
Organic Fruits	☐	☐	☐	☐	☐
Organic Vegetables	☐	☐	☐	☐	☐
Organic Milk/Yoghurt	☐	☐	☐	☐	☐
Organic Meats	☐	☐	☐	☐	☐
Organic eggs	☐	☐	☐	☐	☐
Organic Processed foods	☐	☐	☐	☐	☐

22. Organic produce sold at a premium price and you still buy the same quantity?

☐ Yes   ☐ No

Specific questions related to organic fresh fruits and vegetables

23. Do you buy organic fruits and vegetables for health reasons?

☐ Yes   ☐ No

24. Suppose your favorite fresh fruit or vegetable normally costs $1 per pound. Would you pay slightly more for organic certified produce?

☐ No

☐ Yes, I would pay between 1 cent and 5 five cents more for organic produce

☐ Yes, I would pay between 6 cents and 10 cents more for organic produce

□ Yes, I would pay between 11 cents and 15 cents more for organic produce

□ Yes, I would pay between 16 cents and 20 cents more for organic produce

□ Yes, I would pay over 21 cents more for organic produce

25. How do you think organically grown fruits and vegetables compare to conventionally grown produce in supermarkets and other retail facilities?

In terms of *quality*   □ Better

In terms of *freshness*   □ Better

In terms of *variety*   □ More

In terms of *prices*   □ Higher

26. Please select the amount and types of fruits and vegetables you purchased in the last12 months?

□ All- conventional produce   □ Mostly- conventional produce

□ All-organic produce   □ Mostly-organic produce

27. How do you feel about the following statements?

	Agree	Neutral	Disagree
Conventionally produced fruits and vegetables are generally safe to consume	□	□	□
There is basically no difference between the safety of conventional and organically produced fruits and vegetables	□	□	□
The use of synthetic chemicals in agriculture has a negative effect on the environment	□	□	□

I would buy organic fruits and vegetables if they were more readily ☐ ☐ ☐

available

I have confidence that GMO produce is perfectly safe ☐ ☐ ☐

I would buy organic fruits and vegetables if they were ☐ ☐ ☐

cheaper

28. Please indicate how many visits you made in the past month to purchase organic

fruits and vegetables:

 _____ times/month

29. How much, on average, did you typically spend each visit for organic fruits and

vegetables? $_____/visit.

30. How many different organic farms/ markets/ stores did you visit in the past year?

_____

31. On average, how many miles do you travel to reach organic farms/ markets / stores

(one way) ____miles?

32. Please select the following reasons for non-purchase of organic fruits and vegetables

(select all that apply).

☐ Organic food is not available   ☐Organic food is too expensive

☐ Inconsistent in supply   ☐ Limited varieties / produce

☐ I do not trust that food sold as organic is produced organically

☐ Organic food does not have shelf-life

☐ I do not believe organic food has additional health benefits

☐ Organic food does not look attractive

☐ I do not believe organic food has additional environmental benefits

☐ Others…………………..

33. Please select the following value added / processed organic fruits and vegetables you would like to buy from the food outlets.

☐ Organic Jam/Jelly/ Marmalade   ☐ Organic Chutney/Pickles

☐ Organic Juice   ☐ Organic Juice/Sauces

☐ Organic Wine   ☐ Organic Dried/Chips Fruit and Vegetables

☐ Organic Sliced Fruits and Vegetables   ☐ None of these

Demographics:

34. Please select the best description of the community you live in.

☐ Urban   ☐ Suburban   ☐Rural

35. How many years have you been living at your current place or residence? _____years

36. Number of persons, including yourself, in your household _____

37. Number of persons aged 17 and younger in your household _____

38. Please indicate your gender   ☐ Male   ☐ Female

39. Please indicate the highest level of education you have completed.

☐ No formal schooling   ☐ Elementary school   ☐ Up to high school

☐ 2 year college degree   ☐ 4 year college degree   ☐ Graduate degree

40. Which of the following best describes your primary occupation?

    ☐ Retired   ☐ Self-employed   ☐ Employed by others

    ☐ Homemaker   ☐ Farmers   ☐ Others

41. Please indicate your ethnicity.

    ☐ White   ☐ African American   ☐ Hispanic or Latino

    ☐ American Indian and Alaska Native   ☐ Asian

    ☐ Native Hawaiian and other Pacific   ☐ Other_____

42. Please indicate Annual-Income category of your household before taxes.

    ☐ $ Less than 20,000   ☐ $ 20,000 - 39,999   ☐ $ 40,000 – 59,999

    ☐ $ 60,000 - 79,999   ☐ $ 80,000 – 99,999   ☐ $ 100,000 – 249,999

    ☐ $ 250, 000 above

If any comments:

You are now finished with the survey.

Thank you for your participation.

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