ORGANIC PREFERENCE MODEL IN THE UNITED STATES: AN ORDERED PROBIT MODEL APPLICATION

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To the most important loved ones in my life: my Mom and Dad

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The organic food industry has been growing at a remarkable rate. In 2008, the retail sales for organic food products in the United States reached $22.9 billion, with a growth rate of about 15.8% in 2008 over 2007 (OTA, 2009). Tending to be a lifestyle choice in previous years, organic food purchases have evolved into the fact that at least two-thirds of American consumers buy organic products at some point in time. Given the bottom line that consumption is based on not what the product is, but what consumers perceive and are aware of about the product, it is important to understand consumer behaviors as well as identify the underlying determinants of choosing organic foods.

Household data were collected from an internet survey conducted by the private company from February 2008 through March 2010. The survey was nationally demographically balanced with a total of nearly 38,000 household entries. The essential response to the statement “I seek out organic foods” was scored by using a five-point Likert scale. Explanatory variables included in the models were established from demographic questions (including age, gender, ethnicity, income, education, employment, marital status, household size, region etc), expenditures and grocery shopping locations, behavior/attitudes statements, health concerns and seasonality.

Since household responses to the statement “I seek out organic foods” were discrete values, ordered probit models were appropriate to estimate the probability of seeking out organic foods.

To illustrate how the probabilities of seeking out organic foods differs across socio-demographics, behaviors and attitudes, health concerns, etc., we simulated probabilities for five outcomes with each given a particular set of conditions for the explanatory variables by using the coefficients from the results of the ordered probit models.

By ranking the relative effects to the average likelihood in descending order, variables identified as contributing the major effect on the probability of seeking out organic foods include “numbers of daily servings of fruit”, “eat fresh foods”, “read label”, “go out of way to obtain certain types of produce”, and “age”; alternatively, “gender”, “limited physical mobility concerns”, “shopping for food in warehouse stores”, “cholesterol concerns”, and “obesity concerns” were the five least important factors. Overall, behavioral factors were more important than demographic characteristics, except age, on the probability of seeking out organic foods.

A limitation of the study is that the preference for organics was measured through self-reports of seeking out organics but not reporting the actual consumption level(s). However, an underlying premise is that seeking out organic foods and actual organic consumption are highly correlated.

CHAPTER 1
INTRODUCTION

U.S. Organic Market

The organic food industry has experienced unprecedented growth with an average annual growth rate of 20-24% in recent years (Dimitri and Richman, 2000) and a prediction that high double-digit growth rates would continue into the next decades (NMI, 2007). In 2008, the U.S. organic food industry gained $24.6 billion in consumer sales, among which the retail sales for organic food products reached $22.9 billion (93% of all organic product sales). Although organic food sales only represents 3.47% of the overall food retail share, the level of organic market penetration (organic food as a percent of total U.S. food sales) has doubled or even tripled in the past a few years. Organic food sales rose much faster than total food sales; specifically, the growth rate of organic food sales was about 15.8% in 2008 over 2007, compared to a rise in total U.S. food sales of 4.9% during the same period (OTA, 2009). However, the organic food sales have slowed since 2007 (see Table 1-1). Mintel report (2008) provides the same results about the year-over-year sales trend, and predicts the organic food sales will slow further in the future partially due to the competition between organic and natural foods. The top three categories – produce, dairy products, and beverages – represent 37%, 16% and 13% of total organic food sales in 2008 respectively (Nutrition Business Journal, 2008).

A study that interviewed market managers in more than 20 states, referring to the 2002 market season, reported that within the markets that include organic farmers, demand for organic products was strong in nearly 40%, medium demand in 47%, and low demand in only 13% of these markets (Kremen, Greene, and Hanson, 2004). The demand for organic products is growing rapidly. After the publication of the “USDA organic” label and standards in 2000,

consumer demand for organic products significantly expanded. But what else contributed to this rapid growth?

Formerly organic food purchases were usually lifestyle choices of a smaller number of consumers who were expected to differ by race, be affluent, well-educated, and to differ by households size (Dimitri and Oberholtzer, 2006). In recent years, it appears that at least two-thirds (69%) of American consumers sometime brought organic products with about 28% purchasing weekly according to the Hartman Group (The Hartman Group, 2008). According to the Organic Trade Association's (OTA) 2009 U.S. Families' Organic Attitudes & Beliefs Study, almost three-quarters (73%) of U.S. families purchased organic products at least occasionally even though the economic slow down induced U.S. families to reduce their spending. The characteristics of organic consumers have become much more diverse and cannot easily be profiled by previous significant predictors (such as income, education, etc.). This increase in popularity may be due to increasing availability and affordability for consumers. According to USDA Economic Research Service (USDA/ERS), organic products have been available in nearly 20,000 natural foods stores and in 73% of all conventional grocery stores since 2002. This accessibility likely facilitated the purchasing of organic food into becoming a mainstream activity, as evidenced by where consumers purchased their organic foods. Instead of being limited to just conventional supermarkets or mass merchandisers, organic buyers sometimes chose to do grocery shopping in a variety of retail outlets. Based on the OTA's 2009 U.S. Families' Organic Attitudes & Beliefs Study, among the parents who chose to buy organic products, 19% reported weekly visits to natural food chain stores, 16% reported weekly visits to local health food/natural food stores, 16% went to farmers' markets, and 12% shopped in neighborhood co-ops. New organic products continue to be introduced to the U.S. retail market,

rising from 378 products in 2001 to 1,042 products in 2008. The claim "organic" has ranked among the top 5 advertizing claims every year since 2005 (USDA/ERS Briefing Rooms, 2009). Beverage, packaged and prepared foods, and bread/grains made up of the majority of new organic product introductions in 2008 (USDA/ERS Briefing Rooms, 2008). The availability of a wider variety of organic foods appears to be responding to increased consumer demand.

Credence Attributes

Consumers' decision-making about buying organic products is not only determined by economic factors or by product appearances and tastes, but also by non-material values such as food safety as well as perceived social and environmental benefits. Those are unique aspects of the organic market in product differentiation. Three qualities of a product – search quality, experience quality, and credence quality – have been distinguished by Nelson (1970) and Darby and Karni (1973). With search or experience goods, consumers are often incapable of judging the credence quality of goods even after consumption (McCluskey, 2000). Organic products are a popular example of credence attributes (McCluskey, 2000) since the information referring to the nature of the product is asymmetric and additional information is required. That is, consumers do not know whether the products they are purchasing are organic or not unless this kind of information is revealed by the product producer or experts. Moreover, consumers must be confident about the sources that inform them of the underlying production practices. Otherwise, organically produced foods and conventionally produced foods may not be successfully differentiated. To avoid this supply-side market issue, it is critically important to establish a universally accepted definition of the term of "organic", implement a national standard for organically produced products, as well as utilize labeling based on third party certifications for organic food. In fact, the USDA organic logo has been considered as a feasible way for consumers to recognize organic products and feel confident about the attributes of organic

products they buy since the performance of the National Organic Standards in 2002 (Dimitri and Oberholtzer, 2009).

Organic Agriculture

A current definition of the term "organic agriculture" by the USDA's National Organic Program in condensed form is as follows:

> Organic crops are raised without using most conventional pesticides, petroleum-based fertilizers, or sewage-based fertilizers. Animals raised on an organic operation must be fed organic feed and given access to the outdoors. They are given no antibiotics or growth hormones. (USDA National Organic Program 2005)

Simply speaking, organic food (also referred to as "organics"), is produced relying on ecologically based practices which virtually exclude the use of synthetic chemical inputs, antibiotics and hormones, and in addition promotes soil health, biodiversity, animal fair treatment, and environmental sustainability. Organic agriculture is explicitly defined as an ecological production system. Environmental benefits connected with organic production include "reduced pesticide residues in water and food; reduced nutrient pollution; improved soil tilth, soil organic matter, and productivity; and lower energy use; carbon sequestration; and enhanced biodiversity" (ERS/USDA, 2009). Previous studies reveal that consumers have a basic understanding of organics (Smith et al., 2009). Briz and Ward (2009) showed that a minority of 39% of consumer respondents correctly claimed that organic products are "those cultivated without synthetic pesticides" and only 34% give a tolerable answer. However, consumers are still confused between "organic" and "natural"; for instance, if a food product is made with organic ingredients but also contains artificial flavorings, then it would be "organic" but not "natural". Less than half of respondents could make a distinction between organic and natural food, and most respondents who are able to distinguish these two concepts are younger population between age 18 and 34 (Mintel, 2008).

As we know, organic products are differentiated not solely by economic factors but also perceived social and environmental benefits. Organic price premiums have been considered as an important factor in making organic farming earn a comparable or even higher profit than conventional farming (Dimitri and Greene, 2002). The differential production costs and the relative short supply of organic products can be the basis of a price premium. But a price premium (reflects the high production cost and the relative supply level) cannot fully reflect the true social values or environmental benefits of organically produced products. Hence, it may be necessary to establish public investment in organic agriculture to facilitate accessibility of organic products to consumers, promote profitability to organic farmers, and protect the environment as well (ERS/USDA, 2009).

Organic consumers consider a wide variety of reasons when making purchasing decisions, with health and nutrition (66%), taste (38%), and food safety (30%) as the primary reasons offered for organic purchases (Hartman Group, 2002; Dimitri and Oberholtzer, 2006). Specifically, based on the Hartman Group survey Organic 2006: Consumer Attitudes & Behavior, Five Years Later & Into the Future, the top five reasons given for organics purchases are: 1) to avoid products that rely on pesticides or other chemicals; 2) to avoid products that rely on antibiotics or growth hormones; 3) for nutritional needs; 4) to support the environment; 5) to avoid genetically modified products. However, the debate over organics continues. A UK's Food Standards Agency (FSA, 2009) provides a review stating that there is little difference between the nutrient content of organically versus conventionally grown food.

Given that the bottom line of consumption is not what the concept of the product is, but what consumers perceive and are aware of, it would be insightful to better understand

consumers' attitudes as well as identify the underlying motivations and other factors linked to organic purchases.

Problem Statement

Numerous industry and academic studies have been dealing with consumer behavior and trying to identify socio-demographic factors that motivate consumer's choice of organic products. Consumers of organic foods have in some studies been characterized as Caucasian, with better education, affluent, and caring about health and food quality (Dimitri and Oberholtzer, 2006). With growing availability, organic products are no longer just a lifestyle choice of a select group of consumers but an established practice of two-thirds of American consumers who purchase organic products at least occasionally (Hartman Group, 2004). Asian and African-Americans are inclined to purchase organically grown produce more frequently than Caucasians and Hispanics (Steven-Garmon et al., 2007) and income is not significantly relevant to organic purchases (Steven-Garmon et al., 2007; Thompson, 1998). Thus, it appears that organic consumer profiles have likely become more diverse in the last decade, extending over a wider range of demographics and other consumer distinguishing categories.

"Food is an emotional issue" (The Wall Street Journal, 10.25.2002). While food is essential, food selection is an emotional issue. Although socio-demographic characteristics are expected to affect consumption preferences, those consumer characteristics are not easily changed at least in a relatively short period of time. Nevertheless, consumers have an increasing desire to take ever-greater control of their lives, including their own and family members' health, lifestyle and behavior issues. They may pursue organic food products if they believe organic products are safer, environmental friendly, from local farms and can trace the source, all of which could reassure consumers that they have some feeling of control. That is, they may buy organics for purposes other than just the physical attributes of the product. Moreover, fifty-five

percent of consumers express their willingness to explore new products. This desire may translate to organic opportunities since organically grown products are potentially associated with “fresh and innovative” concepts (Molyneaux, 2007).

One would expect some broader implications based on current consumer data on a national level. For example, can the likelihood of seeking organics be adjusted? How could the likelihood of seeking organics be changed? And it is important to understand what influences the consumption decision for organic foods. Then, the analytical issue is discussed in the study: what is the probability of seeking organics? An interesting aspect in this study is to investigate the effects of consumers’ behaviors or attitudes contributing to the levels of seeking out organic foods besides socio-demographic characteristics.

Drawing from the organic consumer behavior literature, there are a number of studies that employed discrete choice models to measure consumer preferences for organics. While the ultimate research goal would be to measure the amount of organics consumed, that level of consumption detail is often difficult to acquire and often not available on a national basis. Most of the demand studies rely on some level of consumer recall about organics with the simplest measure being “did you buy (or not buy) organic foods within some defined consumption period”. While this type question implicitly documents basic buying behavior, it does not provide the level of intensity. An alternative approach is to ask the consumer if they seek out organic products. This approach gives greater insight into intensity behaviors about organics but still does not empirically link the effort to a specific quantity. Yet, an underlying assumption is that there is a link between intensity (seeking out) and the level of consumption. The specific tenor of this research lies in the essential statement that “I seek out organic foods” measured on a

five-point Likert scale (where a 5 means you "completely agree" with the statement and 1 means you "completely disagree").

Often households can more easily respond to inquiries about the level of intensity whereas it is more difficult to give a precise quantity level, especially when the question is not directed to a specific product. Since this study focuses on a broad preference for organics and the information is available, the preference intensity approach will be used as a proxy for the demand for organic foods. Since preference intensity is an ordinal but ranked scale (i.e., the intensity of 5 exceeds the intensity of 4 or lower scores), the approach to measuring the proxy demand for organics is through determining the probability of each intensity score. Given that intensities are ordered binary values, determining the probabilities is a classical ordered probit problem.

Research Aims and Objectives

The aim of this study is to investigate the demand for organic foods quantitatively using the preference intensity approach and expanding into the following questions:

- How would one measure the probabilities of each score for seeking for organic foods?
- What are the major demand drivers for organic foods? Which factors are significant determinants in explaining preference intensities or probabilities of moving across the scaling value of "seeking out organic foods"? Among the drivers, the expectation is that consumer socio-demographic characteristics, behaviors/attitudes towards organic foods, and health conditions status will be particularly important.

Several explicit hypotheses drive the empirical analyses:

- Consumption levels towards organic foods differ across consumer demographics.
- Some behaviors/attitudes factors are important for consumers' decision-making towards purchasing organic foods.
- It is thought that health conditions significantly affect consumers' choices on organic foods, such as people with diabetes, high blood pressure or other diseases being more likely to purchase organic foods.

- The proportion of expenditures on food compared to the total household disposable income is assumed to be a negative determinant of organic foods purchases.
- Information factors (product differentiation, fancied/fad) would be expected to have positive effects on consumers' choice of organic foods.

Methodology and Data

Data were collected from an internet survey conducted by the private company during February, 2008 through March, 2010. It is a national demographically balanced survey with a total of 37,582 household entries. Every two weeks, at least 1,200 households report through an internet diary survey. In the data set, the focus is on consumption behavior in each two-week period (total 24 periods) referring to organic food products; and respondents know they are submitting a two-week period report. The survey contains questions about demographics (including age, gender, ethnicity, income, education, employment, marital status, household size, region etc); store choice and expenditures for grocery shopping; attitudes; use of food labels; eating habits; and health conditions. Particularly, respondents were asked to score the following question with a five-point Likert scale: "I seek out organic foods".

In addition, during the survey period while some households stay with the survey from the beginning, other households drop out after a short period. However, more than half of the respondents participated longer than a year.

Since the response to "I seek out organic foods" is discrete with five-point scaled values, the likelihood of seeking out organic foods can be estimated by ordered probit models.

Overview of the Study

The remaining five chapters provide a detailed discussion of methodology, results analysis and findings of the study. Chapter 2 provides insight into a literature review of the organic products industry, consumer awareness, consumer preferences, and associated applications of discrete choice models on organic foods. Chapter 3 focuses on the descriptions of the data used

in the study. The preference intensity approach is developed and organic preference model is specified in Chapter 4, setting forth the ordered probit model for the response to the statement of "I seek out organic foods". Regression results including estimated coefficients and supporting statistics plus sensitivity analysis are presented in Chapter 5, followed by a discussion of findings and implications in Chapter 6.

Table 1-1. Organic food sales and penetration of total organic food sales

	Organic Food Sales ($ Million)	Change from Prior Year	Organic Penetration
1997	3,594	Na	0.81%
1998	4,286	19.2%	0.94%
1999	5,039	17.6%	1.06%
2000	6,100	21.0%	1.22%
2001	7,360	20.7%	1.41%
2002	8,635	17.3%	1.63%
2003	10,381	20.2%	1.94%
2004	11,902	14.6%	2.19%
2005	13,831	16.2%	2.48%
2006	16,718	20.9%	2.80%
2007	19,807	18.5%	3.15%
2008	22,929	15.8%	3.47%

Source: OTA's Manufacturer/Organic Industry Surveys, 2006-2009

CHAPTER 2
LITERATURE REVIEW

A Short Review

A large number of studies on several issues of organic consumer behavior have been conducted by both industry and academic researchers. Industry reports usually focus on how often consumers purchase organic products, where to buy and the reasons to buy organic products, as well as demographic data of respondents. Survey reports established by the Hartman Group, the Organic Trade Association (OTA), and the Natural Marketing Institute (NMI) are widely cited in many studies. In NMI's 2007 Organic Consumer Trends Report, organic consumers have been categorized into four distinct segments represented by percentage of the U.S. primary grocery shoppers: Devoteds (16%), Temperates (22%), Dabblers (44%), and Reluctants (18%). Devoteds are those who exhibit the highest usage of organic products and the most knowledge of "organic"; Temperates differ from Devoteds in the belief that organic products are necessity, so they shop for organics with less frequency and spend less on organic purchase. About 75% of total organic spending is attributed to Devoteds and Temperates together; furthermore, they are likely to consume more and more as new organic product introductions keep raising. NMI also suggests that although Reluctants are educable, the size of the Devoteds group would remain relatively stable. The 2009 U.S. Families' Organic Attitudes and Beliefs Study conducted by OTA identifies "organic buyer groups" into four groups by the length of time in the organic market: Newly Organic parents (32%), Experienced Organic parents (20%), Seasoned Organic parents (21%), and Non-buyers (27%). The report reveals that three quarters of U.S. families purchase organic foods no matter how often they shop for organics and how much they spend on organic purchases. Among the organic buyers, Newly Organic parents began to buy organic foods partly because organic foods became available in

conventional grocer stores. Seasoned Organic parents are typical organic consumers who were white, well-educated and wealthy. The Hartman Group (2008) defines "core" organic consumers as those who are the most integrated in the purchase and use of organics across a wide variety of categories and would likely continue to increasingly be involved in the organic market.

Unlike industry studies, academic researches attempt to understand the organic consumers' choices as well as underlying motivations through several different approaches. Thompson (1998) provided a review of emerging studies of consumer demand for organic products, and summarized that attitudes, motives, and willingness to pay have been measured except elasticity estimates due to lack of retail data. After comparing different studies, he concluded that demographic variables were important in explaining differences in organic purchase behavior.

Organic Consumer Behaviors

Generally, demographic factors (such as age, gender, education, income, employment, etc.) were expected to have important impacts on explaining consumer behaviors. A stereo-typical organic consumer was described to be Caucasian, affluent, and well-educated just a few years ago. According to recent studies focusing on organic consumers, the picture of the typical organic shopper was no longer easily identified based on a few traditional significant predictors.

Some studies suggested that organic consumers were clustered into two groups of age 18-29 and of age 40-49 (Lohr and Semali, 2000; Thompson, 1998). Household heads younger than 30 years old or aged 50 and older were more often represented as heavy organic users than lighter users (Steven-Garmon et al., 2007). Younger population with age 18-34 was more likely to purchase organic foods, while respondents older than 65 years showed the lowest organic usage rate (Mintel, 2008). Consumer's organic purchase decisions showed little difference between genders (Thompson and Kidwell, 1998; Briz and Ward, 2009). A few national studies (such as the Hartman Group and the Food Marketing Institute) and academic researches

(Loureiro and Hine, 2001; Briz and Ward, 2009) suggested that education had a positive impact on organic purchasing behaviors. However, Thompson and Kidwell (1998) also provided evidence that shoppers with graduate or professional degrees were less likely to purchase organic products. It had been noticed that parents of young children or infants were more likely constant organic product buyers, which was consistent with the finding that households with children under eighteen were inclined to buy organic food products (Thompson and Kidwell, 1998; Loureiro et al., 2001). But Thompson (1998) also summarized that the presence of children was not the significant indicator in the Delaware studies. Mintel studies (2008) implied a positive correlation between income and organic purchases since the higher price of organics was a barrier for lower-income households. But several studies also provided evidence of exceptions that higher household incomes did not necessarily suggest higher likelihoods of organic purchases (Huang, 1996; Thompson and Kidwell, 1998; Hartman Organic Research Review, 2002); moreover, there might be a declining tendency in higher-income groups, while lower-income consumers seemed to be more "entrenched" organic buyers (Thompson, 1998). Many studies focused on geographic factors and suggested that households residing in the U.S. western region spent more on organic products (Thompson, 1998; Steven-Garmon et al., 2007).

As the organic industry grows, the number of consumers purchasing organic products continues to increase and they are likely not limited to a single ethnic group. In fact, organic consumers today represent a quite diverse ethnic picture. Steven-Garmon et al. (2007) concluded that Asian and African-Americans were more likely to purchase organically grown produce frequently compared to Caucasians and Hispanics. This was generally consistent with the Hartman Group Organic 2006 Survey, which reported Asian Americans and Latino Americans were relatively more likely to purchase organic foods or beverages than Caucasian Americans

based on their representation in the population. And more surprisingly, the ethnic group that was more likely to be "core" organic consumers was Latino Americans, and to a lesser extent, African Americans, compared to Caucasian Americans and Asian Americans. The Hartman group (2006) suggested that this was probably due to the Latino's "historical connection with organics" and their strong concern for family.

Store effect is another critical variable based on several studies which suggest that differences in consumer behavior across stores are significant as long as organic products retain their exclusive availability in a few particular market outlets. "Accounting for where foods are purchased is likely to be important in understanding where potential growth in organic foods might occur" (Thompson, 1998). Households with higher disposal income were inclined to shop in specialty grocer. Furthermore, households who shopped in specialty grocer were sensitive to the price differences between organic and conventional products and they were less likely to purchase organic produce (Thompson and Kidwell, 1998). On the contrary, Batte et al. (2007) concluded that the magnitudes of the willingness to pay for organics by specialty grocery shoppers were substantially more than traditional grocery shoppers as long as the amount of organic content level was higher than 70% organic ingredients.

While the effects of a product's appearance (e.g., cosmetic defects) on food choice were relatively small (Thompson and Kidwell, 1998) or non-significant (Huang, 1996), concerns about nutrition and price were critical to consumers decision-making with respect to organic foods (Huang, 1996; Magnusson et al., 2001). It had been shown that organic foods were valued and experienced not only for their appearances, tastes, prices, but also for their social and environmental benefits (for example, food safety, animal welfare, supporting local farmers,

healthier choices, environmentally-friendly) (Huang, 1996; Williams and Hammit, 2000; Lourerio et al, 2001; Torjusen et al., 2001; Dimitri and Richman, 2000).

In addition, subjective norms (like social pressure) affected consumers' attitude and purchase intentions, but explained little about purchase behaviors (Smith and Paladino, 2009), which was opposite to the finding of Ajzen (1991). Familiarity was an important factor that gave a partial explanation of why so few consumers purchased organic products despite having positive attitudes about organics (Magnusson et al., 2001; Smith and Paladino, 2009; Briz and Ward, 2009).

Discrete Choice Model Applications

Most studies on the factors affecting consumers' choice for organic products applied a discrete choice model: Huang (1996)'s study on consumers' preference for organically grown produce (OGP), in which a bivariate probit model was formulated, suggested that nutritional consciousness, concern about pesticides use, and verifying that produce was free of pesticides were three significant factors for consumers who preferred organic fresh produce. He also examined the probabilities of willingness to buy OGP even if they had sensory defects in trade for food safety and environmental benefits. The results suggested a negative correlation between income level and tolerance of sensory defects on OGP, but consumers who were Caucasian, with better education and large families were more likely to accept it.

In Thompson and Kidwell's study of choice between organic and conventional fresh produce in 1998, they measured actual choices based on data collected in retail stores, rather than drawing out willingness to pay for organic produce. They estimated the choice by using a two-equation probit model, which indicated the possibility that consumer's choice of store and their choice of products may impact each other simultaneously. The results implied an interesting connection between the choice of store and the consumers' choice of fresh organic produce:

despite relatively higher income and education level on average, shoppers who shopped at specialty grocer were less preferred to organic produce, and were sensitive to price differences between organic and conventional produce; shoppers who were less likely to choose organic produce preferred specialty grocery stores.

Briz and Ward (2009) studied consumers awareness of organic products in Spain, and specified a multinomial logit model to predict probabilities of awareness, as well as a probit model to link awareness and purchase of organic products. Specifically, they built three levels of awareness of organic foods, and linked only the probability of correctly being aware of what's organic to consumptions of organic products. They indicated that due to credence attributes of organic products and consumer emotions, the learning curve about organics was probably nonlinear and its slope might not be always positive. That is, at the estimated average awareness level of 46%, the likelihood of organic food consumption actually declined as the state of awareness continued to grow. They also provided a ranking of all determinants in the model to indicate that the education had the most profound impacts on the awareness of organic products, followed by age, knowledge about enriched foods, income, region, market size, and finally, gender having the least effect.

Loureiro et al. (2001) collected survey data directly from consumers in two grocery stores in Portland, Oregon, to be able to obtain estimates of preferences for organic, eco-labeled, and regular apples from the actual decision makers. Their analyses were based on a random utility model and were modeled by using a multinomial logit framework. Results illustrated that concerns for food safety and environmental benefits had a positive correlation with the preference for choosing organic apples compared to eco-labeled and regular options.

Other Methodology Application

In the study of consumer reactions to changes in labeling regulations under the National Organic Program (NOP), Kiesel and Villas-Boas (2010) employed the hedonic price function approach and a discrete choice model. They concluded that the implementation of the USDA organic seal on milk labels significantly acted as a positive shifter of the likelihood of purchases; and the welfare outweighed the costs incurred by labeling regulation based on their cost-benefit analysis. However, while consumers who were aware of the NOP seal were more likely willing to pay a premium for organic foods, awareness of the NOP seal was not a significant indicator of the magnitude of premium (Batte et al., 2007).

A recent study of consumer behavioral intentions towards purchase of food products (including conventional food, quality low-input food, and organic food) across six European countries conducted by Ness et al. (2010) developed country-based structural equation models building on the quality-value-satisfaction-loyalty framework. This study elucidated that perceived quality, value, and satisfaction were determinants of food consumers' behavioral intentions. Specifically, satisfaction was the key to developing consumers' intentions since growing satisfaction had a positive impact on consumers' attitudes; moreover, satisfaction could be increased by increasing perceived value, which was enhanced by greater perceived quality.

CHAPTER 3
ORGANIC DATABASE

Data used in this study were collected from an internet survey conducted by the private company "Market Tools" during February, 2008 through March, 2010. The actual source of the data for research purposes only is through the National Mango Board. The data are private and only the supplemental questions relating to organic preferences were used out of a much larger database. A total of 37,582 household entries were retrieved from this national demographically balanced survey. Each household documented and reported their organic products consumption behavior during a two-week period. The number of times a household reported varies during the survey period: while some households kept filing from the beginning to the end of survey, some households quit submitting after a short period. In fact, more than half of the total respondents remained with the survey longer than one year.

While the data are preparatory to the National Mango Board, the Board commissioned the private company "Market Tools" to collect the data for many commodities along with many questions about the head of the household reporting. Every two-week a selected group of households (panel) report their buying activities along with their demographics, attitudes, and preferences, including that of seeking out organics. Households included in the panel are continually adjusted to maintain a demographically balance panel with the total number usually around 1200 households reporting at any one period. Some households report for several periods while the norm is for households to drop out after participating over a few reporting periods. While not specifically addressed in this study, other results with these data suggest that the length of participating in the panel has little to no effect on the broader conclusions. For this analysis, the final database extended over the periods from February 2008 through March 2010, thus giving as current database as feasible. Details about the company are available on their

website and since the data are privately owned we have been very careful to maintain the confidentiality of the information. That is, the private information cannot be distributed in the public domain but the research results can be.

Respondents were asked to score the segmenting question whether she or he sought out organic foods on a five-point Likert scale. The survey also contained questions on demographic information such as age, gender, ethnicity, race, income, education, employment level, marital status, household size, presence of children, census region, etc., as well as where they went grocery shopping, expenditures for grocery shopping, behavior attributes, eating habits, and health conditions. The dependent variable in the regression was the score for seeking out organic foods (Y), and it was posited to be explained with

Y = f (socio-demographics, attitudes/behaviors attributes, store choices, health conditions).

Among the 37,582 household heads responding to the survey, about 19.2% of the respondents agreed with the statement "I seek out organic food" (using scores 4 and 5 in the five-point Likert scale as indicators of agreement with organic preference), while about 56.2% of respondents choose not to seek out organic food and 24.6% of respondents reported a neutral score (Figure 3-1). Figure 3-2 shows the distributions of five levels of agreement about seeking organic foods: only 7.0% completely agree with the statement, 12.2% mostly agree, 24.6% neither agree nor disagree, 21.7% mostly disagree, and 34.5% completely disagree with the statement about seeking out organic foods during the survey period. Figure 3-3 compares the distribution of agreement in 2009 to that in 2008 and it indicates that the distribution of completely disagreement and agreement both declined by 2.2% and 0.8% respectively, while the distribution of "somewhat disagree" and "somewhat agree" both increased by 2.8% and 0.5% respectively from 2008 to 2009. The distribution of those with neutral agreement does not change much from

2008 to 2009. Figures 3-4 and 3-5 provide an overview of the distribution of agreement with seeking out organic foods in each reporting period during the survey for a total 38 periods. According to the overall distribution, we can observe that the reporting periods with agreement distributions rising above 20% are concentrated in the mid periods of the survey, while during the beginning and ending periods of the survey, the distribution was much lower. These slight shifts during the entire survey period may point to some underlying seasonality effects. The proportion of agreement with seeking out organic foods is illustrated in Figure 3-6, which shows most respondents who claim agreement mostly agree with the statement "I seek out organic foods".

Table 3-1 shows the responses to "I seek out organic food" on a Likert scale and a full description of each explanatory variable with their corresponding discrete classification and their frequency in percent based on 37,582 observations. The demographics, behavior and attitudes attributes, and other important factors expected to influence the decision of buying organics are recorded (see Appendix A). Only household heads with ages older than 18 years are included in this survey, otherwise they are screened out the survey. Female heads of household represent 46 percent of the sample. White and non-Hispanic household heads account for the largest proportion in the sample (nearly 63%), while White/Hispanic, Asian, and African American household heads represent 9.5%, 3.6%, and 13.2% of the sample respectively. Household size is measured by adding each number of people currently living in respondents' household in five age ranges (including the respondent himself or herself); in the sample: 33.7% of households have two members and only 11.6% of households have more than four members. Member(s) with ages less than 18 years were considered as children; in the sample, about 33% of families reported the presence of children. Regarding income levels among the respondents, about 36% of

households have income between $35,000 and $ 75,000, followed by households with income below $35,000 with 34%. Among all respondents, nearly half are full-time employed (including self-employed), and nearly two thirds have some college or a college degree. The geographical attributes of the respondents also varied among areas based on the United States census. These nine areas were aggregated into four regions (Northeast, Midwest, South, and West) to reduce the analyses needed. Approximately 21% of respondents lived in Northeast region, 28% of respondents lived in Midwest region, 32% of respondents lived in South region, and 19% of respondents lived in Western region.

The distribution of expenditures on grocery shopping within one week was 38% of households spent between $100 and $200, 18% spent under $50, and only one percent spent more than $400. Most households reported that they shopped for food in grocery stores (almost 90%) and the fewest reported shopping for food through internet grocery stores (less than 4%). Mass merchandisers (56%) and warehouses (30%) were also popular places for grocery shopping, with lower percentages of households reporting shopping in convenience stores (21.5%) and farmers' markets (11.5%). Approximately 80% of respondents reported that they consume about 1-3 servings of fruits and vegetables in a typical day.

Given that there are a large number of dummy variables in the model, it is necessary to check the correlation between explanatory variables before running the model. Except for a relatively high correlation between household size (XHWD) and households with children under 18 years old (XCHL), there was no significant correlation among all other dummy variables (see in Table B-1).

As suggested earlier, a limitation of this study was that the preference for organic food was measured through reports of seeking out organics rather than actual consumption behaviors.

Again an underlying assumption in this study was that there was a correlation between seeking out organic food and the actual consumption of organic food.

Table 3-1. Descriptions of explanatory variables

Description	Variable	Name/Range	Frequency in percent
Demographics			
AGE:	XAGE1	18 to 24	15.81%
Age of household	XAGE2	25 to 44	39.61%
head (18+)	XAGE3	45 to 64	30.64%
	XAGE4	65 and older	13.94%
GENDER:	XGEN=1	Female	46.39%
Gender of household head	XGEN=0	Male	53.61%
RACE:	RACE1	White/NONHISPANIC	62.93%
Ethnicity	RACE2	White/HISPANIC	9.53%
	RACE3	Black/African American	13.16%
	RACE4	Asian	3.63%
	RACE5	Other	10.74%
CHL:	XCHL=1	Yes	33.14%
With children under 18 years	XCHL=0	No	66.86%
EDUC:	XEDU1	High school or less	21.29%
Highest education	XEDU2	Some college or college degree	64.36%
level	XEDU3	Graduate or professional degree	12.31%
	XEDU4	Other	2.04%
EMPLY:	XEMPLY1	Employed, full time	47.43%
Employment	XEMPLY2	Employed, part time	7.88%
	XEMPLY3	Not employed	7.97%
	XEMPLY4	Other	36.72%
INCOME:	XINC1	Under $35,000	34.05%
Household income	XINC2	$35,000 – $74,999	35.57%
(dollars)	XINC3	$75,000 – $99,999	9.95%
	XINC4	More than $100,000	10.07%
	XINC5	Prefer not to answer	10.36%
MARITAL:	XMAR1	Single, never married	28.05%
Marital status	XMAR2	Married	48.30%
	XMAR3	Living with parents	7.93%
	XMAR4	All others	15.72%
HWD:	XHWD1	1 member (single)	21.83%
House size (number of	XHWD2	2 members	33.70%
members)	XHWD3	3 members	17.86%
	XHWD4	4 members	15.04%
	XHWD5	>4 members	11.57%

Table 3-1. Continued

Description	Variable	Name/Range	Frequency in percent
STATE0: Census region	REGION1	NORTHEAST: New England NORTHEAST: Middle Atlantic	20.73%
	REGION2	MIDWEST: East North Central MIDWEST: West North Central	28.19%
	REGION3	SOUTH: South Atlantic SOUTH: East South Central SOUTH: West South Central	32.16%
	REGION4	WEST: Mountain WEST: Pacific	18.92%
SERV_FRU: Servings of fruit do you consume in typical day (#0-10)	XSERFRU1	0 serving	6.45%
	XSERFRU2	1-3 servings	82.34%
	XSERFRU3	4-6 servings	10.58%
	XSERFRU4	>7 servings	0.63%
SERV_VEG: Servings of vegetable do you consume in typical day (#0-10)	XSERVEG1	0 serving	3.16%
	XSERVEG2	1-3 servings	83.71%
	XSERVEG3	4-6 servings	11.95%
	XSERVEG4	>7 servings	1.18%
EXPEND: expenditures on grocery shopping within a week (dollars)	XEXPD1	under $50	17.85%
	XEXPD2	$50 to $100	33.45%
	XEXPD3	$100 to $200	37.70%
	XEXPD4	$200 to $400	9.67%
	XEXPD5	more than $400	1.33%
SHOP_GRO: Shopping for food in grocery store	XSHOP_GRO=1	YES	89.74%
	XSHOP_GRO=0	NO	10.26%
SHOP_WARE: Shopping for food in warehouse	XSHOP_WARE=1	YES	29.60%
	XSHOP_WARE=0	NO	70.40%
SHOP_INTE: Shopping for food in internet grocery store	XSHOP_INTE=1	YES	3.74%
	XSHOP_INTE=0	NO	96.26%
SHOP_MASS: Shopping for food in mass merchandiser	XSHOP_MASS=1	YES	56.18%
	XSHOP_MASS=0	NO	43.82%
SHOP_CONV: Shopping for food in convenience store	XSHOP_CONV=1	YES	21.51%
	XSHOP_CONV=0	NO	78.49%
SHOP_FARM: Shopping for food in farmers' market	XSHOP_FARM=1	YES	11.51%
	XSHOP_FARM=0	NO	88.49%

Table 3-1. Continued

Description	Variable	Name/Range	Frequency in percent
Behavior/attitude attributes			
BHV_EXERCISE:	B_EXE1	Completely disagree	18.68%
I exercise at least 3	B_EXE2	Mostly disagree	18.04%
times a week	B_EXE3	Neither agree nor disagree	21.48%
	B_EXE4	Mostly agree	16.35%
	B_EXE5	Completely agree	25.45%
CALORIES:	CAL1	Completely disagree	30.62%
I count calories	CAL2	Mostly disagree	21.56%
	CAL3	Neither agree nor disagree	24.98%
	CAL4	Mostly agree	13.98%
	CAL5	Completely agree	8.86%
BHV_LABEL:	B_LAB1	Completely disagree	8.29%
Read ingredients on	B_LAB2	Mostly disagree	10.17%
labels of the foods I	B_LAB3	Neither agree nor disagree	25.44%
buy	B_LAB4	Mostly agree	26.14%
	B_LAB5	Completely agree	29.97%
BHV_HLTH:	B_HLT1	Completely disagree	10.07%
I feel healthier than	B_HLT2	Mostly disagree	14.54%
peers	B_HLT3	Neither agree nor disagree	37.03%
	B_HLT4	Mostly agree	25.21%
	B_HLT5	Completely agree	13.15%
BHV_NEWFOOD:	B_NEW1	Completely disagree	9.79%
I frequently	B_NEW2	Mostly disagree	16.76%
experiment with new	B_NEW3	Neither agree nor disagree	33.68%
foods	B_NEW4	Mostly agree	25.09%
	B_NEW5	Completely agree	14.68%
BHV_FRE:	B_FRE1	Completely disagree	6.45%
I eat fresh foods much	B_FRE2	Mostly disagree	13.71%
more frequently than	B_FRE3	Neither agree nor disagree	31.71%
packaged food	B_FRE4	Mostly agree	27.22%
	B_FRE5	Completely agree	20.91%
BHV_FRUVEG:	B_FV1	Completely disagree	9.51%
I eat fruits and	B_FV2	Mostly disagree	15.55%
vegetable more than	B_FV3	Neither agree nor disagree	35.32%
other people my age	B_FV4	Mostly agree	23.16%
	B_FV5	Completely agree	16.46%
BHV_WAY:	B_WAY1	Completely disagree	12.81%
I go out of my way to	B_WAY2	Mostly disagree	15.32%
get certain types of	B_WAY3	Neither agree nor disagree	30.90%
produce	B_WAY4	Mostly agree	24.51%
	B_WAY5	Completely agree	16.45%

Table 3-1. Continued

Description	Variable	Name/Range	Frequency in percent
Behavior/attitude attributes			
BHV_STORE:	B_ST1	Completely disagree	6.90%
I prefer to buy produce	B_ST2	Mostly disagree	9.25%
from certain stores	B_ST3	Neither agree nor disagree	28.33%
	B_ST4	Mostly agree	30.65%
	B_ST5	Completely agree	24.88%
Health concerns			
HLT_BLOOD4:	HLT_BP=1	No one	58.51%
No one has high blood	HLT_BP=0	Otherwise	41.49%
pressure in household			
HLT_DIABE4:	HLT_DB=1	No one	80.16%
No one has diabetes in	HLT_DB=0	Otherwise	19.84%
household			
HLT_CHOLE4:	HLT_CL=1	No one	62.23%
No one has high	HLT_CL=0	Otherwise	37.77%
cholesterol in			
household			
HLT_ALLEG4:	HLT_AG=1	No one	83.59%
No one has food	HLT_AG=0	Otherwise	16.41%
allergies in household			
HLT_OBEST4:	HLT_OB=1	No one	69.88%
No one has obesity in	HLT_OB=0	Otherwise	30.12%
household			
HLT_MOBIL4:	HLT_MB=1	No one	80%
No one has limited	HLT_MB=0	Otherwise	20%
physical mobility in			
household			
HLT_HEAR4:	HLT_HR=1	No one	82.87%
No one has significant	HLT_HR=0	Otherwise	17.13%
sight or hearing			
impairment in			
household			

Table 3-1. Continued

Description	Variable	Name/Range	Frequency in percent
Seasonality			
MTH_S:	MTH1	Jan.	9.12%
Months from 1-12	MTH2	Feb.	7.02%
	MTH3	Mar.	8.96%
	MTH4	Apr.	8.32%
	MTH5	May	8.22%
	MTH6	Jun.	8.13%
	MTH7	Jul.	8.22%
	MTH8	Aug.	8.00%
	MTH9	Sep.	8.18%
	MTH10	Oct.	8.67%
	MTH11	Nov.	8.57%
	MTH12	Dec.	8.58%

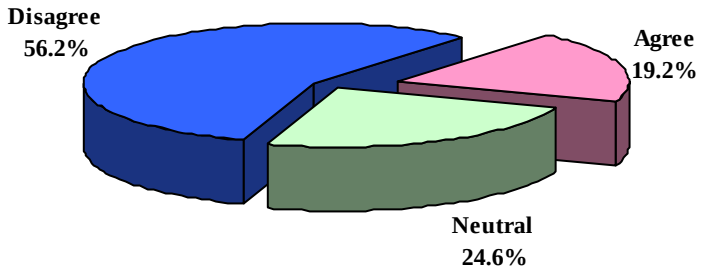


Figure 3-1. Frequency distribution of the responses to "I seek out organic foods" (combining score 5 and score 4 for responses of agreeing with "I seek out organic foods"; combining score 1 and score 2 for responses of disagreeing with "I seek out organic foods")

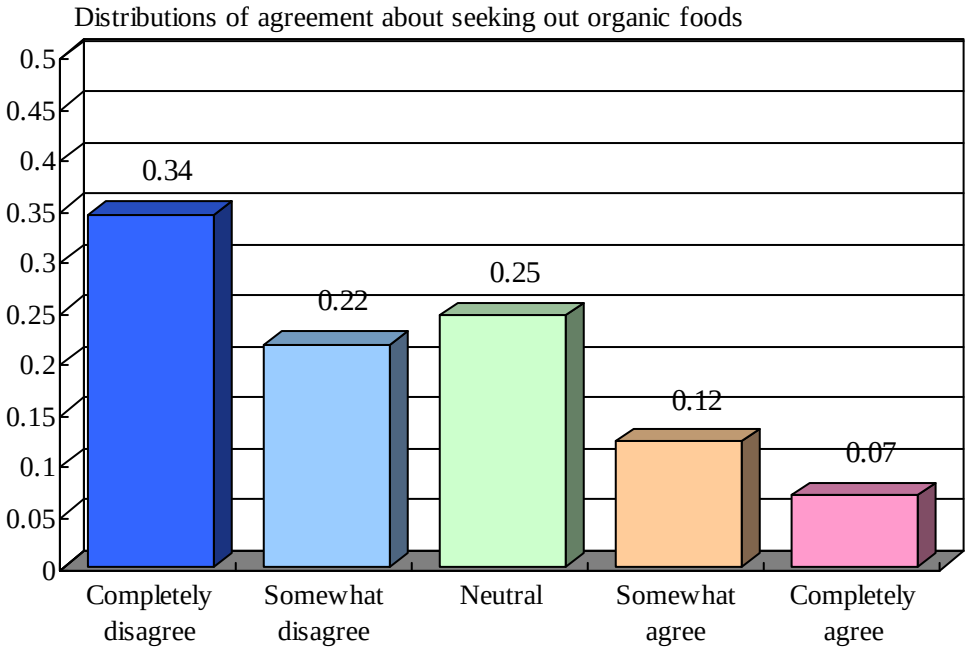


Figure 3-2. Frequency distribution of responses to "I seek out organic foods"

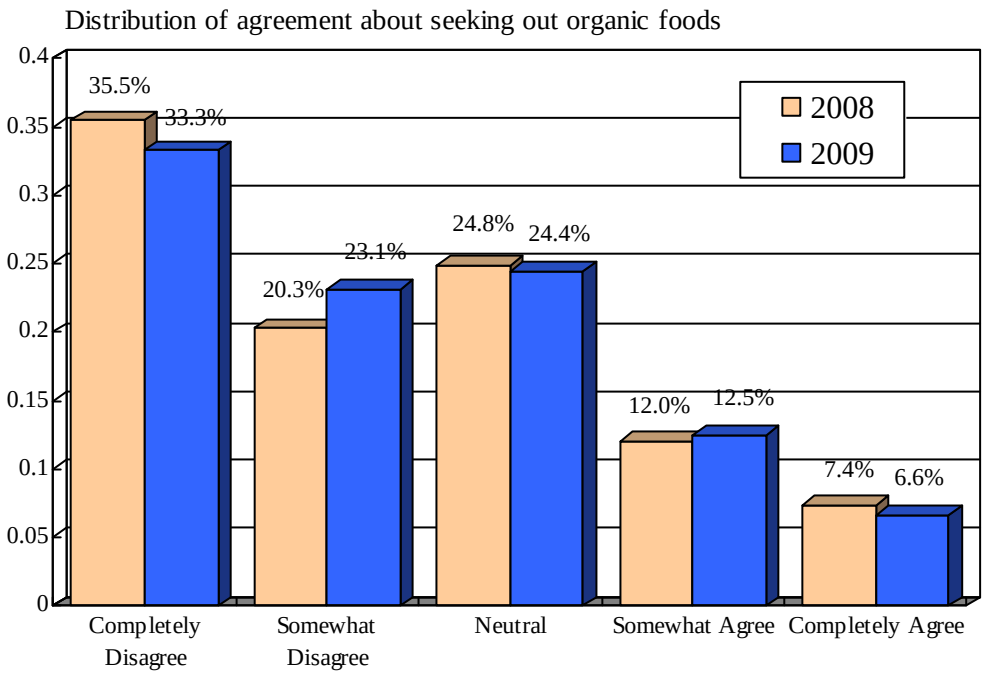


Figure 3-3. Comparison of frequency distribution of responses of agreeing to "I seek out organic foods" in 2008 and 2009

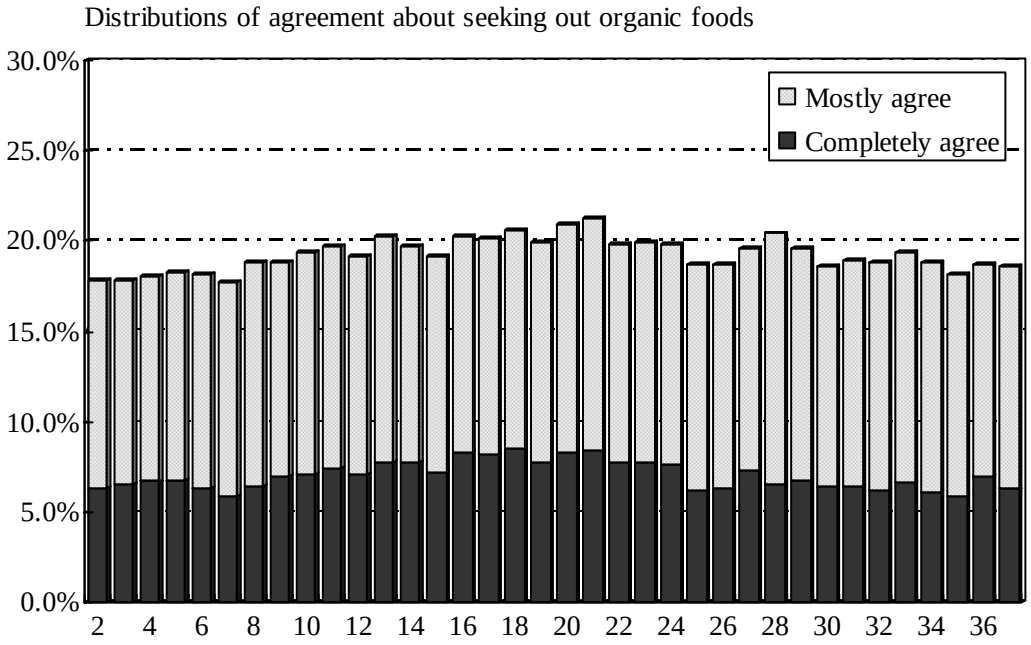


Figure 3-4. Distributions of responses of agreeing to "I seek out organic foods" during the reporting periods (from 2 = Feb. 2008 to 37 = Feb. 2010)

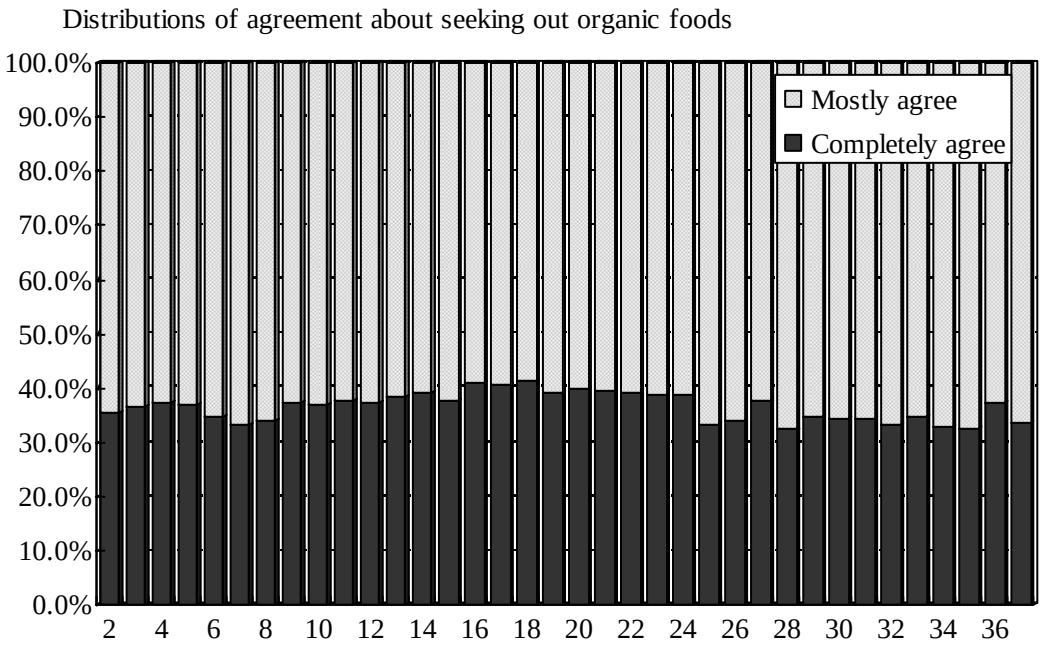


Figure 3-5. Frequency distribution of responses of agreeing to "I seek out organic foods" detailed in "Completely agree (5)" and "Mostly agree (4)" during the reporting periods (from 2 = Feb. 2008 to 37 = Feb. 2010)

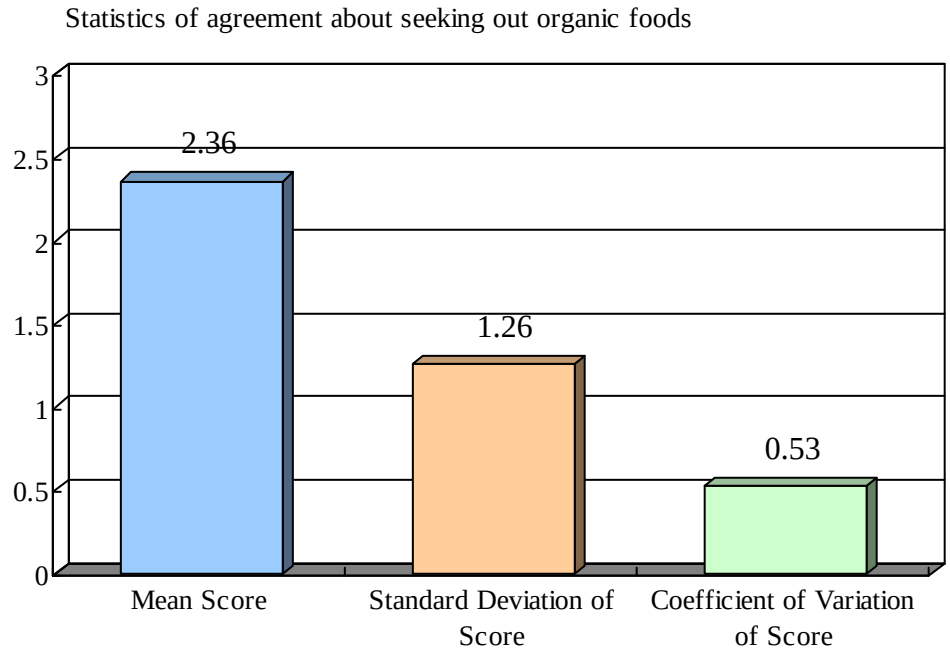


Figure 3-6. Percentage of frequency distribution of responses of agreeing to "I seek out organic foods" during the reporting periods (from 2 = Feb. 2008 to 37 = Feb. 2010)

CHAPTER 4
ORGANIC PREFERENCE MODEL

In the case of estimating the determinants of responses to questions using a Likert scale, the fundamental interest is to determine the probability of each level of outcome and how the probabilities differ across the respondents' characteristics. To estimate the likelihood of "I seek out organic foods", we used an ordered probit model which is appropriate and commonly used when the dependent variable associated with more than two outcomes is both discrete and ordinal.

Let "O" represent "I seek out organic foods", and define O_i as the i^{th} observation in the survey. The outcomes of "I seek out organic foods" ($y = O_i$) is discrete with scaled values form 1 to 5 increasing in magnitude of agreement (1 = completely disagree; 2 = mostly disagree; 3 = neither agree nor disagree; 4 = mostly agree; 5 = completely agree). These scores reflect an ordinal scaling that is exhaustive and mutually exclusive; yet, they are only rankings and have no cardinal significance. A critical assumption of the ordered probit model is that the model fits the parallel slopes requirement, which means the slope coefficients of variables do not vary between different outcomes. Quantitatively, the problem is a classic situation for ordered probit modeling.

Organic Preference Model Specifications

Suppose motivations are captured with a set of variables in matrix X and effects of X are reflected with β. Then $X\beta$ represents the impacts of each motivating variable once $\beta's$ are known.

In Ordered Probit models, we build a latent regression

$$y^* = X\beta + \varepsilon \tag{4-1}$$

where $y*$ is the unobserved latent index ranging from $-\infty$ to $+\infty$ and is determined by observed factors $X's$ along with unobserved factors $\varepsilon's$. Matrix of β is composed of the intercept and all parameters associated with the matrix X. ε is assumed to be normally distributed with a mean of zero and variance of one.

Then the measurement equations for y = O_i could be illustrated as following specifications:

$$
\begin{aligned}
&y = 1 \text{ if } -\infty < y^* \le \theta_1 \\
&y = 2 \text{ if } \theta_1 < y^* \le \theta_2 \\
&y = 3 \text{ if } \theta_2 < y^* \le \theta_3 \\
&y = 4 \text{ if } \theta_3 < y^* \le \theta_4 \\
&y = 5 \text{ if } \theta_4 < y^* < -\infty
\end{aligned}
\tag{4-2}
$$

θ's are called thresholds, which are unknown values to be estimated with β's, and satisfy the relationship of $\theta_1 < \theta_2 < \theta_3 < \theta_4$ ($\theta_k \in (-\infty, +\infty)$, k=1, 2, 3, 4).

The probability for each Likert score of seeking out organic foods can be derived as follows (letting Φ represents the cumulative normal function). Take the probability of score=1 for example:

$$
\begin{aligned}
\text{Prob}(y=1) = \text{Prob}(O_i|O_i=1) &= \text{Prob}(-\infty < y^* \le \theta_1) \\
&= \text{Prob}(-\infty < X\beta + \varepsilon \le \theta_1) \\
&= \text{Prob}(-\infty - X\beta < \varepsilon \le \theta_1 - X\beta) \\
&= \Phi(\theta_1 - X\beta) - \Phi(-\infty - X\beta)
\end{aligned}
\tag{4-3}
$$

Since $\Phi(-\infty - X\beta) = 0$, the scores are exhaustive and mutually exclusive (i.e., $\Phi(\infty - X\beta) = 1$), and by using ORDPROB procedure in TSP software (TSP econometric software was used in this study), the lowest effective boundary value of the threshold is

normalized to zero (i.e., $\theta_1 = 0$), therefore the total number of the thresholds (θ's) to be estimated is the number of values which y takes on less 2. Yields:

$$\begin{aligned}
&\text{Prob}(O_i|O_i=1) = \Phi(-X\beta) \\
&\text{Prob}(O_i|O_i=2) = \Phi(\theta_2 - X\beta) - \Phi(-X\beta) \\
&\text{Prob}(O_i|O_i=3) = \Phi(\theta_3 - X\beta) - \Phi(\theta_2 - X\beta) \\
&\text{Prob}(O_i|O_i=4) = \Phi(\theta_4 - X\beta) - \Phi(\theta_3 - X\beta) \\
&\text{Prob}(O_i|O_i=5) = 1 - \Phi(\theta_4 - X\beta)
\end{aligned} \tag{4-4}$$

For illustration purposes, we suppose that X is made up of X_k (k=1,…,6) being binary and there is no continuous variable. There are a total of 36 discrete variables (X_k) expected to explain the motivations moving across the scale of agreement about seeking out organic foods. Each X could be expressed as: (*j* denotes each discrete level, while *i* represents each of the actual observations)

$$\begin{aligned}
X_1\hat{\beta}_1 = &\sum_{j=1}^{4}\alpha_j XAGE_{ji} + \sum_{j=1}^{2}\alpha_{j+4} XGEN_{ji} + \sum_{j=1}^{5}\alpha_{j+6} RACE_{ji} \\
&+ \sum_{j=1}^{4}\alpha_{j+11} XEDU_{ji} + \sum_{j=1}^{4}\alpha_{j+15} XMAR_{ji} + \sum_{j=1}^{5}\alpha_{j+19} XHWD_{ji} \\
&+ \sum_{j=1}^{2}\alpha_{j+24} XCHL_{ji} + \sum_{j=1}^{5}\alpha_{j+26} XINC_{ji} + \sum_{j=1}^{5}\alpha_{j+31} XEXPD_{ji} \\
&+ \sum_{j=1}^{4}\alpha_{j+36} XEMPLY_{ji} + \sum_{j=1}^{4}\alpha_{j+40} REGION_{ji}
\end{aligned} \tag{4-5}$$

$$\begin{aligned}
X_2\hat{\beta}_2 = &\sum_{j=1}^{5}\delta_j CAL_{ji} + \sum_{j=1}^{5}\delta_{j+5} B_FRE_{ji} + \sum_{j=1}^{5}\delta_{j+10} B_LAB_{ji} \\
&+ \sum_{j=1}^{5}\delta_{j+15} B_ST_{ji} + \sum_{j=1}^{5}\delta_{j+20} B_WAY_{ji} + \sum_{j=1}^{5}\delta_{j+25} B_FV_{ji} \\
&+ \sum_{j=1}^{5}\delta_{j+30} B_HLT_{ji} + \sum_{j=1}^{5}\delta_{j+35} B_EXE_{ji} + \sum_{j=1}^{5}\delta_{j+25} B_NEW_{ji}
\end{aligned} \tag{4-6}$$

$$X_3\hat{\beta}_3 = \sum_{j=1}^{2}\gamma_j XSHOP\_GRO_{ji} + \sum_{j=1}^{2}\gamma_{j+2} XSHOP\_WARE_{ji} + \sum_{j=1}^{2}\gamma_{j+4} XSHOP\_INTE_{ji} + \sum_{j=1}^{2}\gamma_{j+6} XSHOP\_MASS_{ji} + \sum_{j=1}^{2}\gamma_{j+8} XSHOP\_CONV_{ji} + \sum_{j=1}^{2}\gamma_{j+10} XSHOP\_FARM_{ji} \quad (4\text{-}7)$$

$$X_4\hat{\beta}_4 = \sum_{j=1}^{4}\gamma_{j+12} XSERFRU_{ji} + \sum_{j=1}^{4}\gamma_{j+16} XSERVEG_{ji} \quad (4\text{-}8)$$

$$X_5\hat{\beta}_5 = \sum_{j=1}^{2}\omega_j HLT\_BP_{ji} + \sum_{j=1}^{2}\omega_{j+2} HLT\_DB_{ji} + \sum_{j=1}^{2}\omega_{j+4} HLT\_CL_{ji} + \sum_{j=1}^{2}\omega_{j+6} HLT\_AG_{ji} + \sum_{j=1}^{2}\omega_{j+8} HLT\_OB_{ji} + \sum_{j=1}^{2}\omega_{j+10} HLT\_MB_{ji} + \sum_{j=1}^{2}\omega_{j+12} HLT\_HR_{ji} \quad (4\text{-}9)$$

$$X_6\hat{\beta}_6 = \sum_{j=1}^{12}\lambda_j MTH_{ji} \quad (4\text{-}10)$$

$$\text{Then, } X\hat{\beta} = \hat{\beta}_0 + X_1\hat{\beta}_1 + X_2\hat{\beta}_2 + X_3\hat{\beta}_3 + X_4\hat{\beta}_4 + X_5\hat{\beta}_5 + X_6\hat{\beta}_6 \quad (4\text{-}11)$$

In sum, the fundamental challenges are to specify X_k first and then estimate the impacts of each motivating variable. In the next chapter, these measures will be comprehensively explained (see Table 3-1 for the definition of the X variables).

Predicted Probabilities

According to the expressions described in last section, the predicted probability for each Likert score can be derived in a general way as follows: (m=1, 2, 3, 4, 5)

$$\hat{\Pr}(y_i = m) = \Phi(\hat{\theta}_m - X\hat{\beta}) - \Phi(\hat{\theta}_{m-1} - X\hat{\beta}) \quad (4\text{-}12)$$

which indicates the relationship between the dependent categories and explanatory variables. In practice, information about estimated β's and θ's can be obtained from the

regression result, and then calculate in equation (4-12) to obtain predicted probabilities. In the case of more than one independent variable included in a model, the effect of each single variable can be examined while holding other variables as their actual values. If the independent variable is discrete, we make a X matrix containing a 1 in the first column for intercept, a 1 in the column representing the controlled category of dummies, and other columns take their actual values across the panel. Take gender dummies, for instance; the gender variable contains two dummies XGEN1 and XGEN2 (a restricted gender dummy DGEN (1 is female and -1 is male) is used for regression). To illustrate the effect of gender on the probabilities of ordinal outcomes, we first make the X matrix contain a 1 in the first column for the intercept, a 1 in the column representing gender (DGEN) to select female respondents (or a -1 to select male respondents), and other columns again are the actual variable values. The process is similar when discrete variables contain more than two categories of dummies. Take age dummies for example, age dummies contains four categories (XAGE1, XAGE2, XAGE3, and XAGE4) and restricted age dummies (DAGE1, DAGE2, and DAGE3) are included in regressions. The X matrix could contain a 1 in the first column for intercept, a 1 in the column representing XAGE1 to select the respondents with ages between 18 and 24, and other variables remain in their corresponding columns the same values that they actually are. The processes for other categories of age are similar to XAGE1 except the category of XAGE4, for which the matrix contain a 1 in the first column for the intercept, a -1 in columns representing age except XAGE4 (-1 in columns representing XAGE1, XAGE2, and XAGE3), with other columns remaining at their actual values .

Partial Change and Discrete Change in Predicted Probabilities

A question often asked is how the probabilities of the various outcomes would change when the value of one variable changes. The signs of the coefficients obtained from regression

do not directly reveal the direction of impact for each restricted dummy variables. In order to evaluate the marginal effects of explanatory variables, we can estimate the marginal responses, calculate the odds ratios, or simulate the probabilities across different levels of one particular variable category.

For continuous variables X, the marginal effect on the probabilities of a small change in X_{ik} (value of the k^{th} determining variable for person *i*) for person *i*, under a normal distribution is:

$$(Z_i = \sum_{k=1}^{K} \beta_k X_{ik})$$

$$\begin{aligned}
&\frac{\partial \Pr(Y_i = 1)}{\partial X_{ik}} = \frac{d}{dZ_i}\left[\Phi(\theta_1 - Z_i)\right]\frac{\partial Z_i}{\partial X_{ik}} = -\Phi'(\theta_1 - Z_i)\beta_k \\
&\frac{\partial \Pr(Y_i = 2)}{\partial X_{ik}} = \frac{d}{dZ_i}\left[\Phi(\theta_2 - Z_i) - \Phi(\theta_1 - Z_i)\right]\frac{\partial Z_i}{\partial X_{ik}} = \left[\Phi'(\theta_2 - Z_i) - \Phi'(\theta_1 - Z_i)\right]\beta_k \\
&\quad\vdots \\
&\quad\vdots \\
&\frac{\partial \Pr(Y_i = J)}{\partial X_{ik}} = \frac{d}{dZ_i}\left[1 - \Phi(\theta_{J-1} - Z_i)\right]\frac{\partial Z_i}{\partial X_{ik}} = \Phi'(\theta_{J-1} - Z_i)\beta_k
\end{aligned} \tag{4-13}$$

Then the marginal effects of the regressor X on probabilities can be obtained by evaluating the probability density function ($\Phi'(X)$) multiplied by the relative coefficient. It is clear to state that when the value of the k^{th} independent variable increases and $\beta_k > 0$, the probability of outcome $Y_i = 1$ will decline as a result of the opposite sign between the derivative of $\Pr(Y_i = 1)$ and β_k, while the probability of outcome $Y_i = J$ will rise since the derivative of $\Pr(Y_i = J)$ has the same sign as β_k. When interpreting the rest of the marginal effects, the direction of changing the value of a regressor on the probability of outcomes can be ambiguously determined due to the sign of the derivative being different from the sign of beta in some cases. Greene (2008) argued: “What happens to the middle cell is ambiguous. It depends on the two

densities. In the general case, relative to the signs of the coefficients, only the signs of the changes in Prob(y = 0 | X) and Prob(y = J | X) are unambiguous! The upshot is that we must be very careful in interpreting the coefficients in this model. Indeed, without a fair amount of extra calculation, it is quite unclear how the coefficients in the ordered probit model should be interpreted."

In addition, when the independent variable is a dummy variable, interpretation using the probability density function multiplied by the associated coefficient can also be misleading (Long, 1997; Borooah, 2001). In fact, we interpret the discrete change instead of the marginal change in the case of dummy independent variables. Long (1997) implies the discrete change is a more informative measure for ordered regression models. Discrete change can be expressed as follows:

$$\frac{\Delta \Pr(Y_i = J \mid \mathrm{x})}{\Delta X_{ik}} = \Pr(Y_i = J \mid \mathrm{x}, X_{ik}=1) - \Pr(Y_i = J \mid \mathrm{x}, X_{ik}=0) \qquad (4\text{-}14)$$

where the notation $\Pr(Y_i = J \mid X_{ik})$ indicates the probability of given .

It suggests that when the value of X_{ik} changes from 0 to 1, the predicated probability of outcome J changes by $\frac{\Delta \Pr(Y_i = J \mid \mathrm{x})}{\Delta X_{ik}}$ while holding other variables at x. That is, we compare the probability when the dummy variable takes one value (i.e., 1) with the probability when it takes another value (i.e., 0) while holding other variables fixed. The difference between the two sets of probabilities is the effect from moving one condition to another on the probability of being at different outcomes.

In the next chapter, the estimated probabilities across demographics, behavior/attitudes factors, as well as concerns on health problems will be illustrated respectively while letting all other factors take their actual values, from which we can analyze how a household's probability

of seeking out organic foods at five levels would be affected if he or she moves between different demographic conditions (age, income, education etc.), behavioral conditions, as well as health conditions.

Restricted Dummy Variables

Another thing that must be pointed out is that given so many binary variables in this model, we have to deal with the "dummy-variable trap". If we include all the dummy variables for one of the categories when running the model, perfect collinearity would be introduced into the model. To avoid the dummy-variable trap, we can simply choose a dummy variable of a group to omit from the model. Then the coefficients on the included variables measure how those groups differ from the omitted group. Take the AGE dummies ($\sum_{j=1}^{4}\alpha_j XAGE_{ji}$) for example, we could simply drop $\alpha_1 AGE_{1i}$ and run regression. The intercept represents the base, and the t-test is to test against the omitted category. In the case of large number of dummies included in the model, it is inefficient to interpret coefficients from every combination of benchmarks. Or we can adopt a method of restricting an unweighted sum of the coefficients to zero for each dummy category, which is convenient since each coefficient estimated is expressed relative to the average respondent rather than to each set base. Using this method, we add D notation to each dummy variable included in the regression. Take XAGE dummies ($\sum_{j=1}^{4}\alpha_j XAGE_{ji}$) for example:

$$\begin{aligned}&\sum_{j=1}^{4}\alpha_j = 0 \text{ or } \alpha_4 = -\sum_{j=1}^{3}\alpha_j \\ &\sum_{j=1}^{4}\alpha_j XAGE_{ji} = \sum_{j=1}^{3}\alpha_j (XAGE_{ji} - XAGE_{4i}) = \sum_{j=1}^{3}\alpha_j DAGE_{ji}\end{aligned} \tag{4-15}$$

In this way, the intercept represents the unweighted average household and all coefficients and t-values are expressed relative to the average. That is, a statistically significant t-value

implies that the coefficient is statistically different from the unweighted average β_0. For age dummies, the effect of $XAGE_1$ is $\beta_0 + \alpha_1$, the effect of $XAGE_2$ is $\beta_0 + \alpha_2$, the effect of $XAGE_3$ is $\beta_0 + \alpha_3$, and the effect of $XAGE_4$ is $\beta_0 - \alpha_1 - \alpha_2 - \alpha_3$; and the t-values of three age dummies in the regressions are testing if each DAGE is different from the unweighted average respondent.

This method used for the dummy variable is just for convenience when discussing the statistical test since all t-values are relative to an average instead of just the variables dropped out in the traditional method for dealing with dummy variables. With either dummy method, the conclusions about the probability for each Likert score will be identical in the end results.

CHAPTER 5
ANALYSIS OF RESULTS AND SIMULATIONS

In this chapter, we first discussed the ordered probit estimates based on the ordered probit methodology (see equations 4-5 through 4-10) and econometric models developed in the previous chapter, and then we focused on reporting how the changes in the explanatory variables (demographic factors, behavior/attitudes, health conditions etc.) affected the probabilities of seeking out organic foods. After that, the importance of each variable was ranked to compare the relatively different effects on the marginal change in the probabilities of seeking out organic foods.

Ordered Probit Estimates

The models specified in chapter 4 estimated responses to the statement "I seek out organic foods" with 36 variables by using ordered probit procedures. The results were shown in Table 5-1, including scaled R-squared, estimated coefficients for the restricted dummies used in regressions, t-statistics and corresponding p-values, as well as the thresholds for moving across the Likert scales. Since the total number of thresholds to be estimated was the number of values which y takes on less 2; for the outcome with five Likert scales, only three thresholds (θ_2, θ_3, θ_4) were estimated in the regression since the others were then predetermined. And since we applied the method of restricting an unweighted sum of coefficients to zero, all the coefficients and t-statistics obtained from regression were expressed relative to the unweighted average household. Hence, the estimated coefficients associated with dummies created originally were recalculated and shown in Table 5-2 to show the coefficients for every level in each dummy class.

According to the estimate results, generally the ordered probit model explained many reasons for seeking out organics, as indicated by the scaled R-squared of 0.457. It suggested that

over 45 percent of variation in the consumer preferences for seeking out organic foods was explained by the model, recognizing the limited interpretation of the R^2 in discrete choice models. Among the 99 dummy variables included in the regression, only 23 dummy variables were not statistically differ from the average level of seeking out organic foods at a 95% confidence level, including the marital status being single, Black/African American, having incomes between $35,000 and $74,999, household sizes with either two or four members, South census region, zero daily servings of fruit, 0-3 daily servings of vegetables, mostly disagreeing and completely agreeing with the statement “buying produce from certain stores”, completely agreeing with the statement “eating fruits and vegetables”, “no one in household has obesity problem”, and all the “months” variables. It was important to recall that the t-statistics values were expressed relative to the average level rather than to the null hypothesis of the true slope coefficient equaling zero. While not included in the analysis, one could have easily tested differences between any of the levels within a dummy class using the covariance matrix associated with the results in Table 5-1. Since the number of possibilities were very large, we instead would concentrate on showing the estimated probabilities for each level and then one could easily see the numerical differences across the levels with the class (e.g., compare the probabilities across all ages).

Ordered Probit Model Simulations

To illustrate how the probabilities of different levels of seeking organic foods differ across socio-demographics, behaviors and attitudes, as well as health conditions, probabilities for each of five outcomes given a particular set of conditions of the other explanatory variables were simulated. One set of conditions is using the actual variables of the variables not being simulated and then compare the probabilities after averaging across the panel observations.

As a starting point, the probabilities for each level of seeking out organic foods for the average respondent were predicted. Specifically, using the coefficients from Table 5-1, probabilities for each respondent were estimated and averaged over the total 37,582 observations. The average probability of each level of seeking out organics provided a reference base in order to compare probabilities as each variable's impact was considered. As shown in Figure 5-1, the probability of people who would like to seek out organic foods (combining scores 4 and 5) was estimated to be around 19 percent for the average respondent, while the average respondent was estimated to be 56 percent unlikely to seek out organic foods (combining scores 1 and 2), and 25 percent that are neutral or indifferent.

Then the probabilities were averaged over the households with only the controlled variable being changed. The fact that each conditional probability was simulated relative to the overall average probability made the simulations comparable. The difference between the conditional probability and the overall mean probability was focused on the impact of the variable being controlled. By comparing the conditional probabilities, we were able to observe both the direction and magnitude of the effects of the variables being controlled.

In each of the subsequent figures, the probabilities predicted for each level of seeking out organic foods and the reference probability were shown on the vertical axis and values of controlled variable(s) were depicted on the horizontal axis. For the response to the question of seeking out organic foods with a five-option Likert scales, a set of three figures is shown for each controlled variable with combining intensities of both "completely agree (disagree)" and "mostly agree (disagree)" together. The percentages of agreeing and disagreeing with the statement "I seek out organic foods" as well as the percentages of neutral responses were all presented in adjacent figures. For each controlled variable, the people with neutral attitude on seeking out

organic foods seemed to have the same likelihood moving pattern as those who agreed with "I seek out organic foods", exhibiting around the likelihood of 24.8% as the average respondent with neutral response. People with responses of "complete disagree" or "mostly disagree" showed an opposite pattern compared to those who agreed with the statement "I seek out organic foods". The response intensities of "completely agree (disagree)" and "mostly agree (disagree)" generally kept the similar proportions for each controlling variable. Combining the two levels of agree provided a much more visual way to see the tendency to favor organics or not instead of reporting separately the five probabilities. Also it gave a clear indication if the intensity of seeking out (or not) with the idea that if the probability of completely agreeing was rising relative to mostly agreeing, then the intensity of seeking out organics was increasing (or not). Thus in all of the subsequent figures, two aspects were of particular importance. What were the probabilities under each controlled condition and did the intensities change within the "agree" (or "disagree") scores.

Seeking Out Organic Foods across Demographics

In Figure 5-2 through Figure 5-11, the predicted probabilities across the demographic factors averaged over the actual values of the other variables were illustrated. These demographic factors included age, gender, marital status, race, income, education, employment, household size, presence of children under 18 years old, and aggregated census region. Again, the probabilities for each demographic was based on averaging over the probabilities for each household with only the controlled variable being changed.

A consistently decreasing probability of agreeing with seeking out organic foods was shown over different ranges of age, from the highest 26 percent for young populations of 18-24 years to the lowest 12 percent for populations of 65 years and older. The older population's likelihood of seeking out organics was about 7% points below the average (19.3%), comparing to

the younger population with the highest likelihood that was almost 7% points above average. Correspondingly, the probability of disagreement was shown increasing from younger to older populations. The result was partially consistent with findings from Lohr and Semali (2000) and the summary from Thompson (1998) that age brackets of 18-29 and 40-49 were the consumers with highest percentage of buying organic produce while consumers over 60 purchased the least amounts. If the goal was to continue to enhance the demand for organics, the age probabilities suggested targeting the older population was needed since that was where the major weakness appears to be occurring. Alternatively, if sectors of the organic industry were concerned about locations where the initial greatest gains could be realized, then locations in areas with less concentrated say in retirement areas would be suggested since those areas generally had a much higher numbers in the older age group. Clearly, the age figure provided a number of directions for marketing and policy, depending on the overall goal of variables sectors of the organic industry.

Gender and marital status contributed little to explaining the differences in the responses to seeking out organic foods, while Thompson (1998) implied gender and marital status together might be important predictors of organic consumer's profiling. Similarly, Thompson and Kidwell (1998) and Briz and Ward (2009) reported little difference in the organic searching behavior likelihoods was shown between female and male household heads, no matter how much she or he agreed with seeking out organic foods statement. In Figure 5-3, the differences between different marital status and the average level was quite small with the single shopper exhibiting a slightly higher likelihood of seeking organics than the average shopper.

Figure 5-5 showed likelihoods of seeking out organics differing across ethnic groups. Asians Americans (with a substantial probability of 27%) and Black/African Americans (with a

probability of 20%) were relatively more likely to seek out organic foods than Whites (with a probability of 19%) and Hispanics (with a probability of 18%). Compared to other ethnic groups, Asians Americans presented the highest level of propensity to seek organics at about 7% above the average likelihood level. Hispanic shoppers were least inclined to seek organics, showing with the likelihood below average. Steven-Garmon et al. (2007)'s study pointed to similar results that Asian and African-Americans were more likely to purchase organically grown produce frequently compared to Caucasians and Hispanics. But our result did not confirm the finding from the Hartman Group Organic 2006 Survey, which reported that Hispanic households were more likely to be "core" organic consumers based on their representation in the population.

A popular opinion that households with higher incomes are more likely to purchase organic foods makes sense based on the relationship between consumers' affordability and the generally higher prices of most organic produce. However, our finding did not confirm any consistent positive connection between household income levels and the likelihood of seeking organics. Households with incomes between $75,000 and $99,000 had the highest probability of seeking out organic foods (22%). Households with incomes under $35,000 showed a likelihood of 20% and those who with income more than $35,000 but less than $75,000 showed a slightly lower likelihood of seeking organics than the average level. Conversely, households with incomes more than $100,000 are less likely to choose organics at about 2% below the average likelihood. In addition, households who are employed part-time or unemployed have greater probabilities of seeking out organic foods, while those who are not employed show the highest likelihood (nearly 23%).

A clear positive association between education and awareness of organic foods was revealed by Briz and Ward (2009). However, education level did not display a profound impact

on the likelihood of seeking out organic foods in this study. According to Figure 5-7, the effects of education were mixed: having some college or a college degree showed no significant detectable effect on seeking organics; yet people with less than high school or a high school education and people with graduate or professional degrees were slightly more likely to seek out organic products. This result was consistent with the finding of Thompson and Kidwell (1998) that having a college education had little impact on shoppers' decisions to purchase organic produce, but contradictory to their conclusion that having advanced degrees lower the probability of purchasing organic produces.

Household sizes with two or more than two members did not contribute substantial differences in the likelihood from the average level except for household sizes with a single person being 2% below average. This implied that single people were less likely to choose organic foods, whereas the presence of more household members did not indicate a greater likelihood of seeking out organic foods. Households with children under age eighteen would be expected more likely to seek out organic foods since some studies had concluded this. However, surprisingly, this study found that this segment reported being nearly 4% less likely to choose organic foods than those households without children under age eighteen.

The literature review indicated that households residing in the West region were more likely to consume organic products. In this study, the geographical differences in seeking out organic foods were quite small, given that only the West region respondents displayed a slightly higher probability (20%) than the average level (19.3%), while respondents in all other census regions presented lower propensities to seek out organic foods relative to the average level.

Store Choice and Expenditures

The six graphs in Figure 5-12 illustrated the impact of store choice on the likelihood of seeking out organic foods. See Table 3-1 for the shopping categories. The category of food

shopping in “none of the places” mentioned in the survey was not represented in the simulation because of zero observations in this category. The most substantial differences in the likelihood of seeking organics were exhibited between those who went food shopping in farmer’s markets or produce stands and those who did not, showing with the probability of 25% and 18% respectively. The probability of seeking out organic foods was almost 4% greater for households who chose to shop for food through internet grocery stores (such as Peapod, Fresh Direct, etc.) than for those who did not or the average respondent. Households who shopped for food in convenience stores (such as gas station, 7-11, Quik Check, etc.) were slightly more likely to choose organic foods, while those who shopped in grocery stores and mass merchandisers (such as Wal-Mart, Target, etc.) were slightly less likely to seek out organic foods. People who chose to grocery shop in warehouse club stores (such as Costco, Sam’s Club, etc.) did not significantly differ from the average respondent. People who chose not to shop in grocery stores displayed a higher propensity towards organic products. Overall, since about 90% indicated using traditional grocery stores for food shopping, the probabilities for those type stores were the more relevant for most organic food marketing strategies.

In Figure 5-13, expenditures on grocery shopping showed a reasonably positive impact on the level of seeking out organic foods. The probability of seeking out organic foods rose consistently as expenditures on grocery shopping increased, showing that shoppers with weekly grocery spending more than $100 were more likely to consume organic foods. That is, as the overall average expenditure levels (per two-week food shopping) grew, the likelihood of including organic purchases in the food basket (product mix) increased. While not directly shown from the data, one could surmise that larger food stores likely included more consumers

in the higher expenditure levels and those focused on those type stores. Clearly, the correlation between store size and expenditures per shopper needed to be someway verified.

Behavior/Attitudes Attributes

Graphs in Figures 5-14 and 5-15 included the relationships between the number of servings of fruit/vegetables per day and the likelihood of seeking out organic foods. The graphs interestingly implied that the organic propensity changes among different ranges of servings were opposite between that of fruits and vegetables. People who consumed more than 7 servings of fruit per day and those who consumed 4-6 servings of vegetables per day displayed the higher propensity to choose organic foods, showing with the likelihood levels at 33% and 23% respectively. Alternatively, those who consumed 7 servings of vegetables or more per day and those who consumed 4-6 servings of vegetables per day had the lowest probability which was below the average consumer. In addition, the probability of seeking organics consistently increased as the number of daily servings of vegetables rose until 6 servings per day then dropped to the lowest probability. On the contrary, the probability of seeking organics consistently declined as the number of daily servings of fruit increased until 6 servings per day then began to boost to the highest level of probability of 33%. This high range generally had a very low level of occurrence.

The graphs in Figures 5-17 through 5-25 illustrated the likelihood differences across five levels of responses to several behavioral statements (including “count calories”, “eat fresh foods rather than package foods”, “read ingredients on labels of the food when buying”, “go out of way to get certain types of produce”, “eat fresh fruit and vegetables more than other people with the same age”, “feel healthier than peers”, “exercise at least three times per week”, and “explore new foods”). Most graphs illustrated a logically consistent increasing pattern of probability of seeking out organic foods from disagreeing to agreeing with these behavioral statements. Specifically,

"concerns about calories", "eat fresh food rather than packaged foods", "read ingredients on labels of the food when buying", "go out of way for certain types of produce", "feel healthier than his or her peers", and "frequently experiment with new foods" displayed considerable impacts on the propensity to seek out organic foods. People who did not practice the behaviors mentioned at all were least likely to seek out organic foods.

Households who were seriously concerned about calories were more likely to seek out organic foods than those who did not count calories they eat each day, thus implying that people on a diet might be more interested in organic foods. The profound differences in the propensity towards organics were exhibited between households who eat fresh foods much more frequently than packaged foods, showing that the probability increased consistently from the lowest 10% (who ate packaged food more frequently) to the highest 25% (who ate fresh food more frequently). Similar to the moving pattern of "eat fresh foods rather than packaged foods" effect, "read ingredients on labels when buying foods", showing a seeking out level of 25% (those who did not read labels showing only 10%), concentrated a significant impact on the propensity towards organics. This was reasonable. Due to the credence attribute of organic foods that organic foods were difficult to be differentiated from conventional produced foods unless with clear identification or labels, consumers cannot be aware of the intrinsic qualities unless notified (through labels). The difference in the likelihood of seeking out organics was also substantial between those going out of the way to get certain types of produce being at 24% and those who did not constituting only 8%. People who thought they were healthier than their peers were more likely to seek out organic foods than those who did perceive themselves were less healthy. Similarly, people who frequently explored new foods had a greater probability to seeking out organics compared to those who did not. Among those household considering "eating fresh fruit

(vegetables) more than others", "prefer to buy produce from certain stores", and "exercise at least three times per week", there were little consistent trends and considerable variation across the simulated probabilities.

Health Concerns

Health conditions obtained in the survey included concerns about high blood pressure, diabetes, high cholesterol, food allergies, obesity, limited physical mobility, and significant sight or hearing impairment on four dimensions (do you, does your spouse/significant other, does other household member, or no one in household have any of those problems). Only the situation of no household member having those health concerns was considered in simulation for simplification. One thing that should be pointed out was that the horizontal axis in Figure 5-26 had the statement "do not have any health concerns".

According to Figure 5-26, only the household heads who had and/or his (her) family member(s) had food allergies concerns were more likely to seek out organic foods. On the contrary, household heads where no one in his (her) household had blood pressure concerns had greater probabilities of seeking out organic foods. Concerns about diabetes, high cholesterol, and significant sight or hearing impairment presented the similar moving pattern on the likelihood of seeking organics. Other health concerns did not indicate enough differences between probabilities and the average level. Overall and contrary to much of the discussion about organics and healthiness, the impact of health problems generally had little influence on the probabilities of seeking out organic foods..

Seasonality

In Figure 5-16, little variation was shown among probabilities of seeking out organic foods across twelve months of the survey period. And compared to the average respondent, there were no appreciable differences among the simulated probabilities and the average level for each score

level. Shoppers were very slightly more likely to consume organic foods in September and October during the whole year, comparing to the average likelihood level. Overall it implied that seasonality was simply not a factor when seeking out organic foods.

Ranking the Effects on Probabilities of Seeking Out Organic Foods

The effects of explanatory variables being controlled usually contributes different outcomes on the marginal change in the probabilities of seeking out organic foods. Hence, in addition to discussing the directional effects of all explanatory variables, it is also insightful to illustrate the relative effects of variables being controlled on the likelihood of seeking out organic foods in a perspective way. A ranking of the conditional simulated probabilities was depicted in Figure 5-27, with horizontal bars showing the minimum and maximum effects relative to the average on the left side according to the conditional explanatory variables' correspondingly absolute ranges.

To illustrate the rankings of importance, the difference between the maximum and minimum values of simulated probabilities based on each controlled variable was calculated and then these absolute ranges were sorted in descending order. In Figure 5-27, the changes were expressed relative to the average respondent with a likelihood of 0.07 for score 5 (completely agree), likelihood of 0.12 for score 4 (mostly agree), likelihood of 0.24 for score3 (neutral), likelihood of 0.22 for score 2 (mostly disagree), and likelihood of 0.34 for score 1 (completely disagree). For all probabilities of response with scaled values from 1 to 5, "number of daily servings of fruit", "eat fresh foods more frequently than packaged foods", "read labels", "go out of the way to get certain types of produce", and "age" generally contributed relatively further impact on the probability of seeking out organic foods than other factors. To the contrary, moving down the charts, "gender", "limited physical mobility concern", "food shopping in

warehouse stores", "cholesterol concern", and "obesity problem" were the five least important factors regardless of order.

With respect to the top 10 variables in the ranking, based on probabilities of seeking out organic foods with "completely agree" (score 5) relative to the average level of 7%, "number of servings of fruit" had the greatest impact by far, followed by "eat fresh foods", "read labels", "go out of the way to get certain type of produce", "age", "frequently experiment with new foods", "expenditures on foods", "ethnicity", "feel healthier than peers", and "number of daily servings of vegetables". "Daily servings of fruit" was the most important factor impacting the likelihood of seeking out organic foods, ranging from 3.7% to 10.1%. Reports of "go out of the way for certain types of produce" had the minimum likelihood (only 2%) among all variables. Only "age" and "ethnicity" were impactful demographic attributes, ranging from 3.7% to 10.1% and from 6.4% to 10.7%, respectively. Education level could be an important determinant since it showed a low level of minimum likelihood at 4.3%, but its absolute range was adequate.

In the second chart in Figure 5-27, the rankings based on probability of seeking out organic foods with "mostly agree" (score 4) relative to the average of 12.4%, suggested that "go out of the way for certain type produce", "read labels", and "eat fresh foods rather than packaged foods" contributed a substantially greater impact than other factors. Reports of "go out of the way for certain types of produce" still displayed the minimum likelihood of 6.2% among all variables. "Age", "ethnicity" and "education level" ranked higher than other demographic factors, ranging from 8.8%, 12.1%, 11% to 15.9%, 16%, and 13.6%, respectively.

The third chart in Figure 5-27 revealed the ranking based on a probability of seeking out organic foods with "neither agree nor disagree" (score 3) relative to the average level of 24%. The variable with the largest difference between the minimum and maximum likelihood was "go

out of the way to get certain types of produce", followed by "read labels", "eat fresh foods rather than packaged foods", "frequently experiment with new foods", as well as "age". Finally, in the forth chart in Figure 5-27, the rankings based on probability of seeking out organic foods with "mostly disagree" (score 2) relative to the average of 21.5% showed that most variables did not present an adequate difference except "number of daily servings of fruits".

The rankings based on probability of seeking out organic foods with "completely disagree" (score 1) relative to the average of 34.3% was presented in the last chart in Figure 5-27. A profound difference was seen with "go out of the way for certain types of produce", with an absolute range of 25.2%. Both "read labels" and "eat fresh foods rather than packaged foods" had similar effects on the probability, and "age" still showed considerable effects. Similarly, "number of daily servings of fruit", "experiment with new foods", "feel healthier than my peers", "expenditures on food", "number of daily servings of vegetables", "education level", "ethnicity", "count calories", and "food shopping in farmer's markets" can also be important determinants, but with less substantial effects.

Overall, the Figure 5-27 charts provided a direct way to compare the relative effects of all determinant variables on the probability of seeking out organic foods. According to the rankings, behavior and attitude variables were major impacting factors while demographics except age played a less important role when seeking out organic foods.

Table 5-1. Results from Organic Preference ordered probit model

Variables	Description	Ordered Probit Parameters	t-statistics	p-value
C	Intercept	0.7225	20.9578	[.000]
DAGE1	Age 18-24	0.3046	19.9795	[.000]
DAGE2	Age 25-44	0.0963	9.0858	[.000]
DAGE3	Age 45-64	-0.1520	-12.0182	[.000]
DGEN	Female	-0.0231	-3.6187	[.000]
DMAR1	Single	0.0224	1.6946	[.090]
DMAR2	Married	-0.0345	-2.9880	[.003]
DMAR3	Living with parents	-0.0483	-2.7676	[.006]
DRACE1	White/Non-Hispanic	-0.1059	-9.5242	[.000]
DRACE2	White/Hispanic	-0.1118	-6.4698	[.000]
DRACE3	Black/African American	-0.0212	-1.3121	[.189]
DRACE4	Asian	0.2699	10.6685	[.000]
DINC1	Income under $35,000	0.0597	4.8776	[.000]
DINC2	Income $35,000-$74,999	0.0104	0.9918	[.321]
DINC3	Income $75,000-$99,000	0.1343	8.2871	[.000]
DINC4	Income >$100,000	-0.1246	-7.4626	[.000]
DEDU1	High school or less	0.1018	6.4516	[.000]
DEDU2	College	0.0337	2.5351	[.011]
DEDU3	Advanced degree	0.1281	7.2255	[.000]
DHWD1	Household size: 1	-0.1118	-6.3863	[.000]
DHWD2	Household size: 2	0.0173	1.2693	[.204]
DHWD3	Household size: 3	0.0310	2.4501	[.014]
DHWD4	Household size: 4	-0.0035	-0.2330	[.816]
DCHL	With children under 18	-0.0843	-8.1726	[.000]
DEMPLY1	Employed full time	-0.0522	-4.6580	[.000]
DEMPLY2	Employed part time	0.0592	3.4861	[.000]
DEMPLY3	Not employment	0.1242	7.2048	[.000]
DREG2	Region: Midwest	-0.0410	-3.9685	[.000]
DREG3	Region: South	-0.0020	-0.2081	[.835]
DREG4	Region: West	0.0438	3.7234	[.000]
DSHOP_GRO	Shop in grocery stores	-0.0486	-4.7238	[.000]
DSHOP_WARE	Shop in warehouse stores	0.0230	3.3157	[.001]
DSHOP_INTE	Shop in internet stores	0.0935	5.5372	[.000]
DSHOP_MASS	Shop in mass merchandisers	-0.0506	-7.8411	[.000]
DSHOP_CONV	Shop in convenience stores	0.0454	5.9319	[.000]
DSHOP_FARM	Shop in farmer’s markets	0.1561	15.6844	[.000]

Table 5-1. Continued

Variables	Description	Ordered Probit Parameters	t-statistics	p-value
DEXPD1	Expenditure under $50	-0.1908	-10.8673	[.000]
DEXPD2	Expenditure $50-$100	-0.1133	-7.5831	[.000]
DEXPD3	Expenditure $100-$200	-0.0466	-3.2888	[.001]
DEXPD4	Expenditure >$400	0.1029	5.4341	[.000]
DSERVF1	0 servings of fruit	-0.0364	-1.1669	[.243]
DSERVF2	1-3 servings of fruit	-0.1313	-5.6687	[.000]
DSERVF3	4-6 servings of fruit	-0.2741	-10.7484	[.000]
DSERVV1	0 servings of vegetable	-0.0432	-1.2224	[.222]
DSERVV2	1-3 servings of vegetable	0.0099	0.5073	[.612]
DSERVV3	4-6 servings of vegetable	0.2029	9.1451	[.000]
DCAL1	Count calories (1)	-0.2192	-17.4283	[.000]
DCAL2	Count calories (2)	-0.0377	-3.0572	[.002]
DCAL4	Count calories (4)	0.1021	7.2887	[.000]
DCAL5	Count calories (5)	0.1130	6.2442	[.000]
DB_FRE1	Eat fresh foods (1)	-0.3744	-12.8631	[.000]
DB_FRE2	Eat fresh foods (2)	-0.1414	-8.4793	[.000]
DB_FRE4	Eat fresh foods (4)	0.1297	9.5450	[.000]
DB_FRE5	Eat fresh foods (5)	0.4069	24.8498	[.000]
DB_LAB1	Read labels (1)	-0.3503	-14.6740	[.000]
DB_LAB2	Read labels (2)	-0.1810	-10.2195	[.000]
DB_LAB4	Read labels (4)	0.0386	3.0463	[.002]
DB_LAB5	Read labels (5)	0.4436	33.0480	[.000]
DB_ST1	Certain store (1)	-0.1421	-5.5342	[.000]
DB_ST2	Certain store (2)	0.0280	1.5540	[.120]
DB_ST4	Certain store (4)	0.0324	2.5884	[.010]
DB_ST5	Certain store (5)	0.0066	0.4598	[.646]
DB_WAY1	Certain type (1)	-0.4983	-24.9168	[.000]
DB_WAY2	Certain type (2)	-0.2411	-16.2240	[.000]
DB_WAY4	Certain type (4)	0.2545	20.4537	[.000]
DB_WAY5	Certain type (5)	0.3662	22.3867	[.000]
DB_FV1	Eat fruit & vegetable (1)	-0.1679	-6.8491	[.000]
DB_FV2	Eat fruit & vegetable (2)	0.0628	3.9838	[.000]
DB_FV4	Eat fruit & vegetable (4)	0.0324	2.4237	[.015]
DB_FV5	Eat fruit & vegetable (5)	0.0245	1.3893	[.165]
DB_HLT1	Feel healthier (1)	-0.2053	-9.6842	[.000]
DB_HLT2	Feel healthier (2)	-0.1272	-8.3431	[.000]
DB_HLT4	Feel healthier (4)	0.1731	13.8625	[.000]
DB_HLT5	Feel healthier (5)	0.2147	12.1973	[.000]

Table 5-1. Continued

Variables	Description	Ordered Probit Parameters	t-statistics	p-value
DB_EXE1	Exercise (1)	-0.1288	-8.2912	[.000]
DB_EXE2	Exercise (2)	-0.0549	-4.2859	[.000]
DB_EXE4	Exercise (4)	0.0959	7.2800	[.000]
DB_EXE5	Exercise (5)	-0.0300	-2.4792	[.013]
DB_NEW1	Explore new foods (1)	-0.3503	-17.0487	[.000]
DB_NEW2	Explore new foods (2)	-0.0939	-6.5996	[.000]
DB_NEW4	Explore new foods (4)	0.0860	7.1489	[.000]
DB_NEW5	Explore new foods (5)	0.2641	16.7418	[.000]
DHLT_BP	Do not have blood pressure	0.0842	11.1721	[.000]
DHLT_DB	Do not have diabetes	0.0689	8.1704	[.000]
DHLT_CL	Do not have high cholesterol	0.0235	3.2276	[.001]
DHLT_AG	Do not have food allergies	-0.0873	-10.7729	[.000]
DHLT_OB	Do not have obesity	0.0038	0.5257	[.599]
DHLT_MB	Do not have limited mobility	0.0292	3.2861	[.001]
DHLT_HR	Do not have sight / hearing impairment	0.0377	4.3787	[.000]
DMTH2	Feb.	-0.0255	-1.2282	[.219]
DMTH3	Mar.	-0.0347	-1.8568	[.063]
DMTH4	Apr.	-0.0152	-0.7860	[.432]
DMTH5	May	-0.0025	-0.1300	[.897]
DMTH6	Jun.	0.0079	0.4083	[.683]
DMTH7	Jul.	0.0047	0.2411	[.809]
DMTH8	Aug.	0.0095	0.4868	[.626]
DMTH9	Sep.	0.0133	0.6884	[.491]
DMTH10	Oct.	0.0328	1.7478	[.080]
DMTH11	Nov.	0.0013	0.0696	[.944]
DMTH12	Dec.	0.0021	0.1101	[.912]
MU3	Thresholds	0.7711	100.6900	[.000]
MU4	Thresholds	1.7561	159.5480	[.000]
MU5	Thresholds	2.5944	176.5350	[.000]

Number of observations = 37582	LR (zero slopes) = 20742.8 [0.000]
Mean of dep. var. = 2.35607	Schwarz B.I.C = 46058.1
Std. dev. of dep. var. = 1.25866	Log likelihood = -45515.6
Scaled R-squared = 0.456931	

Table 5-2. Organic Preference ordered probit model coefficient estimates

Variables (see Appendix)	Coefficient	Variables (see Appendix)	Coefficient
b0	0.7225	XEMPLY1	-0.0522
XAGE1	0.3046	XEMPLY2	0.0592
XAGE2	0.0963	XEMPLY3	0.1242
XAGE3	-0.1520	XEMPLY4	-0.1312
XAGE4	-0.2489	REGION1	-0.0007
XGEN1	-0.0231	REGION2	-0.0410
XGEN2	0.0231	REGION3	-0.0020
XMAR1	0.0224	REGION4	0.0438
XMAR2	-0.0345	SHOP_GRO1	-0.0486
XMAR3	-0.0483	SHOP_GRO2	0.0486
XMAR4	0.0604	SHOP_WARE1	0.0230
RACE1	-0.1059	SHOP_WARE2	-0.0230
RACE2	-0.1118	SHOP_INTE1	0.0935
RACE3	-0.0212	SHOP_INTE2	-0.0935
RACE4	0.2699	SHOP_MASS1	-0.0506
RACE5	-0.0310	SHOP_MASS2	0.0506
XINC1	0.0597	SHOP_CONV1	0.0454
XINC2	0.0104	SHOP_CONV2	-0.0454
XINC3	0.1343	SHOP_FARM1	0.1561
XINC4	-0.1246	SHOP_FARM2	-0.1561
XINC5	-0.0800	XEXPD1	-0.1908
XEDU1	0.1018	XEXPD2	-0.1133
XEDU2	0.0337	XEXPD3	-0.0466
XEDU3	0.1281	XEXPD4	0.1029
XEDU4	-0.2635	XEXPD5	0.2478
XHWD1	-0.1118	XSERFRU1	-0.0364
XHWD2	0.0173	XSERFRU2	-0.1313
XHWD3	0.0310	XSERFRU3	-0.2741
XHWD4	-0.0035	XSERFRU4	0.4418
XHWD5	0.0670	XSERVEG1	-0.0432
XCHL1	-0.0843	XSERVEG2	0.0099
XCHL2	0.0843	XSERVEG3	0.2029
		XSERVEG4	-0.1696

Table 5-2. Continued

Variables (see Appendix)	Coefficient	Variables (see Appendix)	Coefficient
CAL1	-0.2192	B_EXE1	-0.1288
CAL2	-0.0377	B_EXE2	-0.0549
CAL3	0.0417	B_EXE3	0.1177
CAL4	0.1021	B_EXE4	0.0959
CAL5	0.1130	B_EXE5	-0.0300
B_FRE1	-0.3744	B_NEW1	-0.3503
B_FRE2	-0.1414	B_NEW2	-0.0939
B_FRE3	-0.0208	B_NEW3	0.0941
B_FRE4	0.1297	B_NEW4	0.0860
B_FRE5	0.4069	B_NEW5	0.2641
B_LAB1	-0.3503	HLT_BP1	0.0842
B_LAB2	-0.1810	HLT_BP2	-0.0842
B_LAB3	0.0492	HLT_DB1	0.0689
B_LAB4	0.0386	HLT_DB2	-0.0689
B_LAB5	0.4436	HLT_CL1	0.0235
B_ST1	-0.1421	HLT_CL2	-0.0235
B_ST2	0.0280	HLT_AG1	-0.0873
B_ST3	0.0752	HLT_AG2	0.0873
B_ST4	0.0324	HLT_OB1	0.0038
B_ST5	0.0066	HLT_OB2	-0.0038
B_WAY1	-0.4983	HLT_MB1	0.0292
B_WAY2	-0.2411	HLT_MB2	-0.0292
B_WAY3	0.6824	HLT_HR1	0.0377
B_WAY4	0.0324	HLT_HR2	-0.0377
B_WAY5	0.0245	MTH1	0.0063
B_FV1	-0.1679	MTH2	-0.0255
B_FV2	0.0628	MTH3	-0.0347
B_FV3	0.0482	MTH4	-0.0152
B_FV4	0.0324	MTH5	-0.0025
B_FV5	0.0245	MTH6	0.0079
B_HLT1	-0.2053	MTH7	0.0047
B_HLT2	-0.1272	MTH8	0.0095
B_HLT3	-0.0553	MTH9	0.0133
B_HLT4	0.1731	MTH10	0.0328
B_HLT5	0.2147	MTH11	0.0013
		MTH12	0.0021

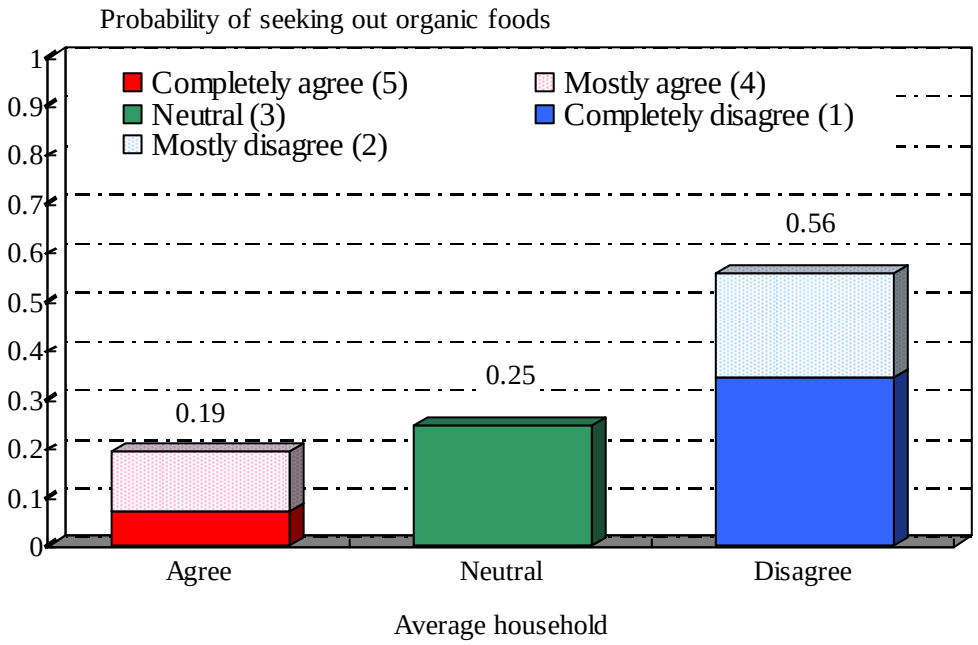
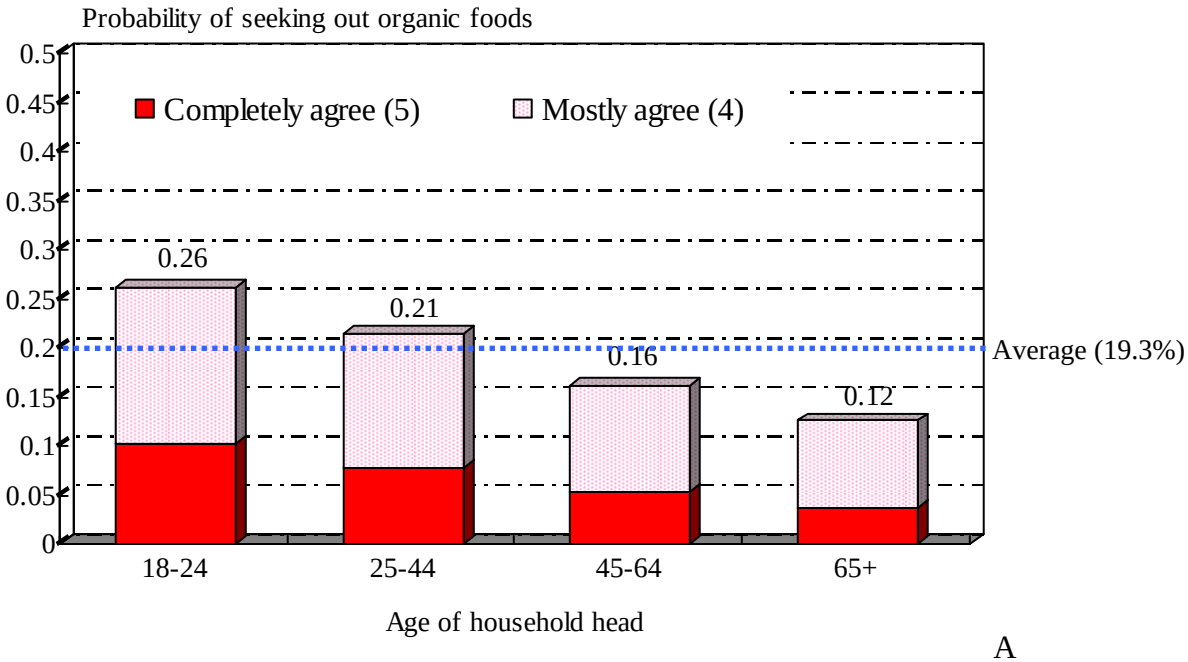
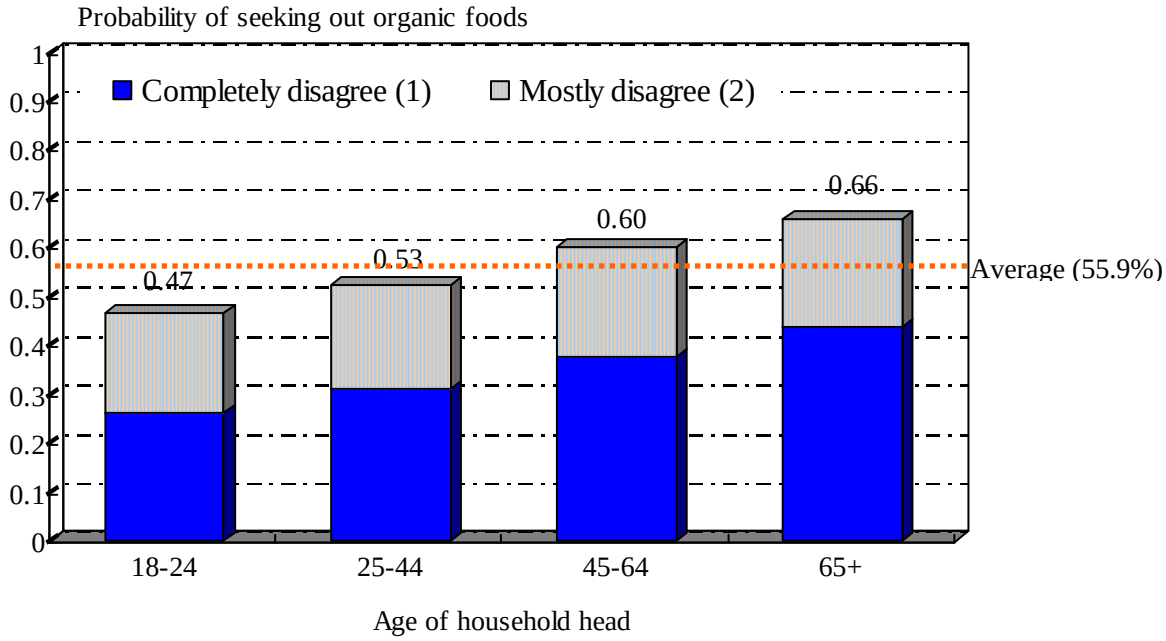


Figure 5-1. Probability of seeking out organic foods for the average respondent



A

Figure 5-2. Impact of age of household head on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



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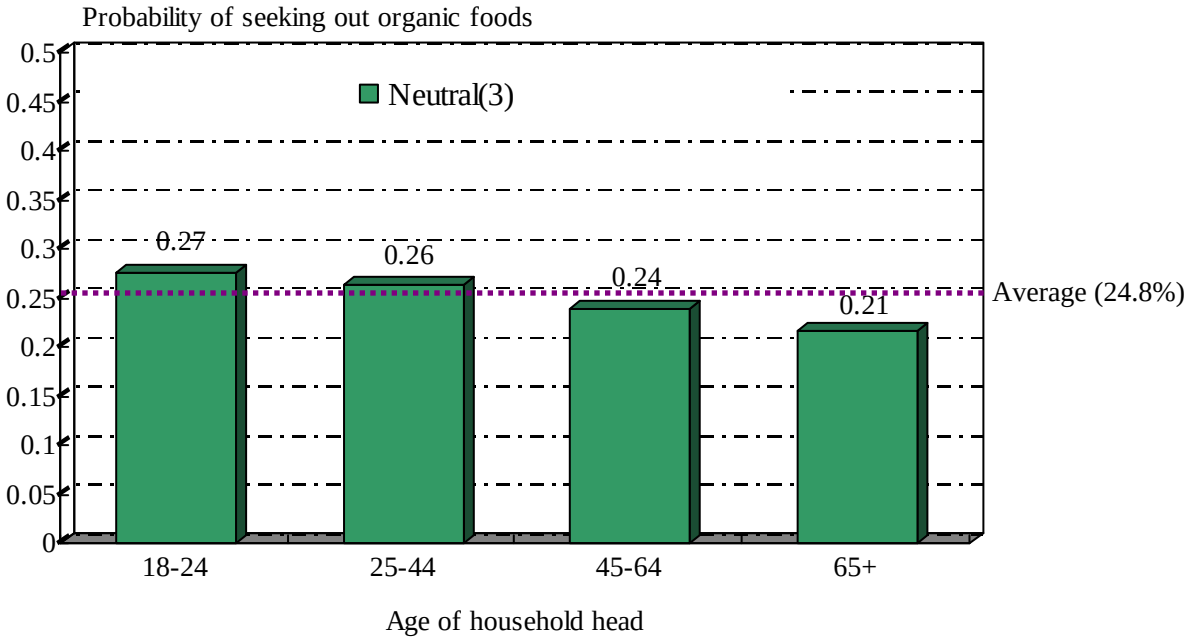
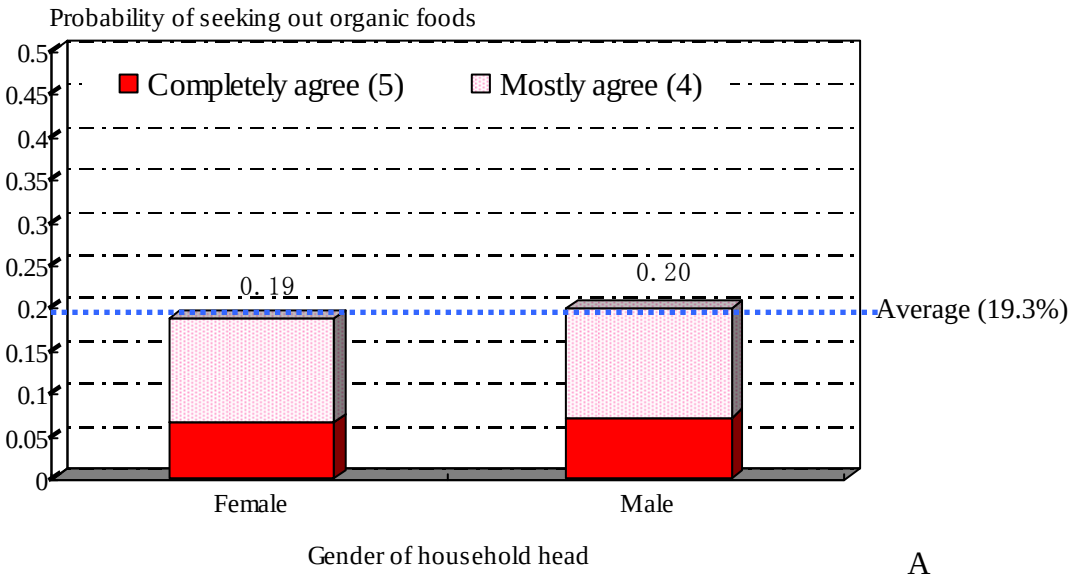


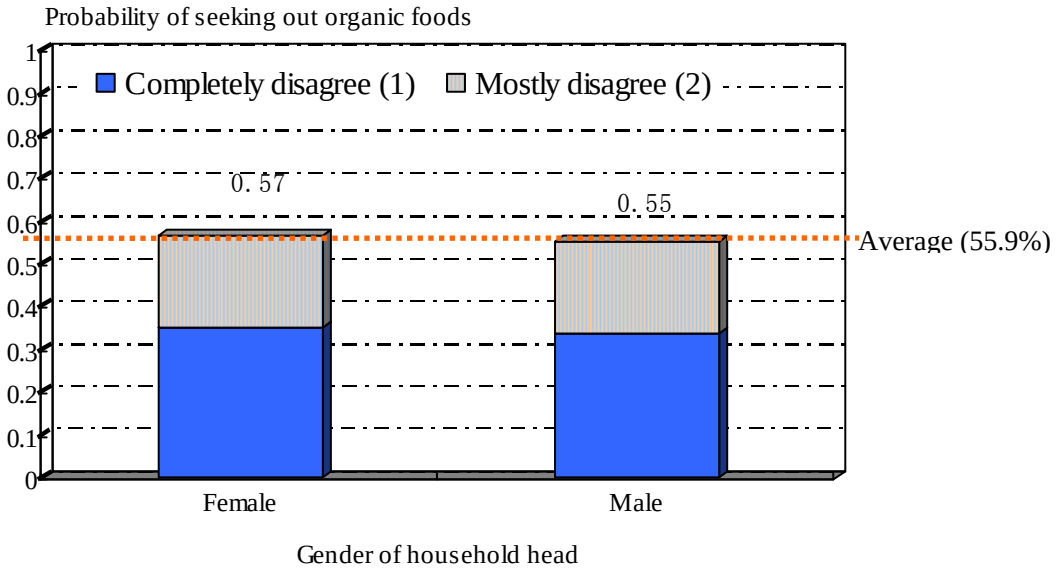
C

Figure 5-2. Continued



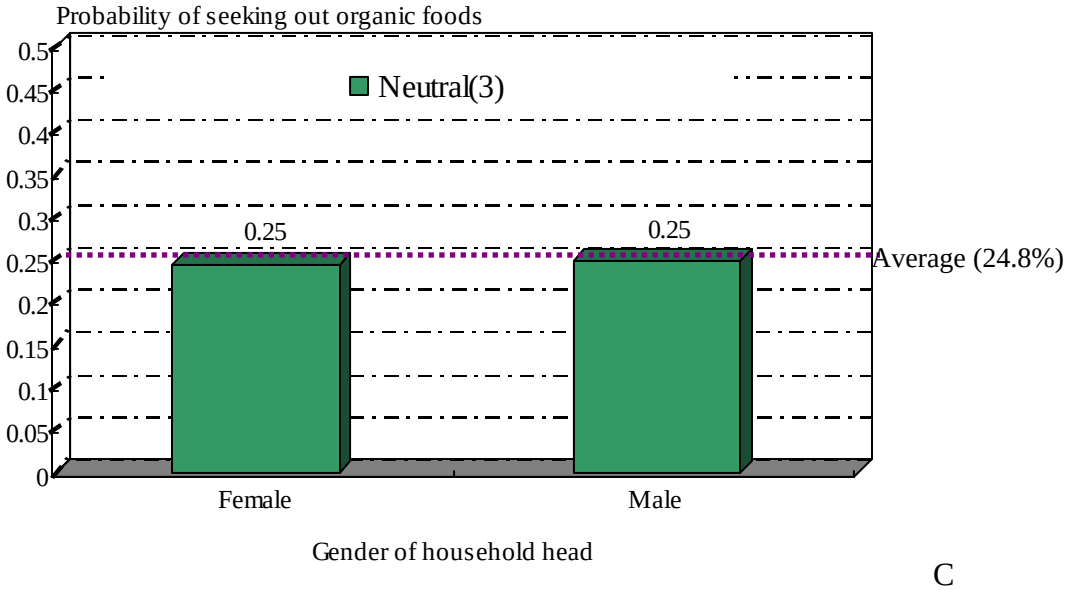
A

Figure 5-3. Impact of gender of household head on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



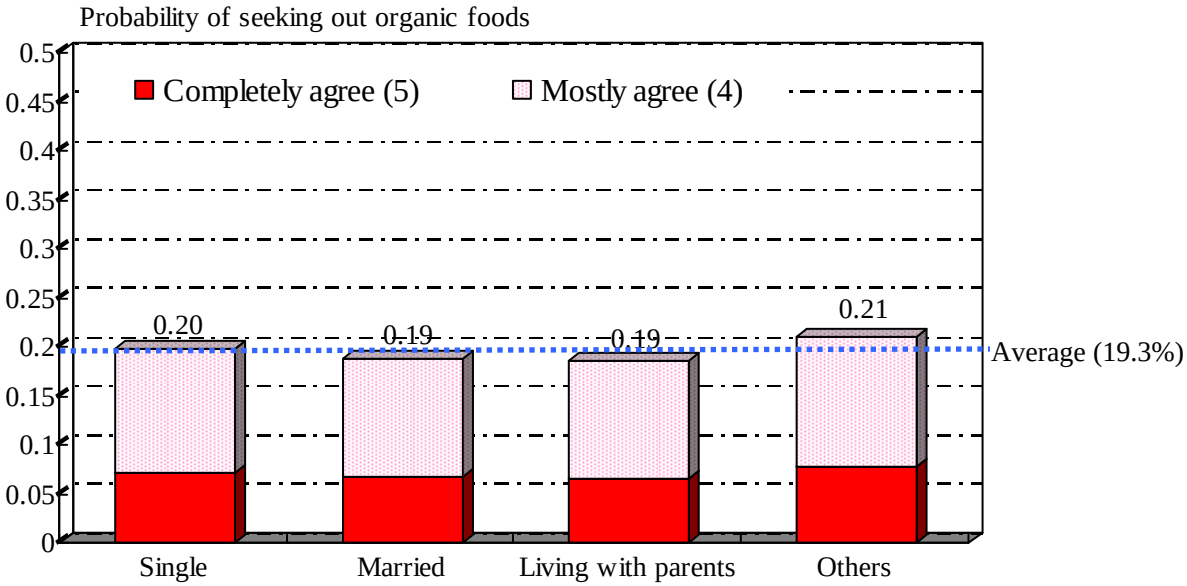
B

Figure 5-3. Continued



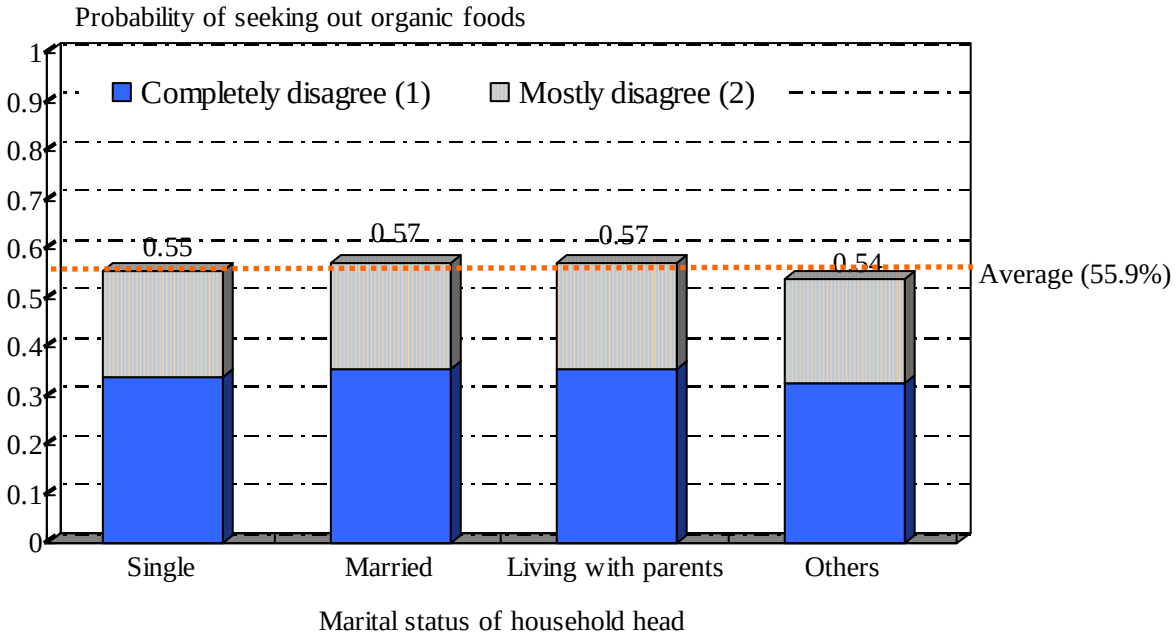
C

Figure 5-3. Continued



A

Figure 5-4. Impact of marital status of household head on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



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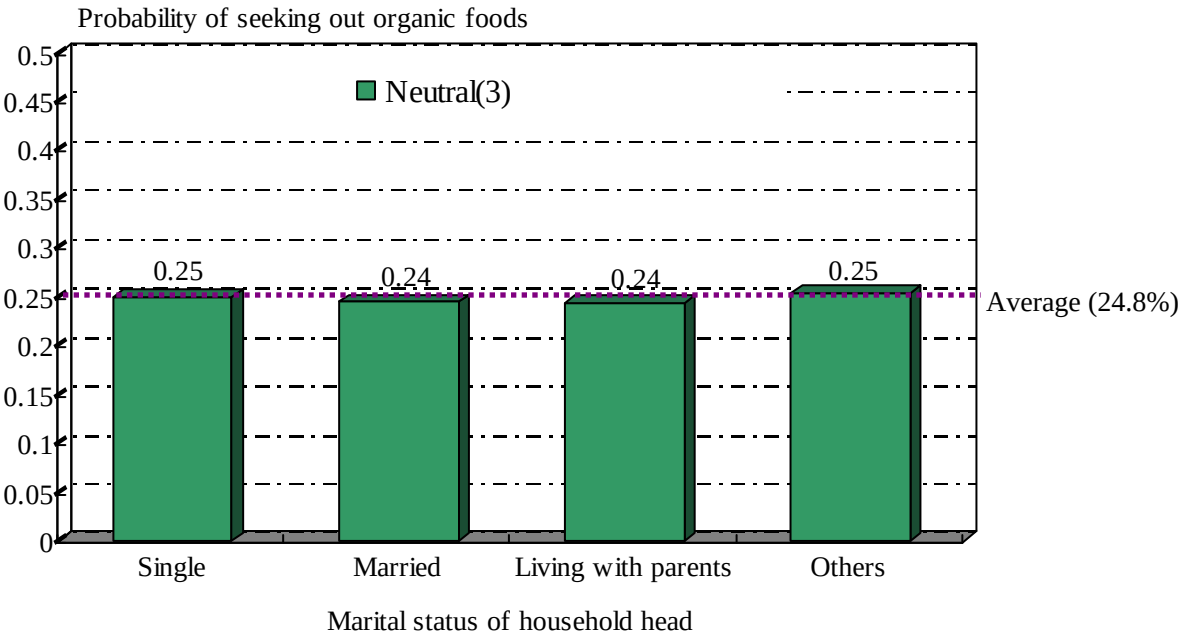
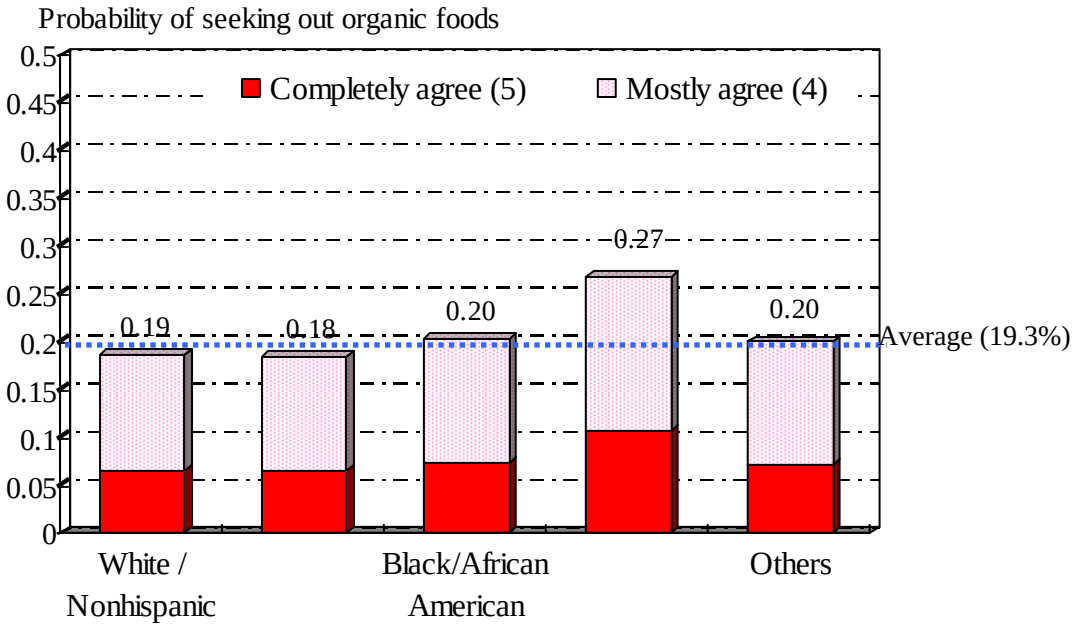


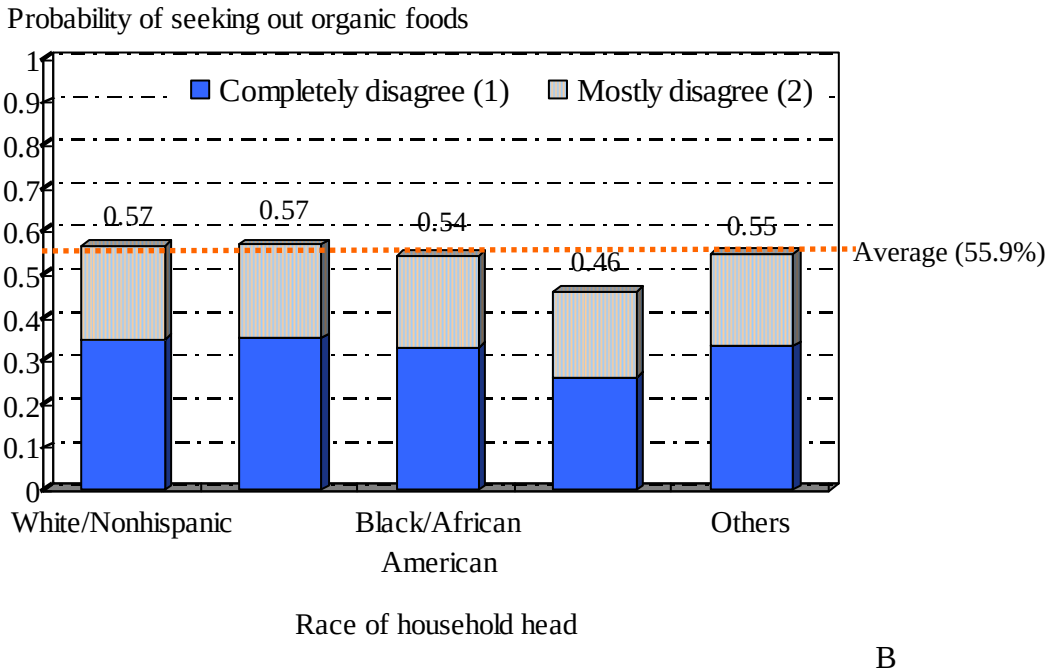
C

Figure 5-4. Continued



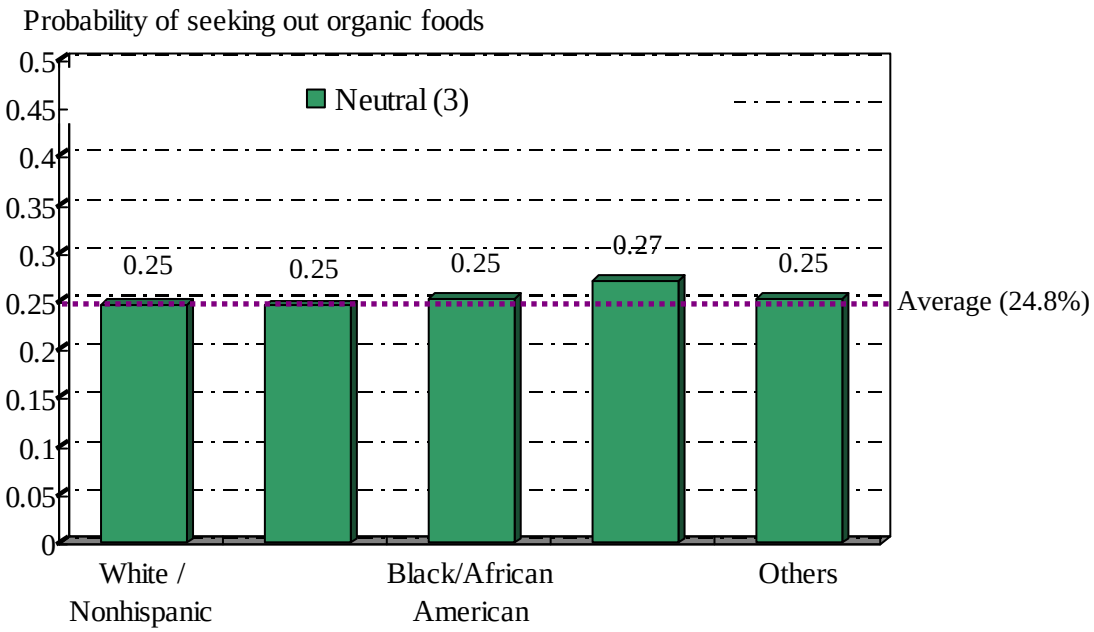
A

Figure 5-5. Impact of race of household head on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



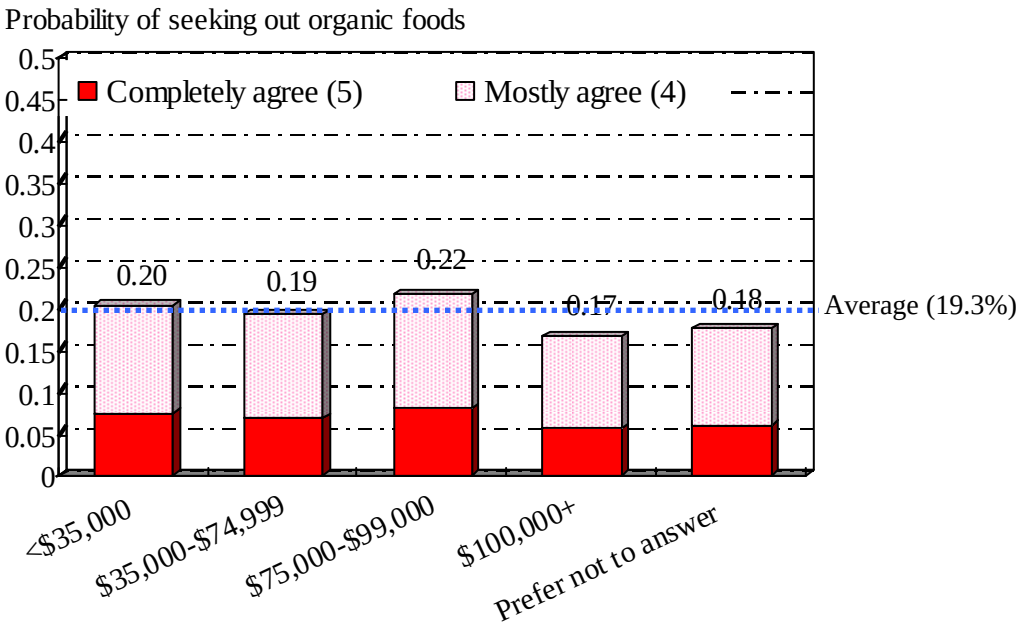
B

Figure 5-5. Continued



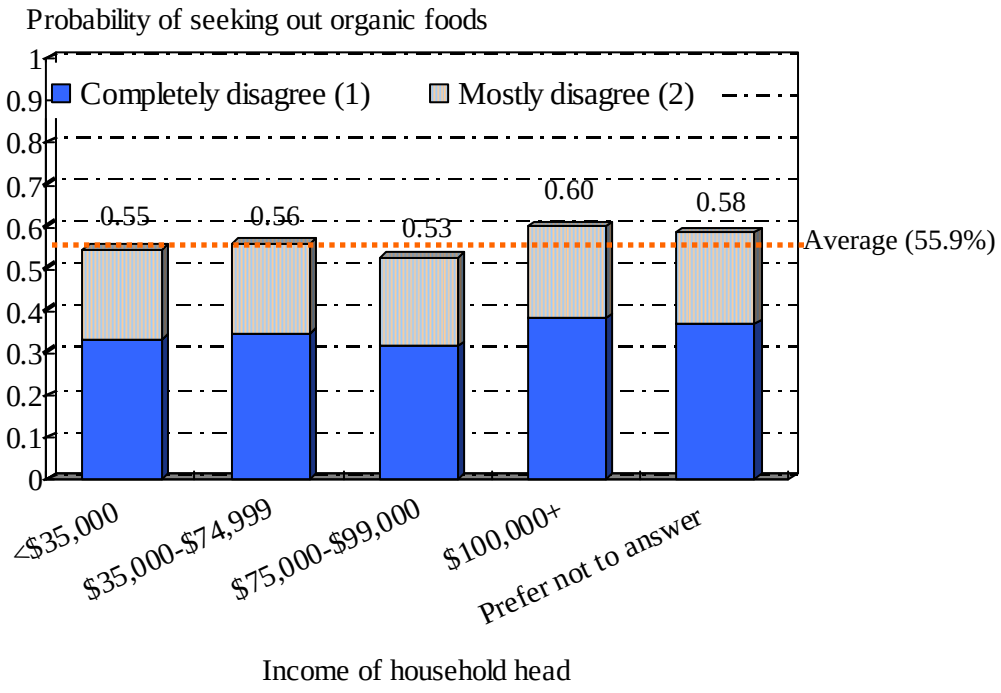
C

Figure 5-5. Continued



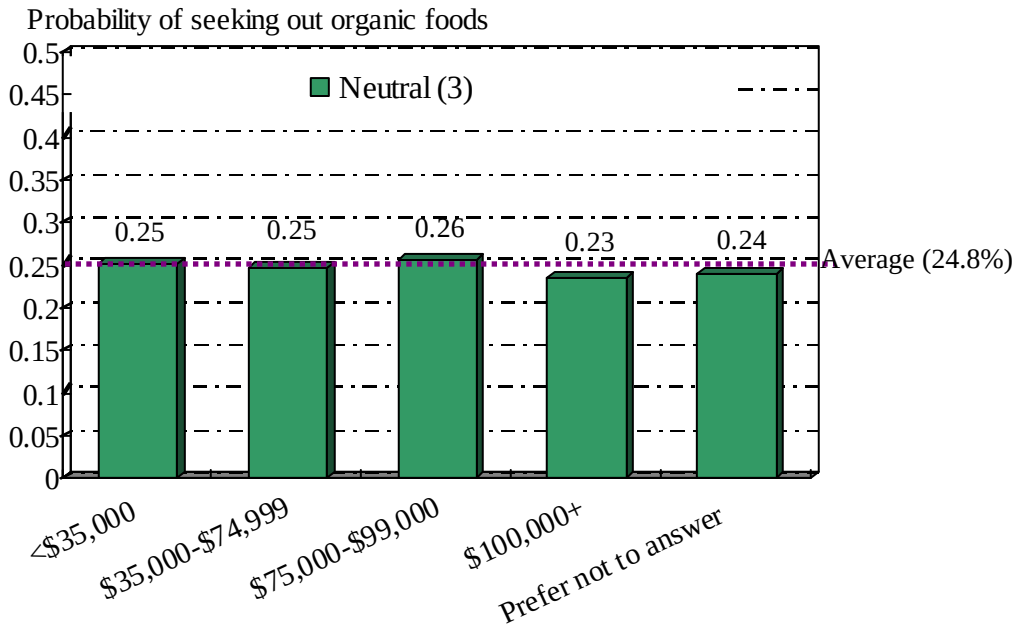
A

Figure 5-6. Impact of income of household head on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



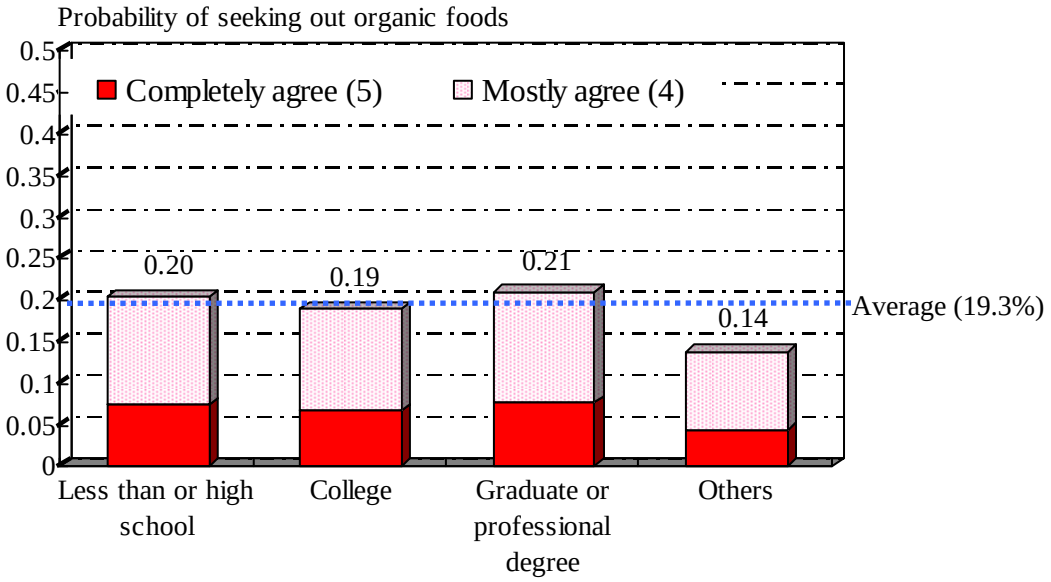
B

Figure 5-6. Continued



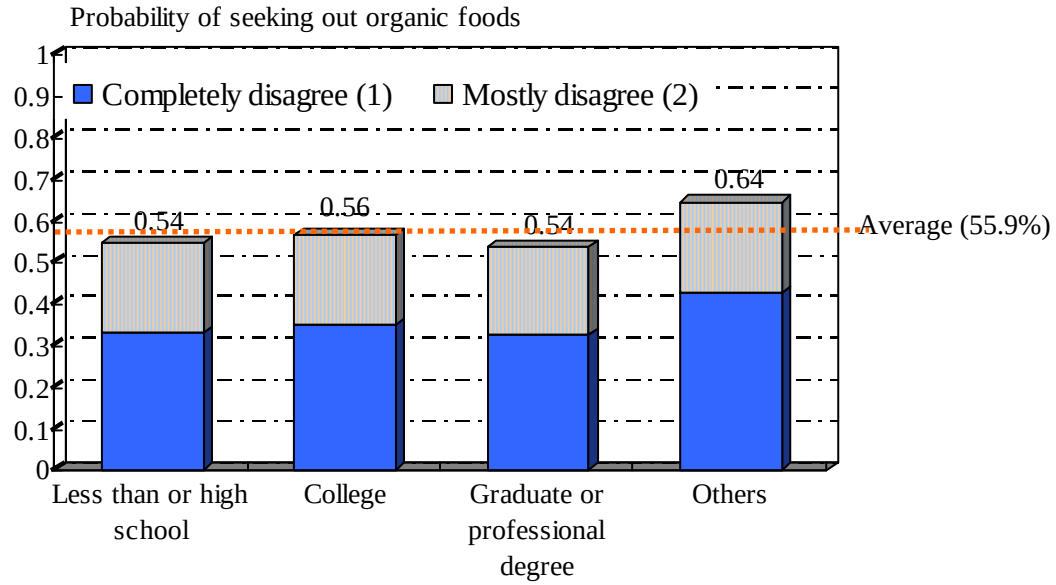
C

Figure 5-6. Continued



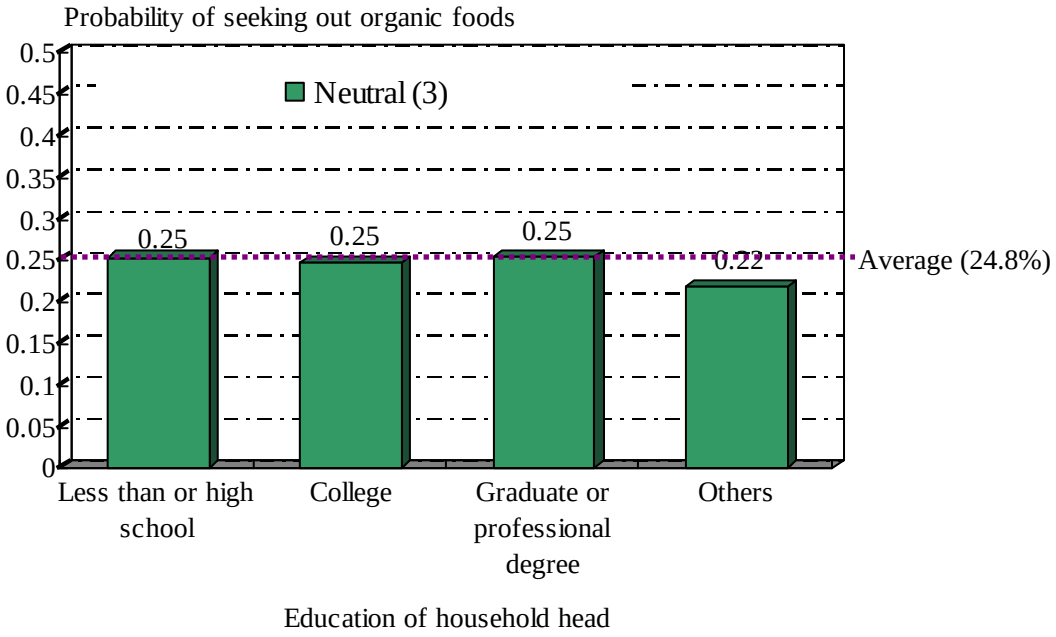
A

Figure 5-7. Impact of education level of household head on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



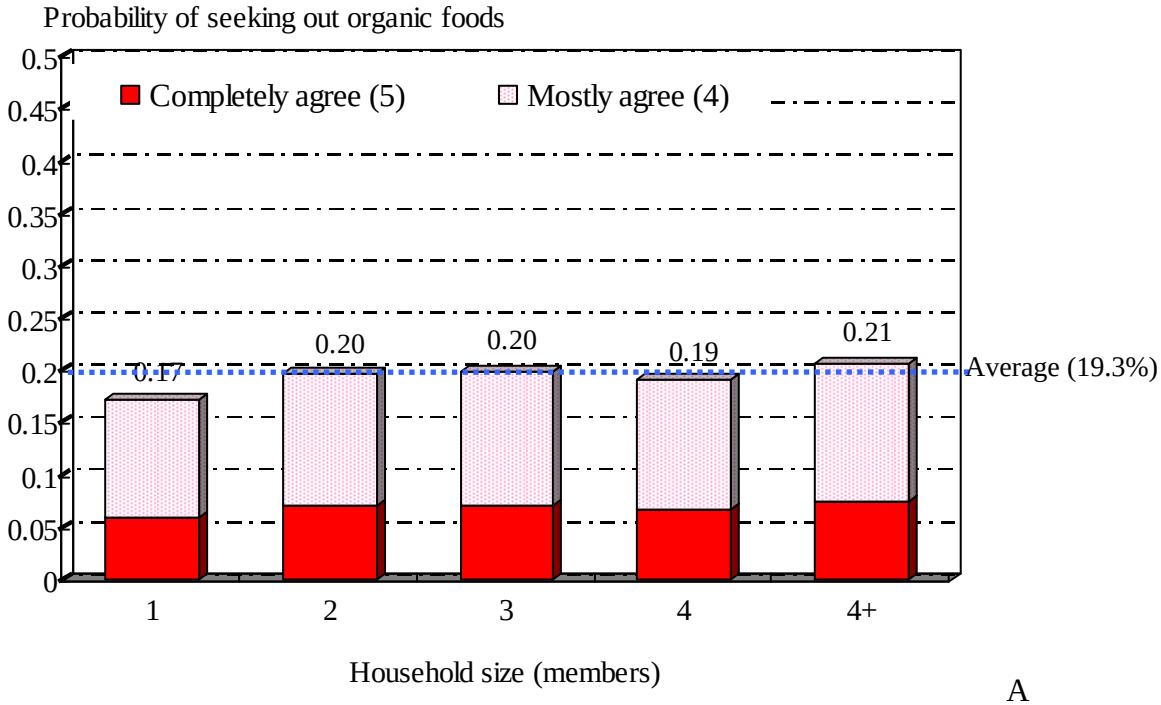
B

Figure 5-7. Continued



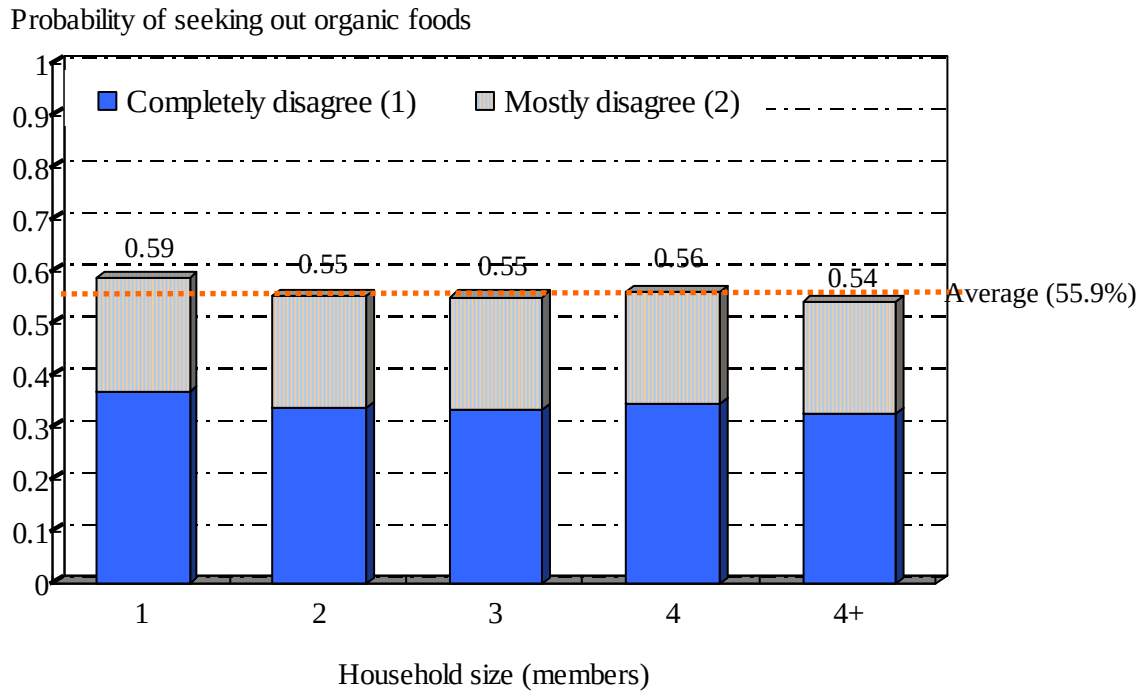
C

Figure 5-7. Continued



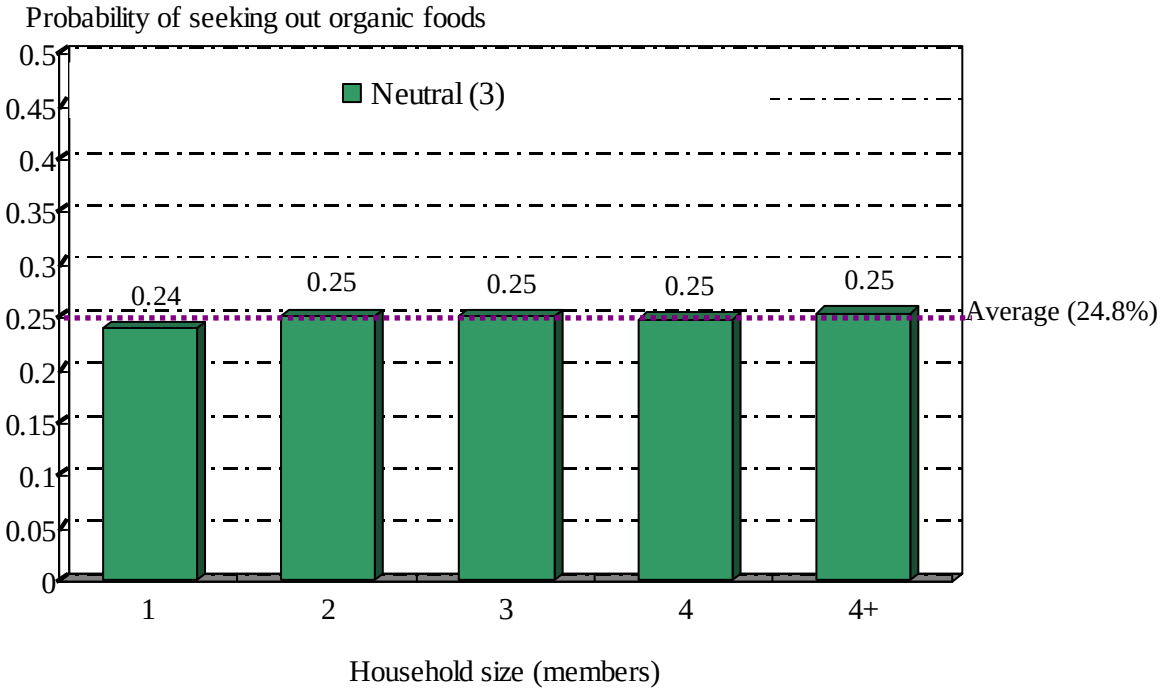
A

Figure 5-8. Impact of household size on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



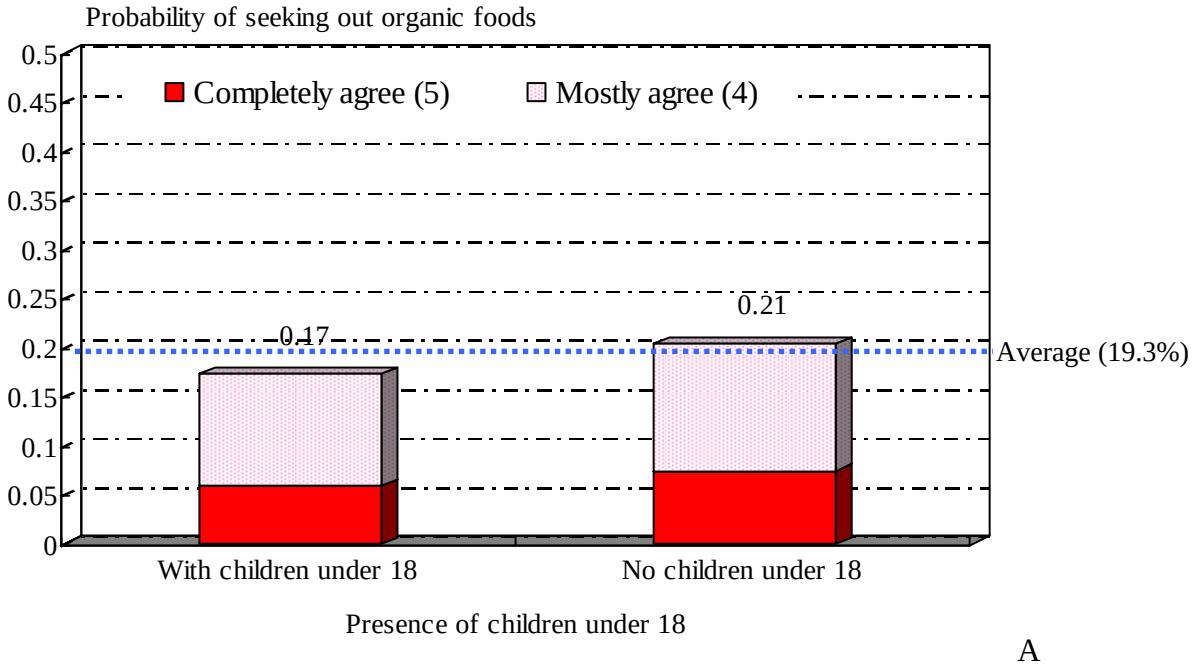
B

Figure 5-8. Continued



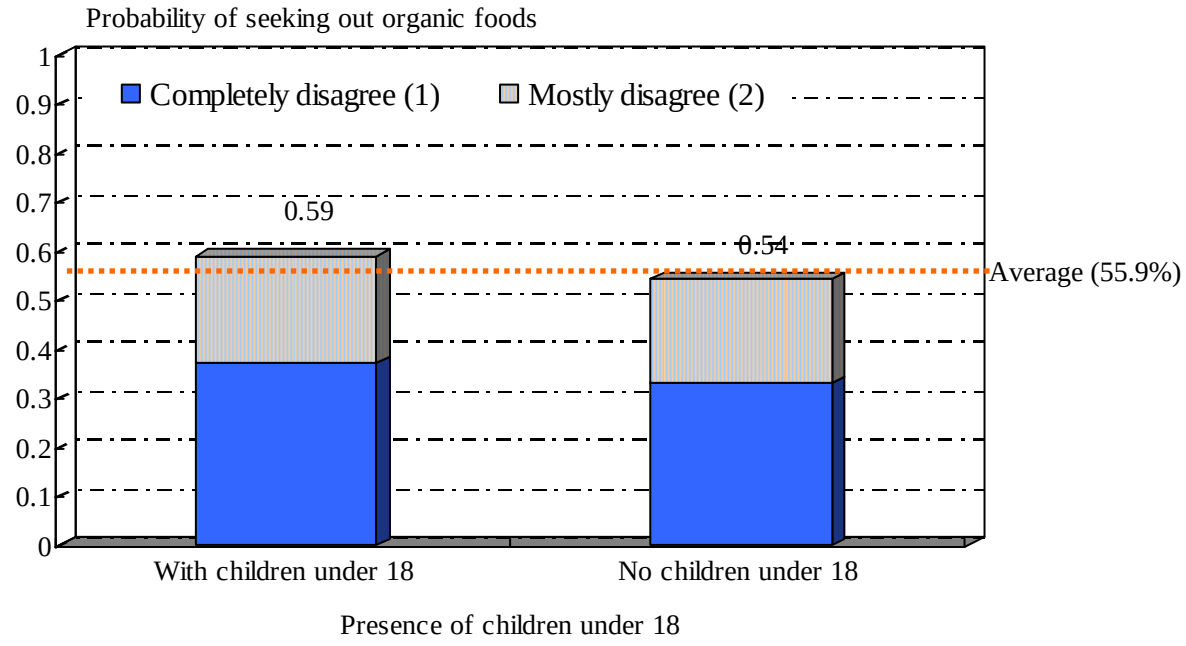
C

Figure 5-8. Continued



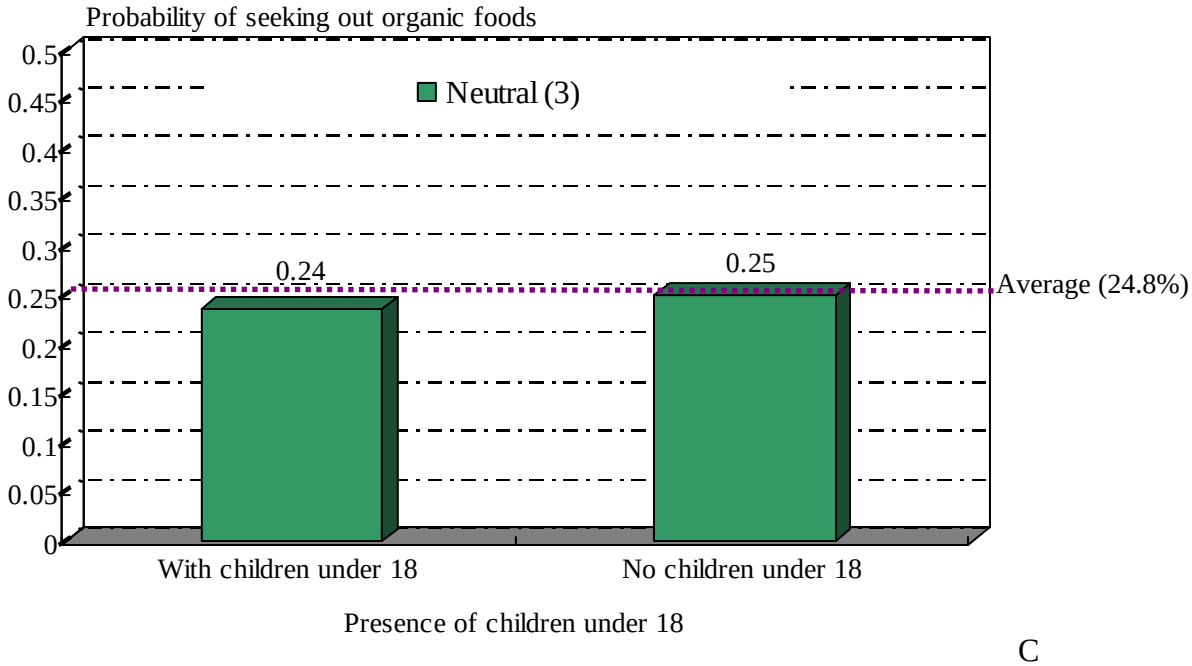
A

Figure 5-9. Impact of presence of children under 18 in household on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



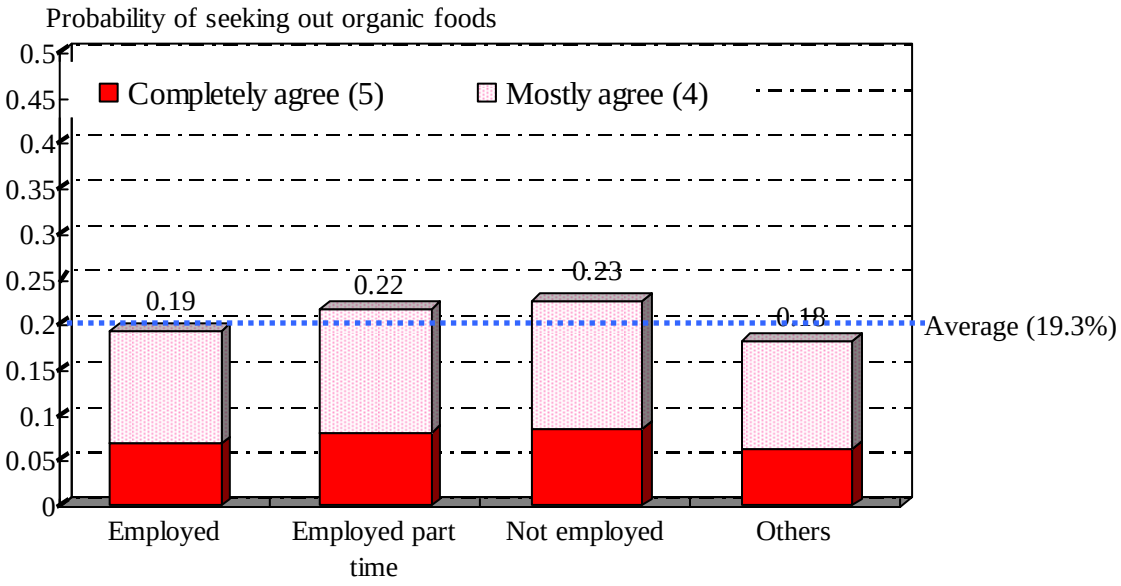
B

Figure 5-9. Continued



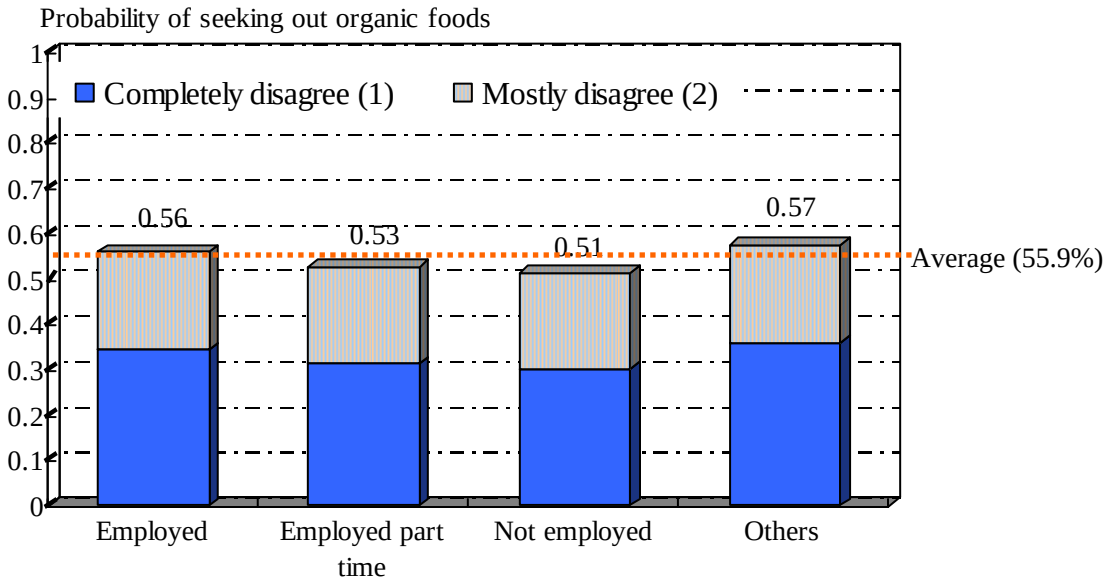
C

Figure 5-9. Continued



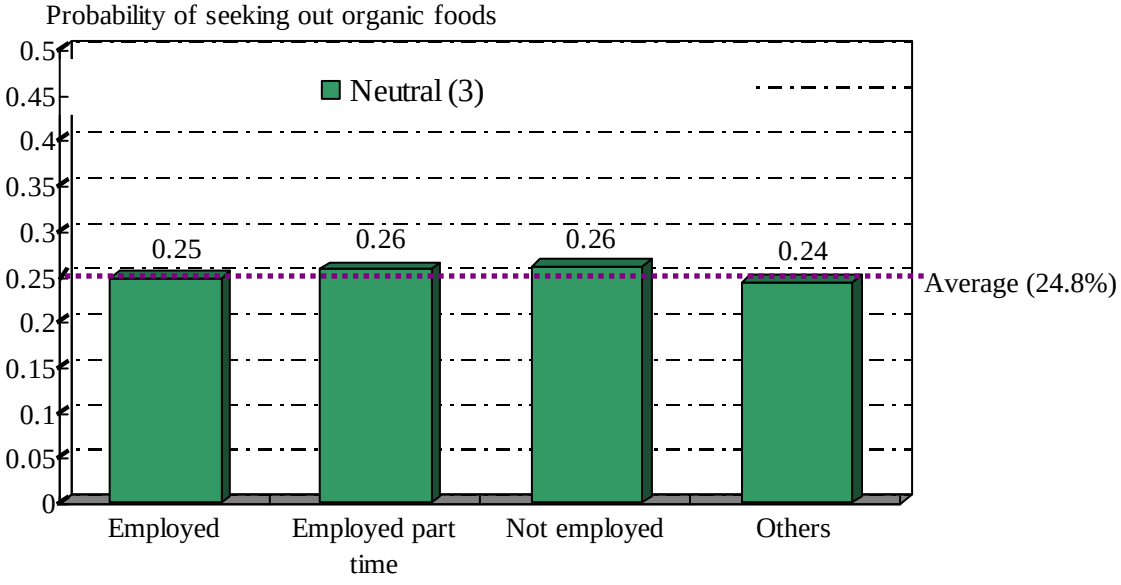
A

Figure 5-10. Impact of employment status of household head seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



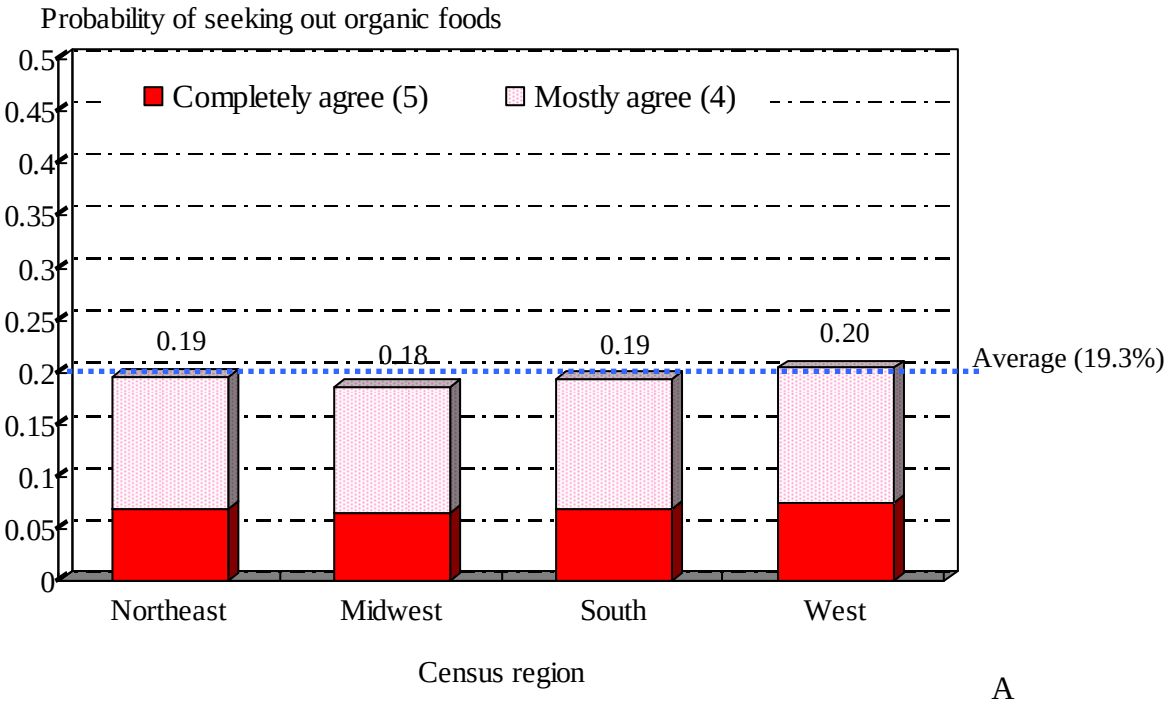
B

Figure 5-10. Continued



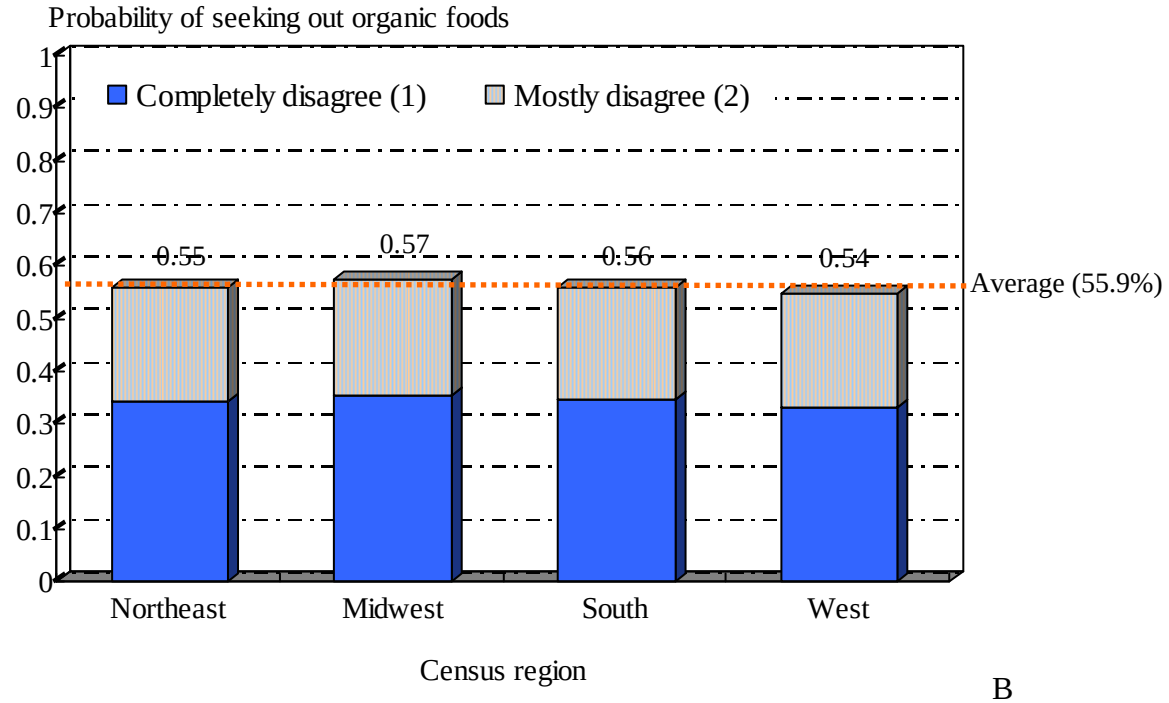
C

Figure 5-10. Continued



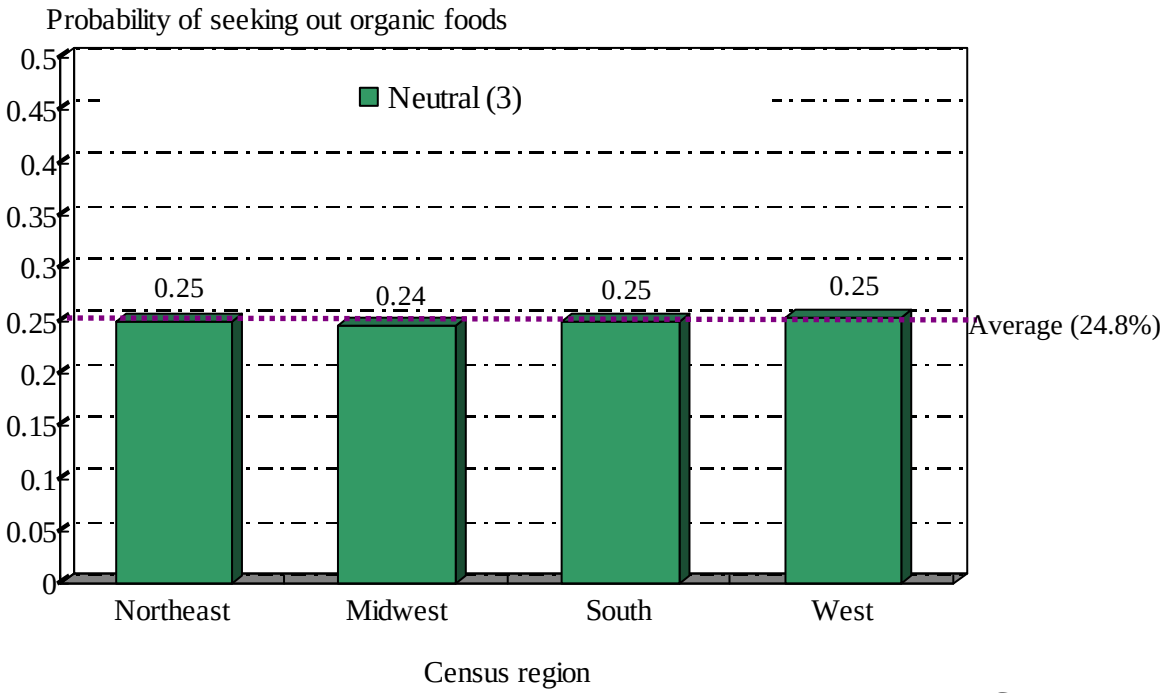
A

Figure 5-11. Impact of census region of household head seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



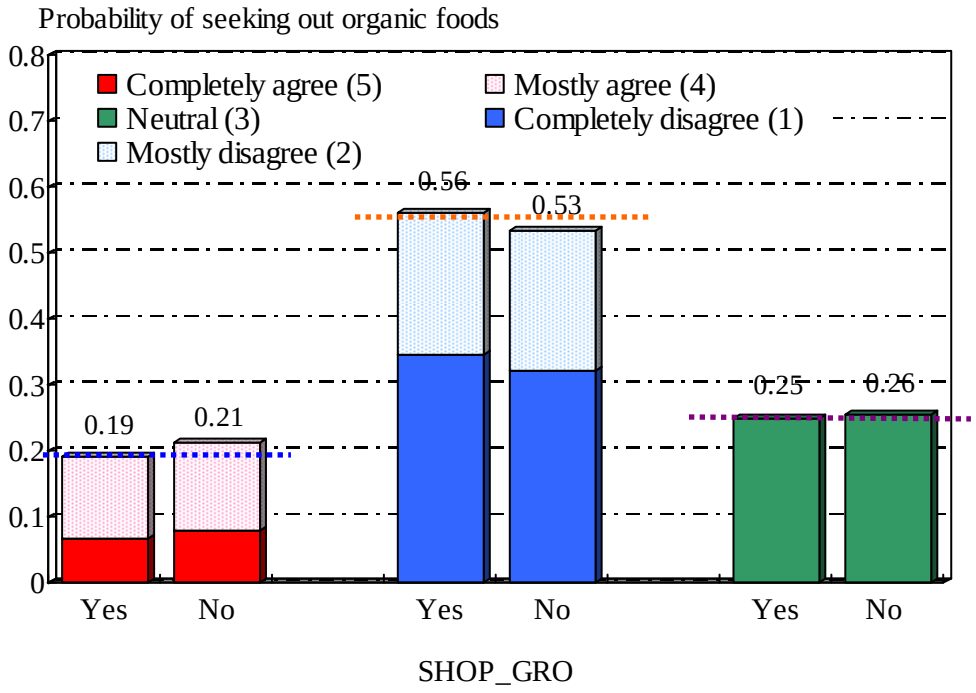
B

Figure 5-11. Continued



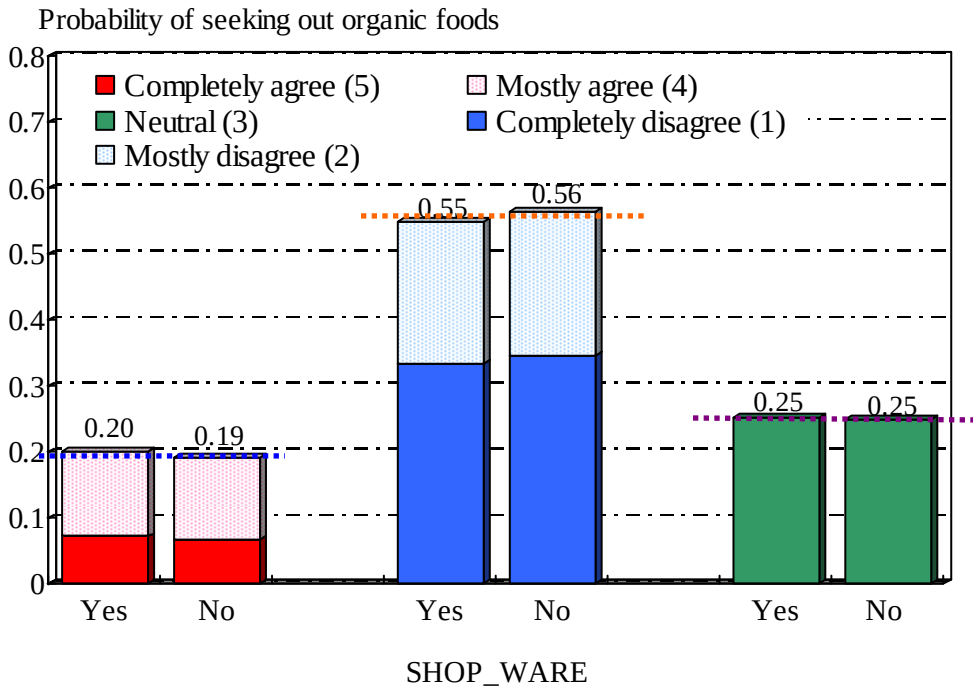
C

Figure 5-11. Continued



A

Figure 5-12. Impact of grocery shopping places seeking out organic foods. A) shopping food in grocery store. B) shopping food in warehouse. C) shopping food through internet store. D) shopping food in mass merchandiser. E) shopping food in convenience store. F) shopping food in farmer's market.



B

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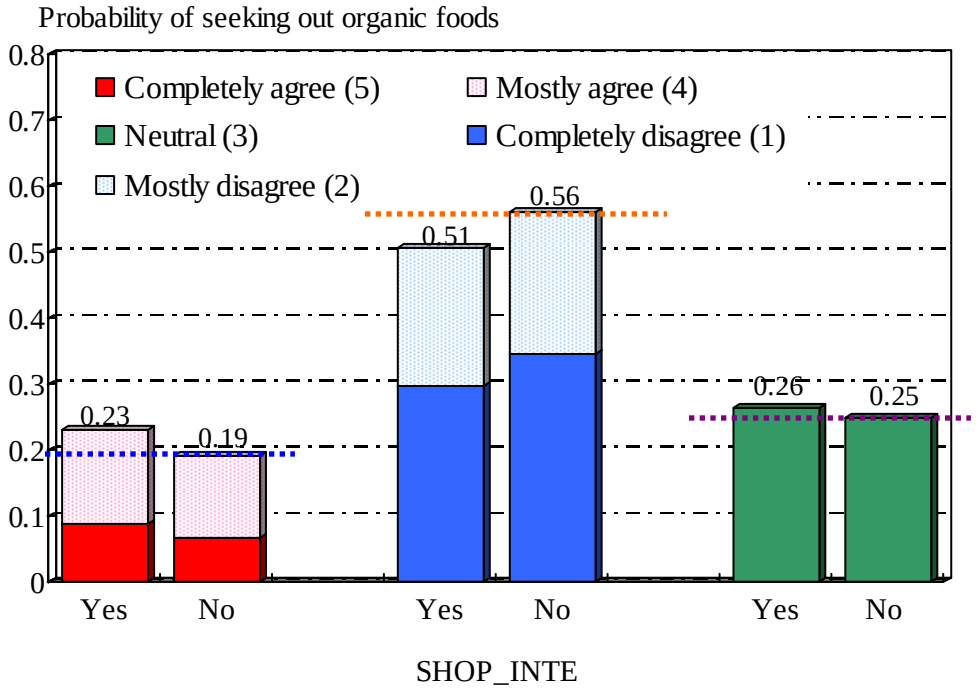

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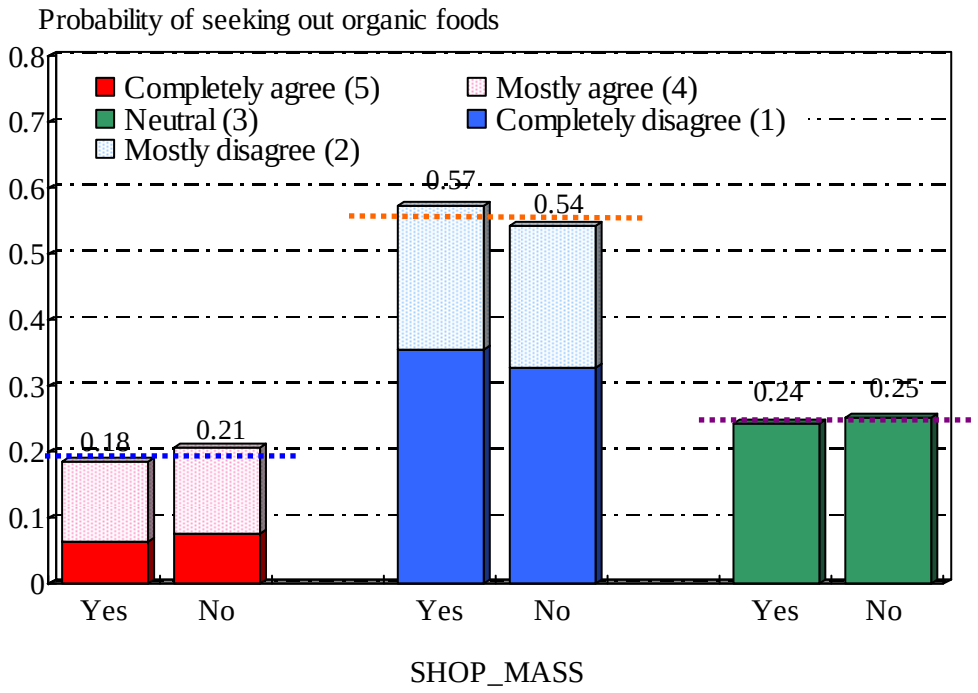
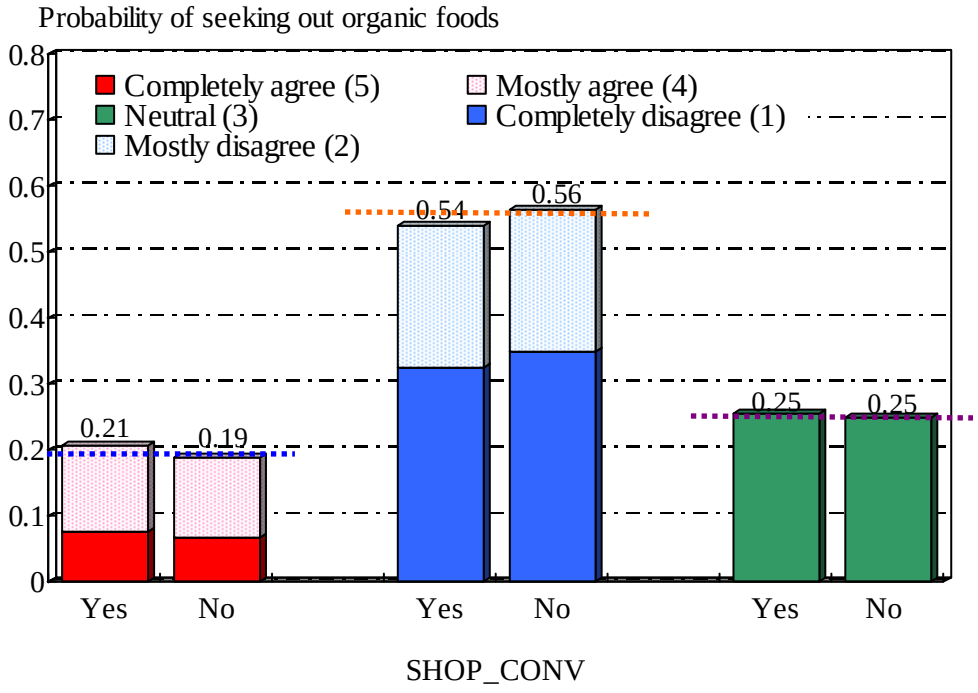


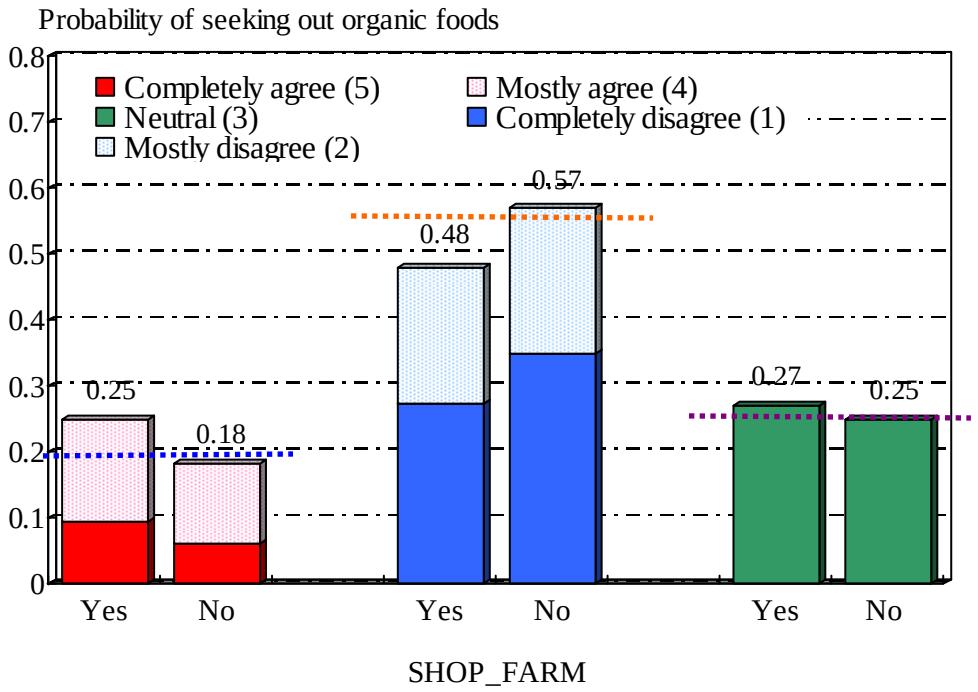
D

Figure 5-12. Continued



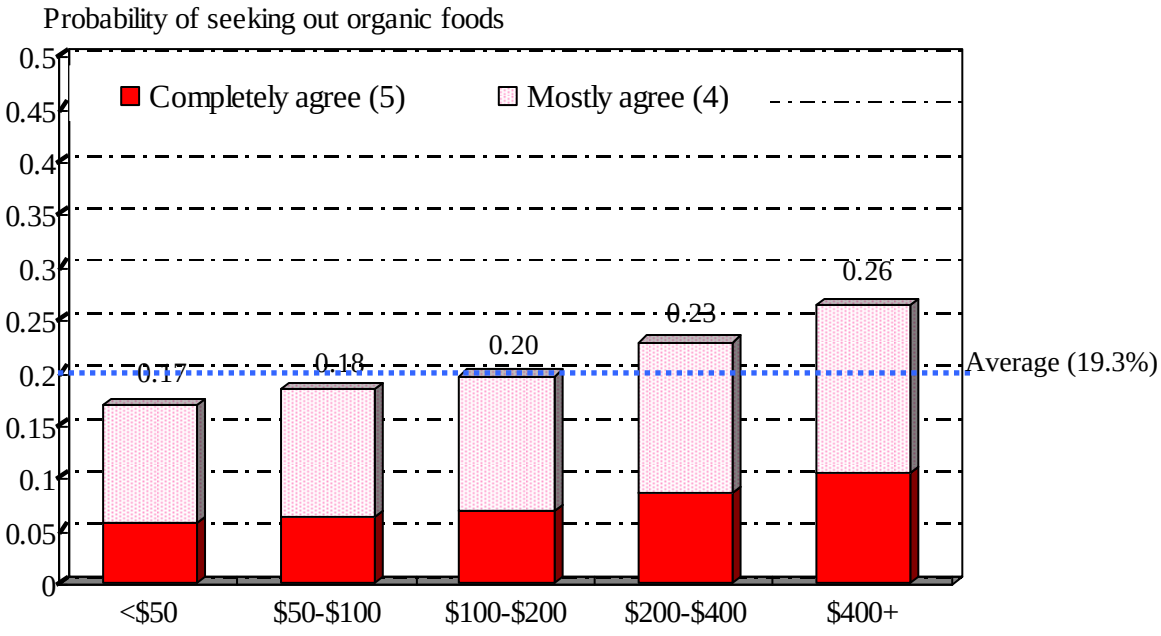
E

Figure 5-12. Continued



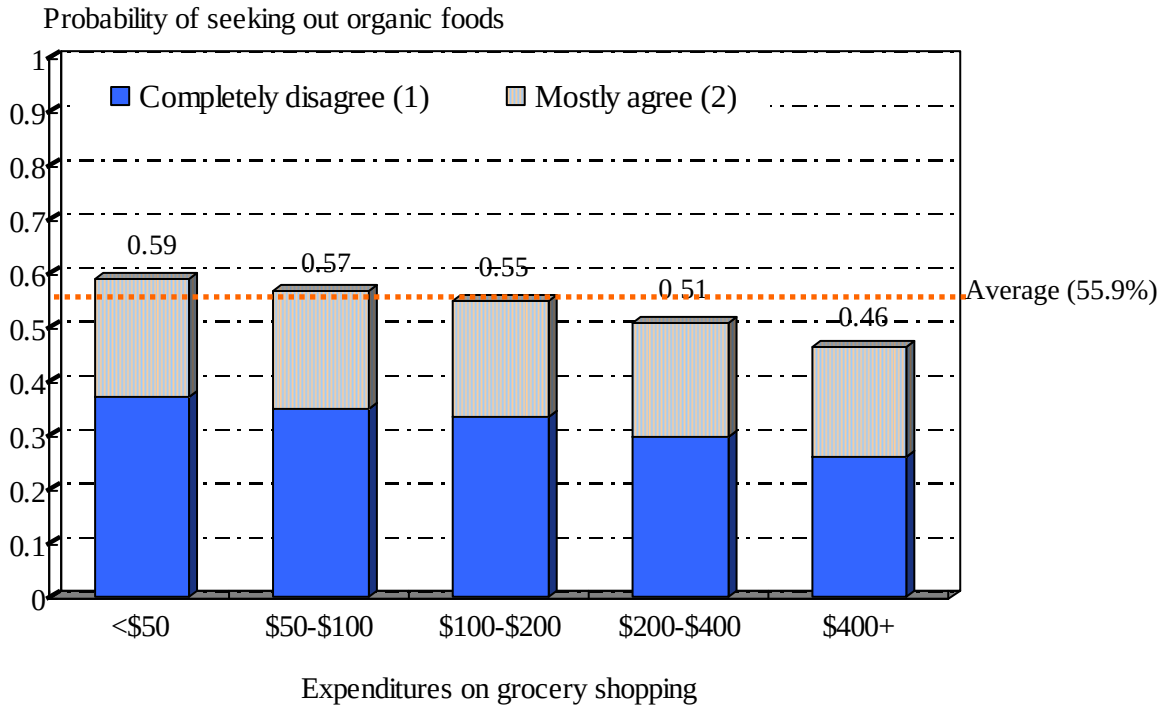
F

Figure 5-12. Continued



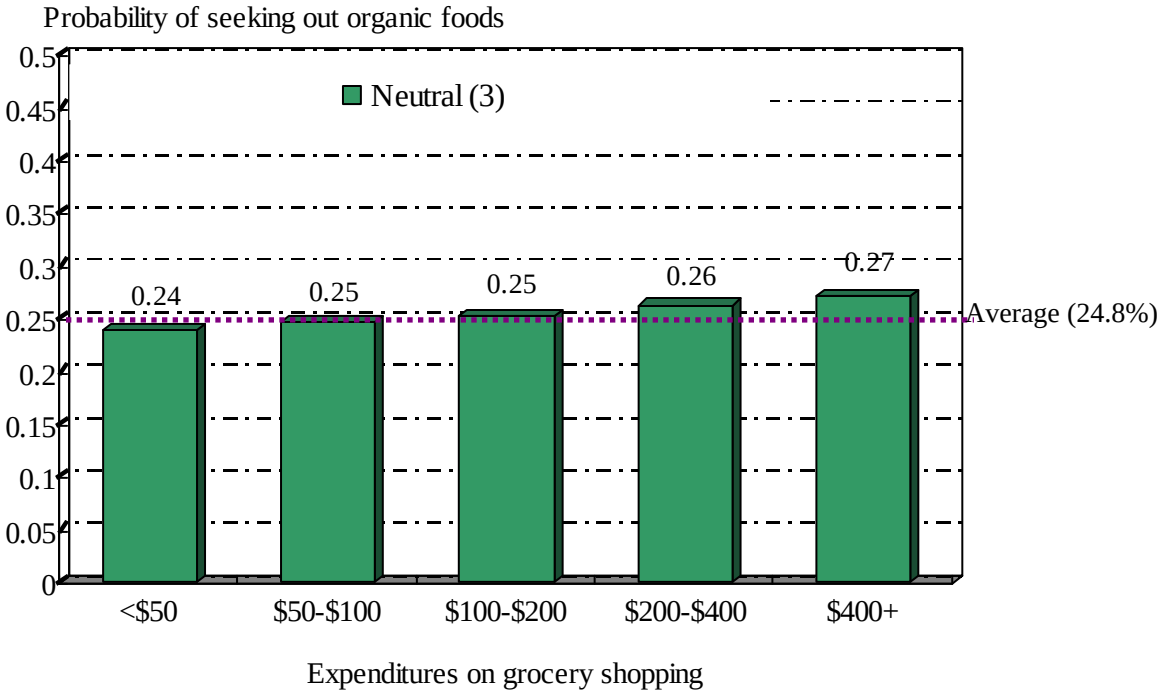
A

Figure 5-13. Impact of expenditures on grocery shopping on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



B

Figure 5-13. Continued



C

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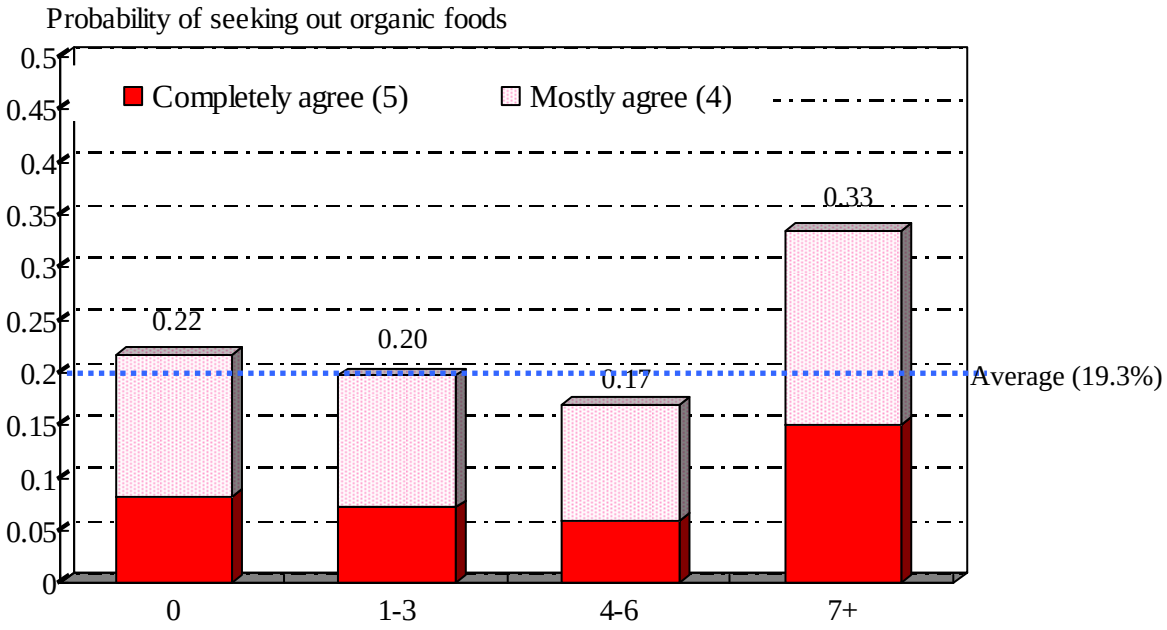
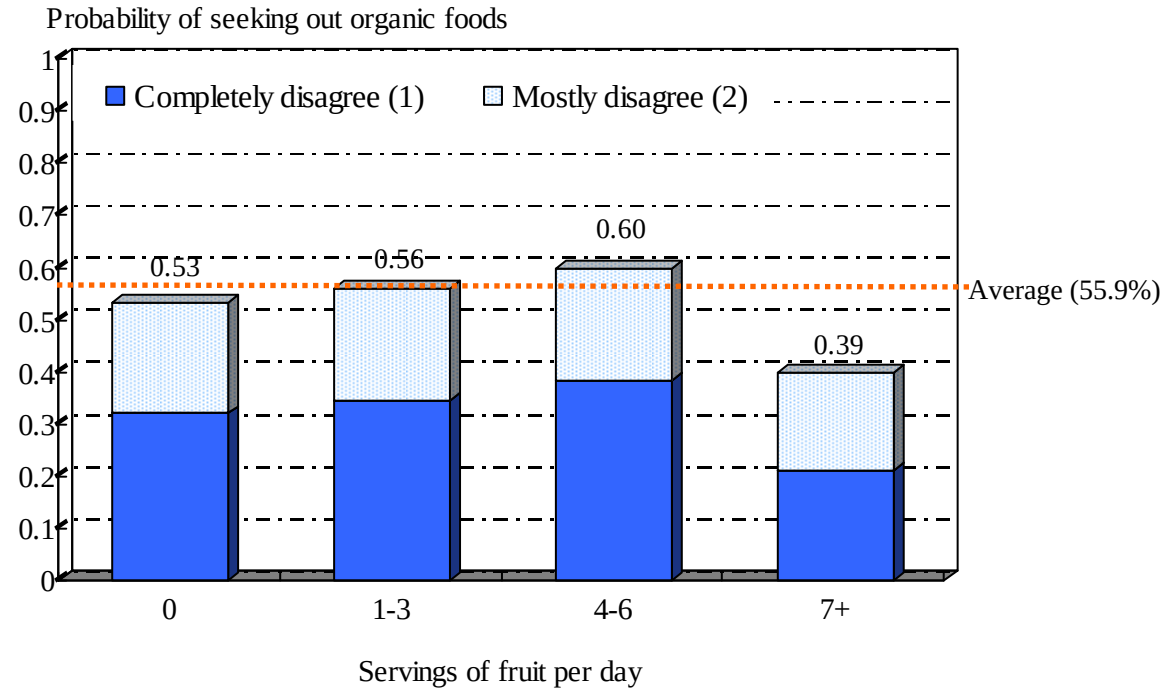


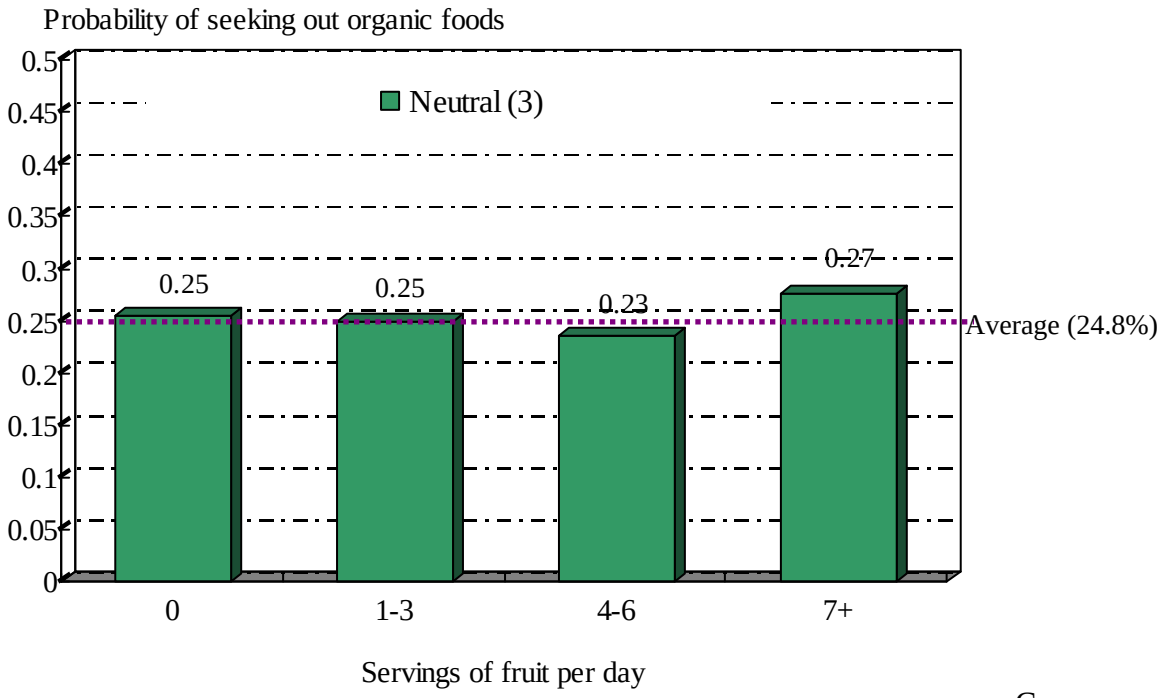
A

Figure 5-14. Impact of servings of fruit on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



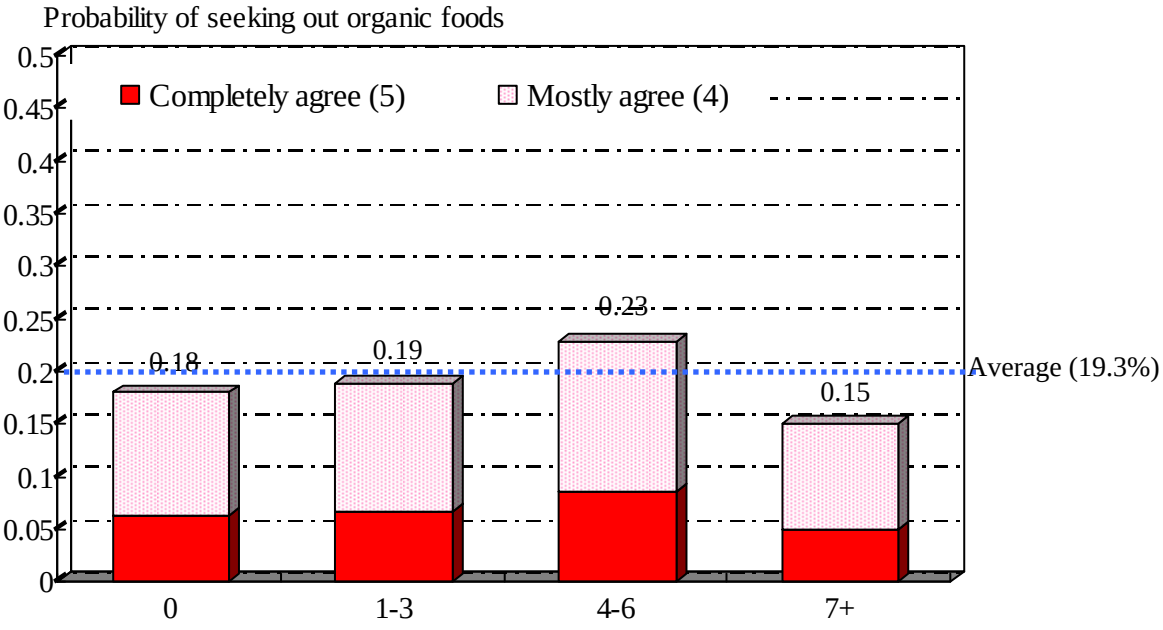
B

Figure 5-14. Continued



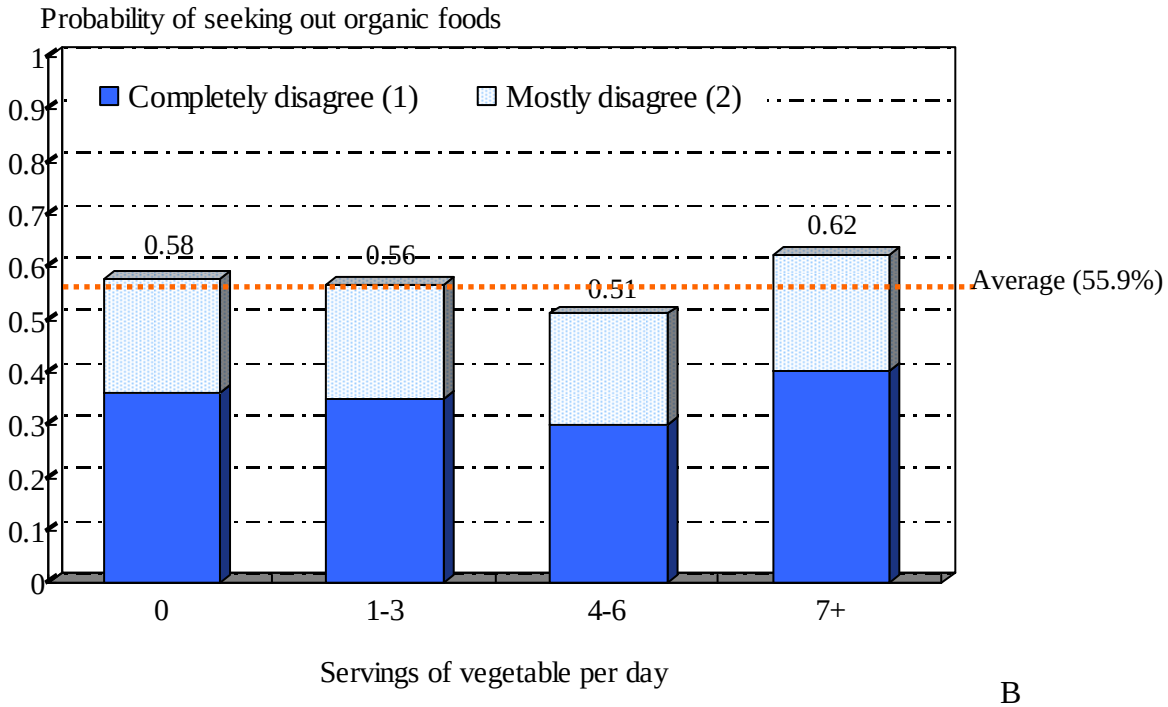
C

Figure 5-14. Continued



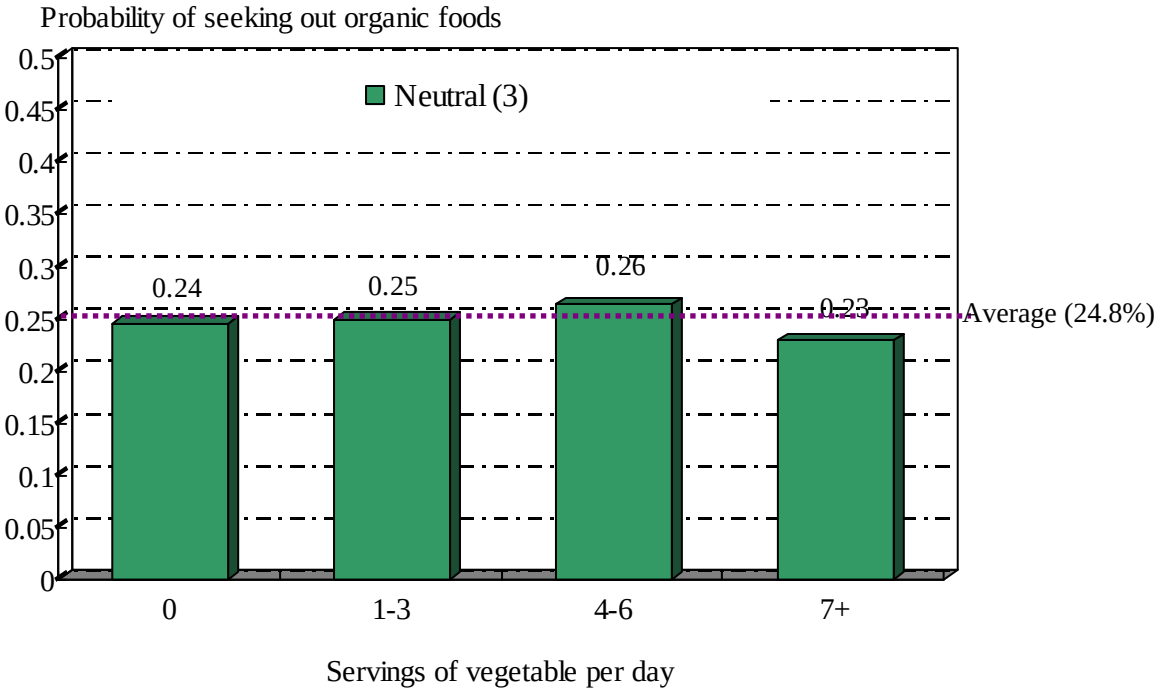
A

Figure 5-15. Impact of servings of vegetables on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



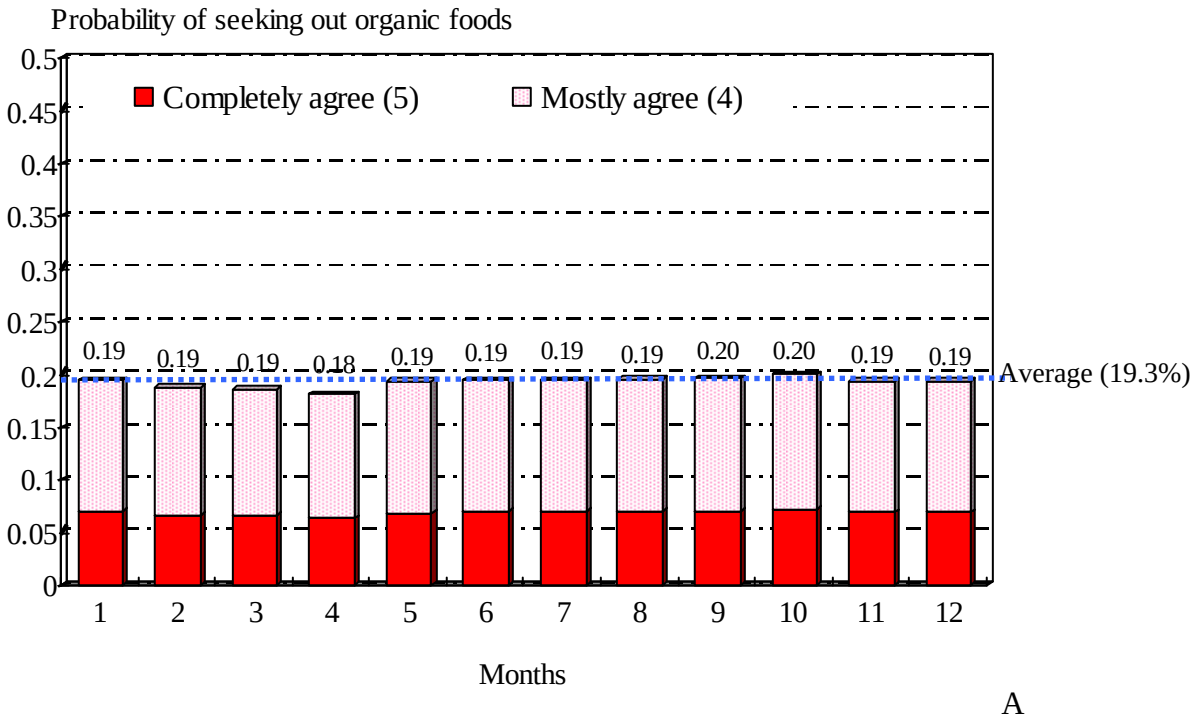
B

Figure 5-15. Continued



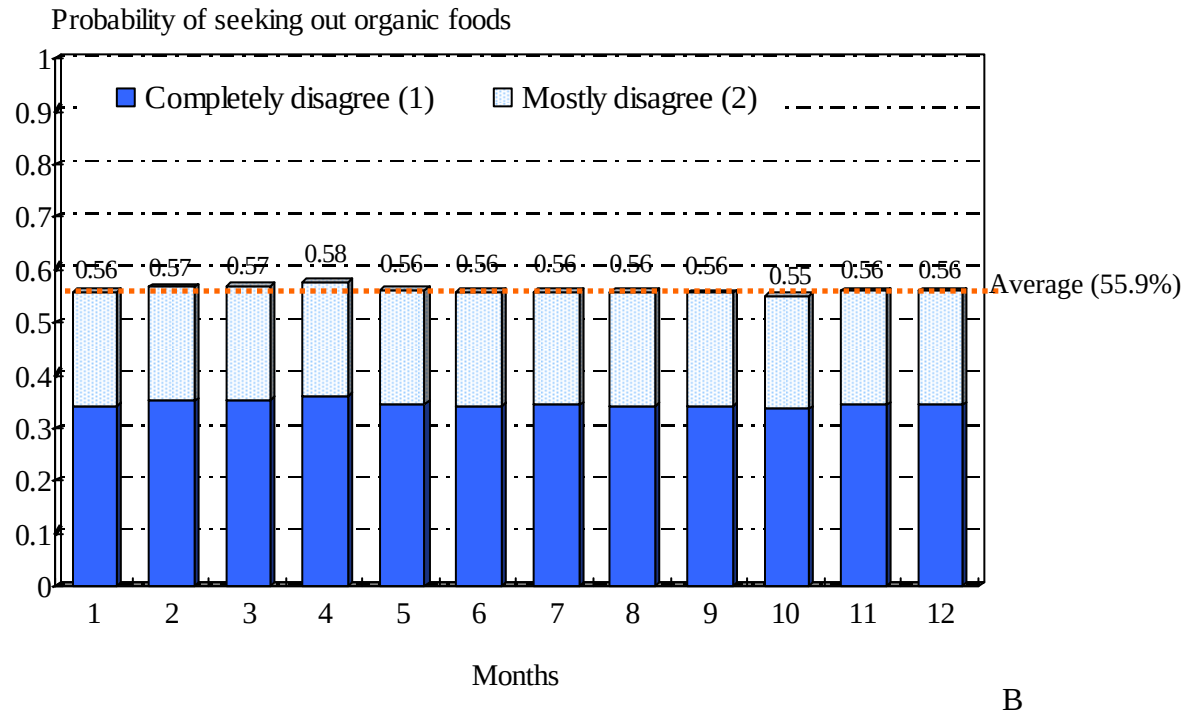
C

Figure 5-15. Continued



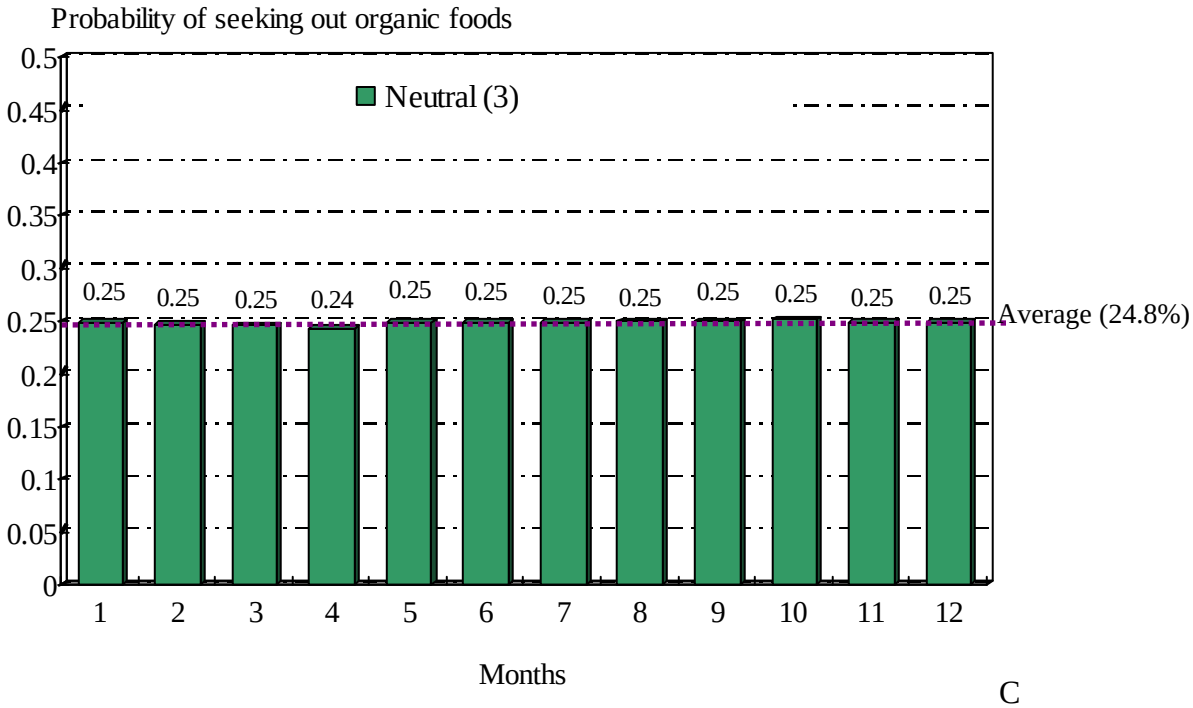
A

Figure 5-16. Impact of seasonality on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



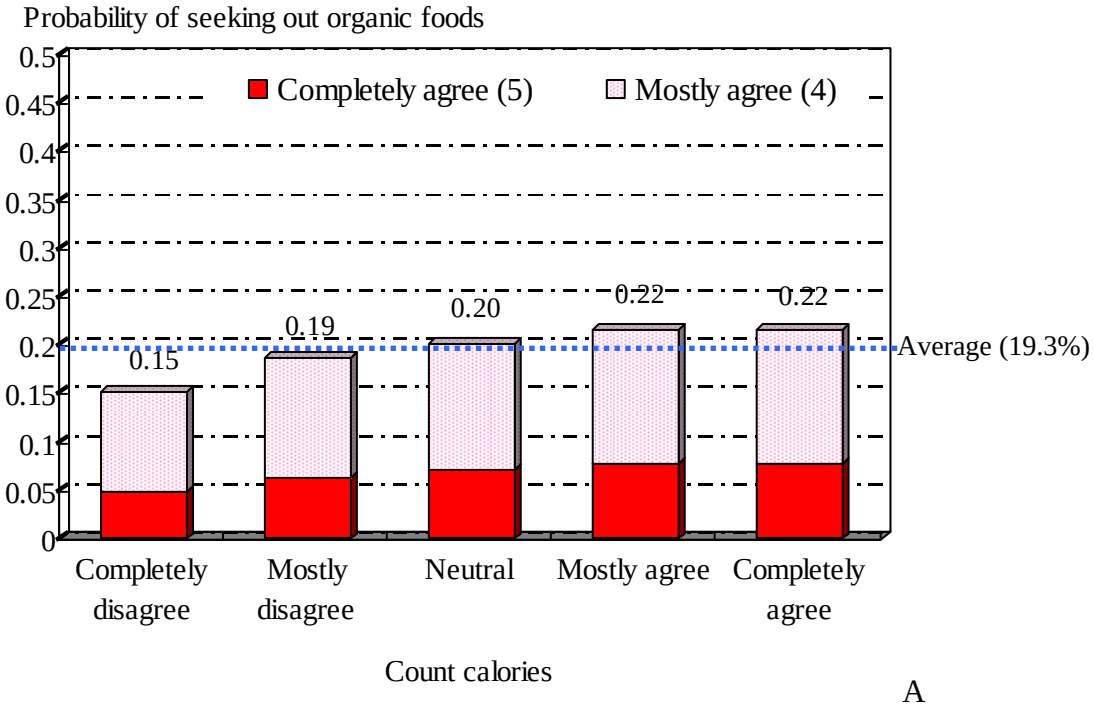
B

Figure 5-16. Continued



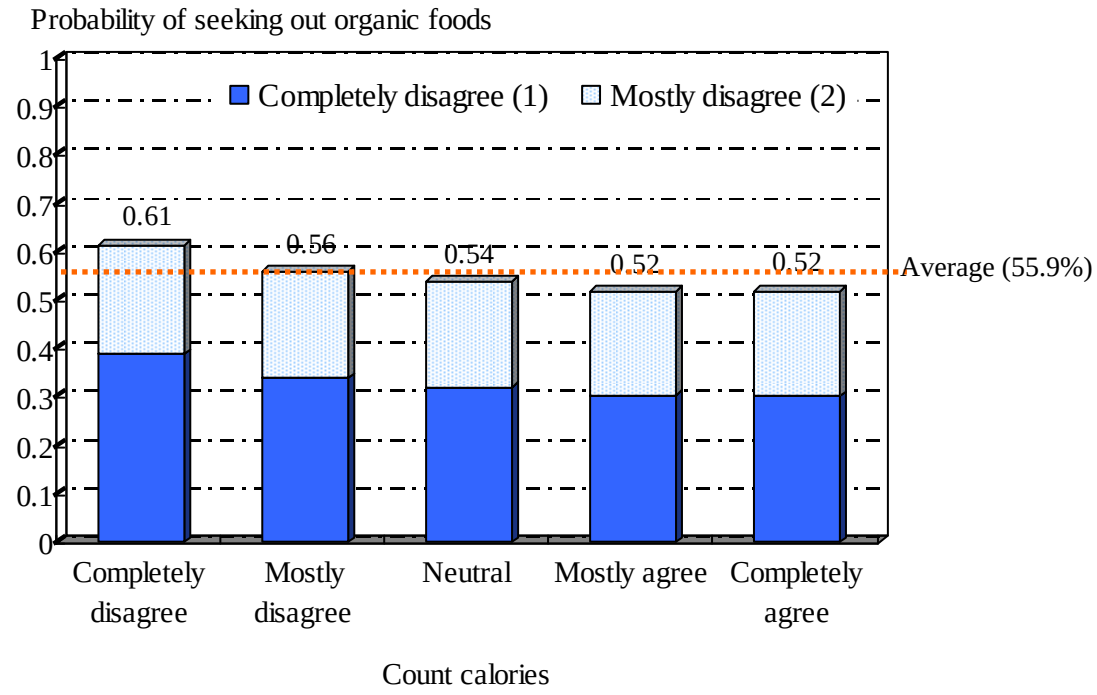
C

Figure 5-16. Continued



A

Figure 5-17. Impact of "count calories" on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



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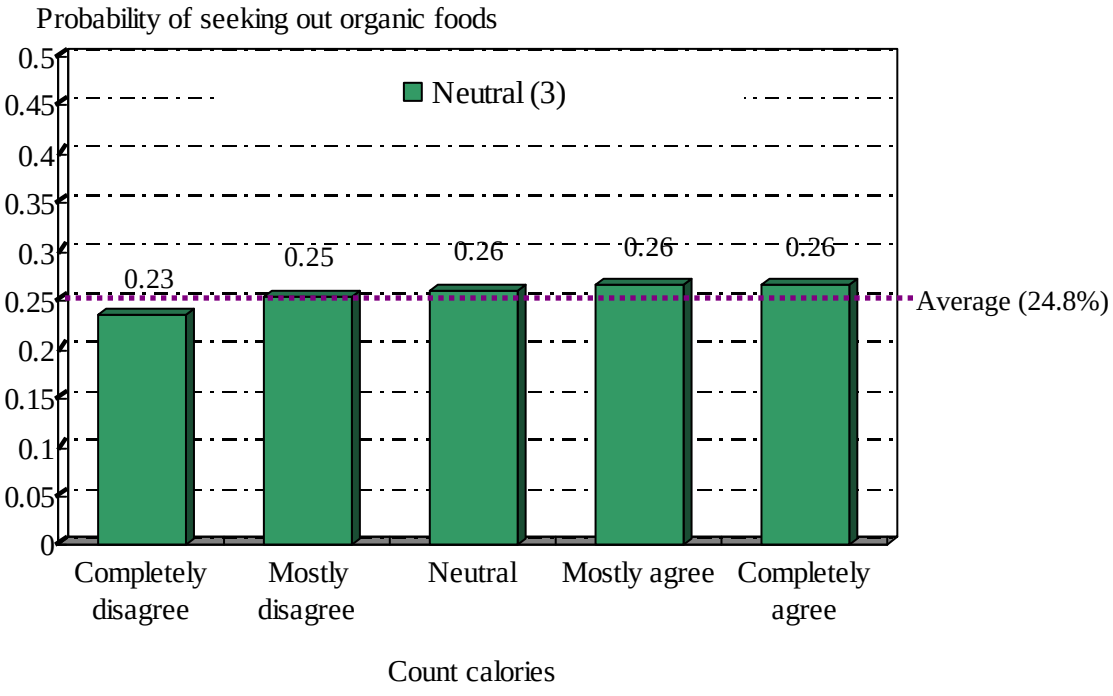
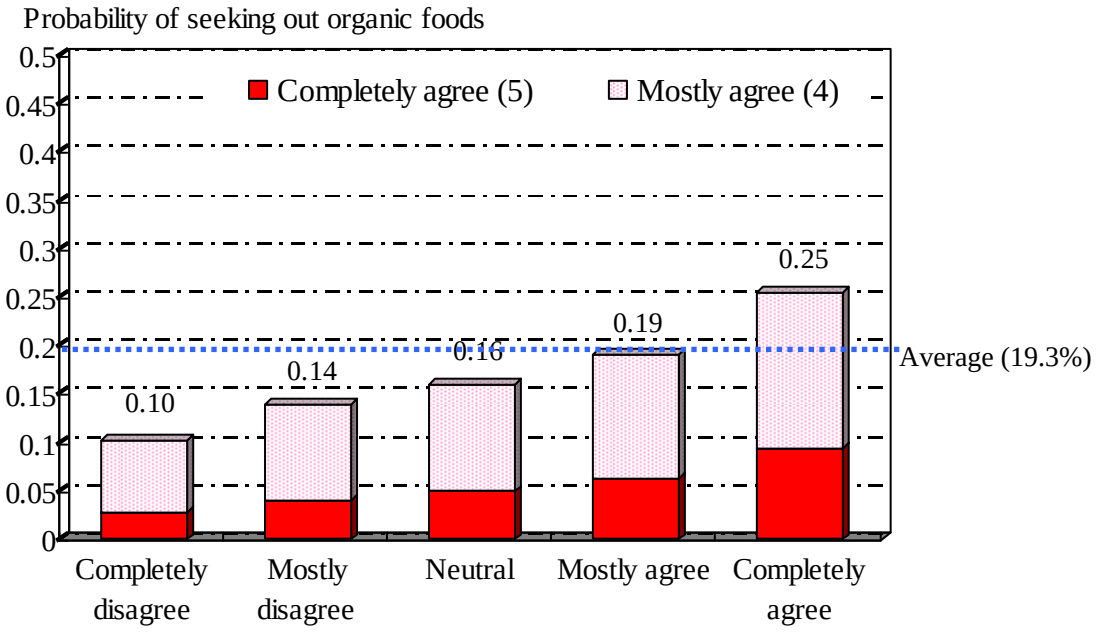


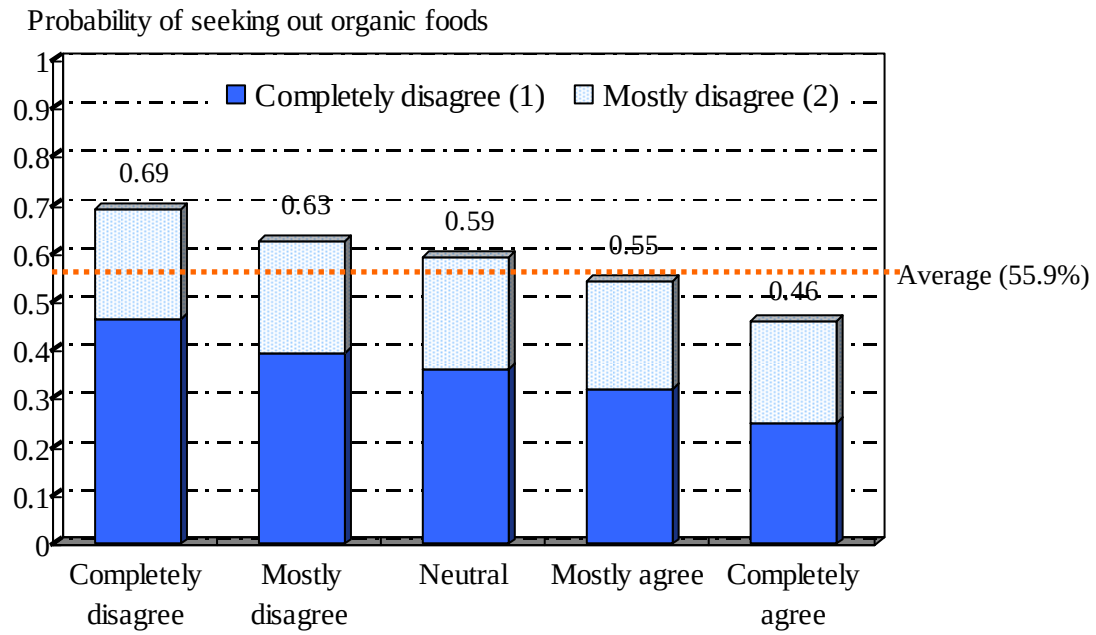
C

Figure 5-17. Continued



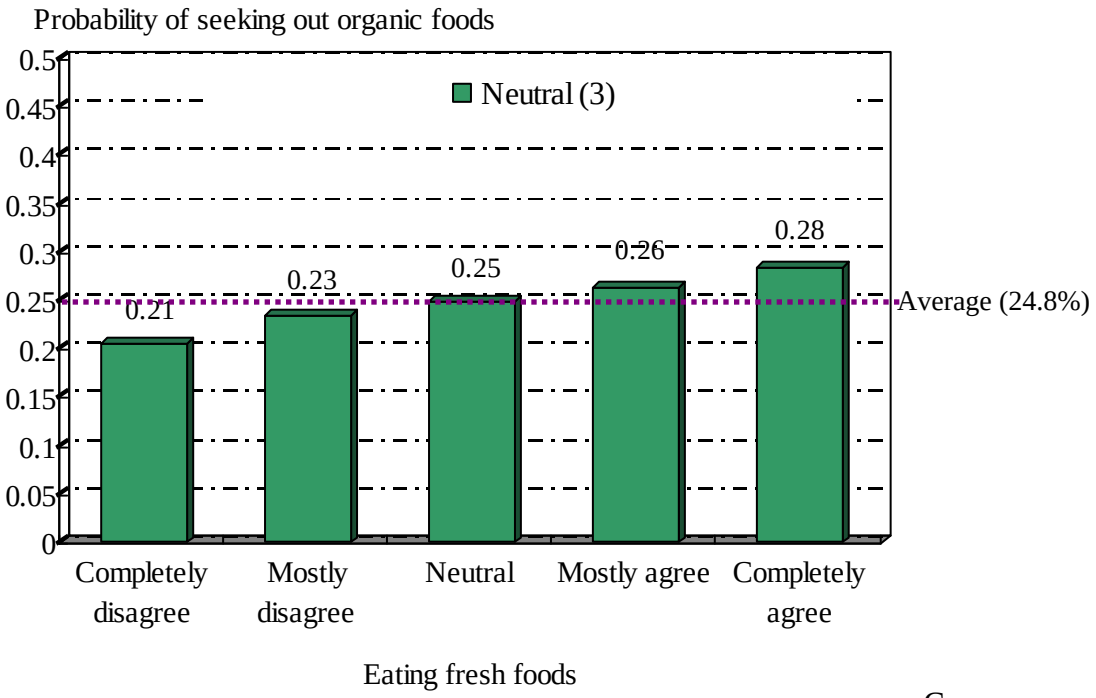
A

Figure 5-18. Impact of "eat fresh foods" on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



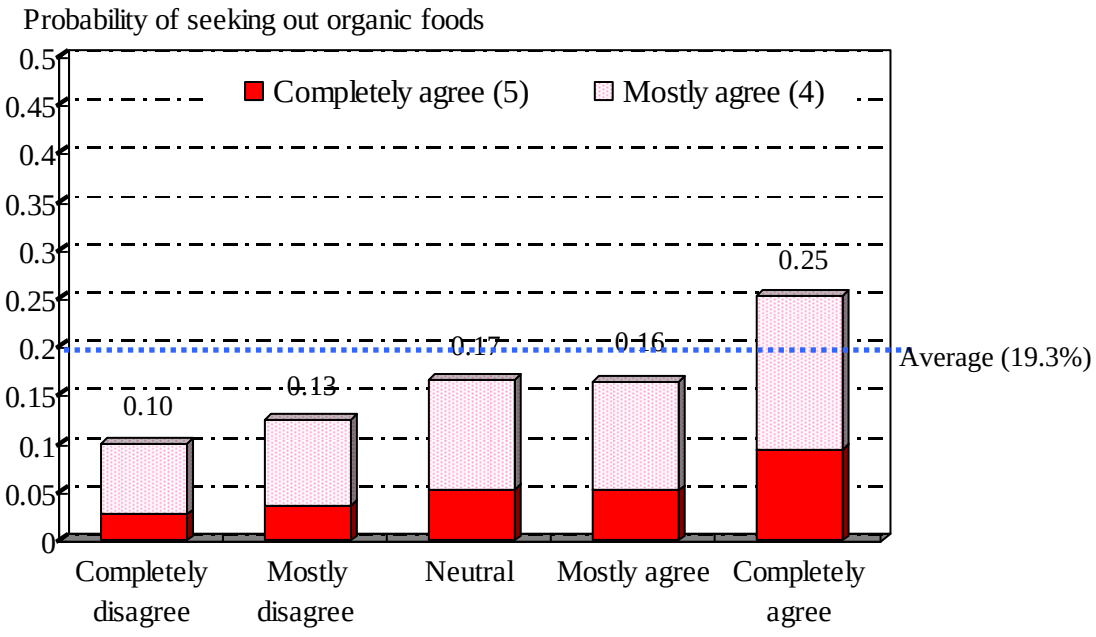
B

Figure 5-18. Continued



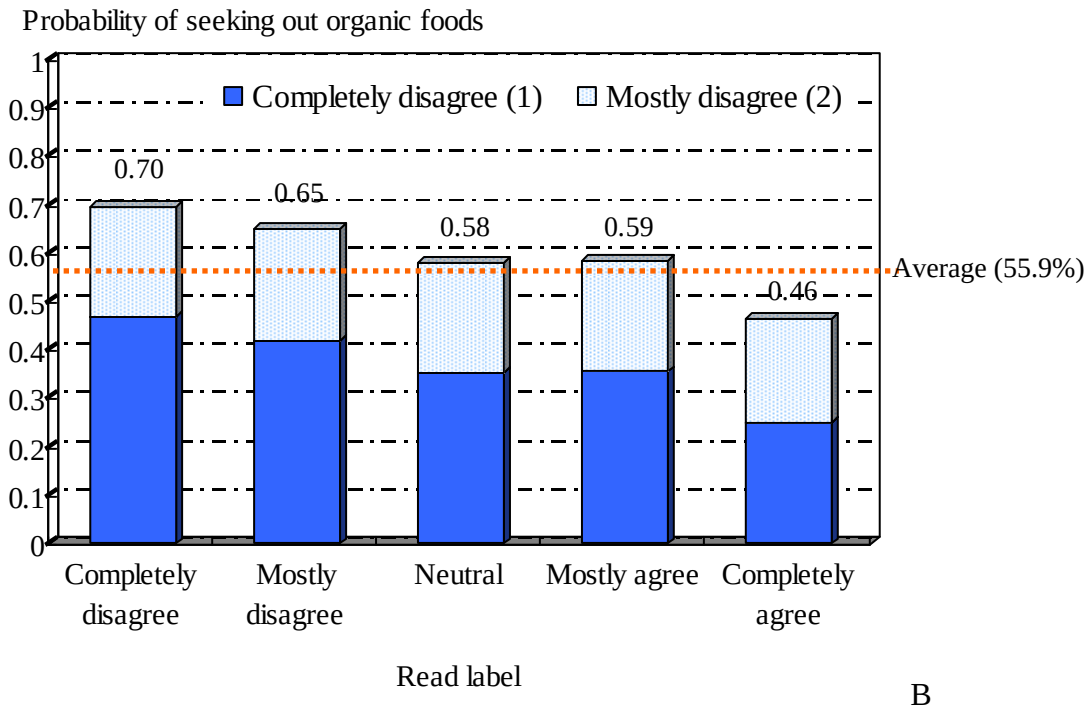
C

Figure 5-18. Continued

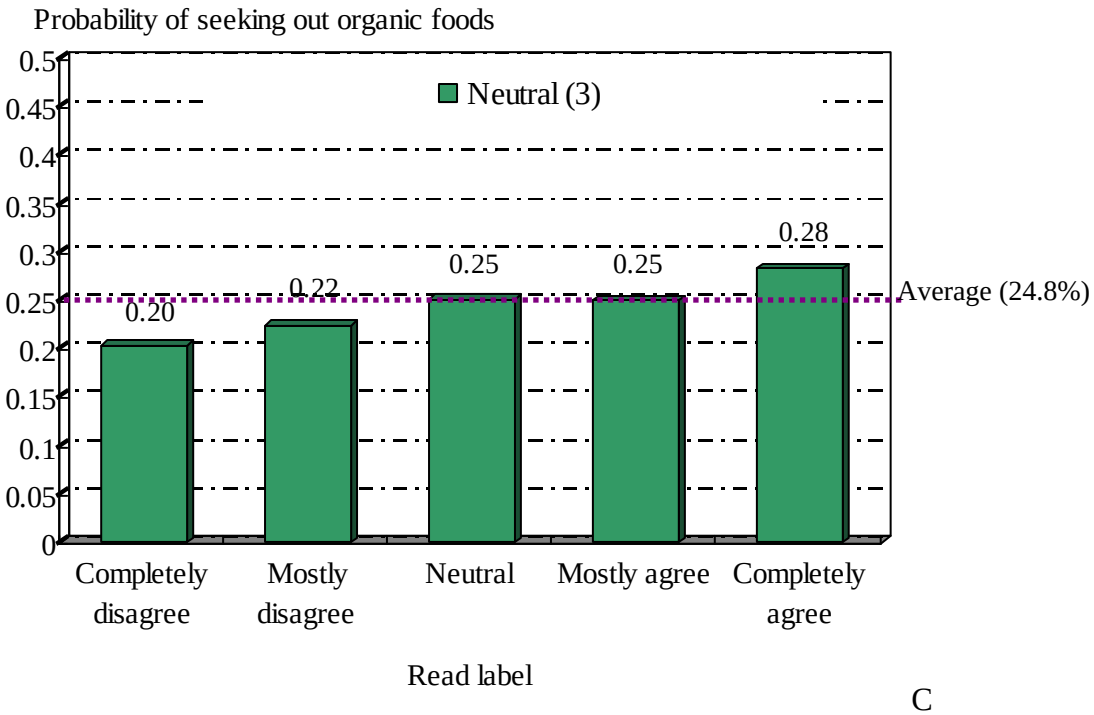


A

Figure 5-19. Impact of "read label" on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".

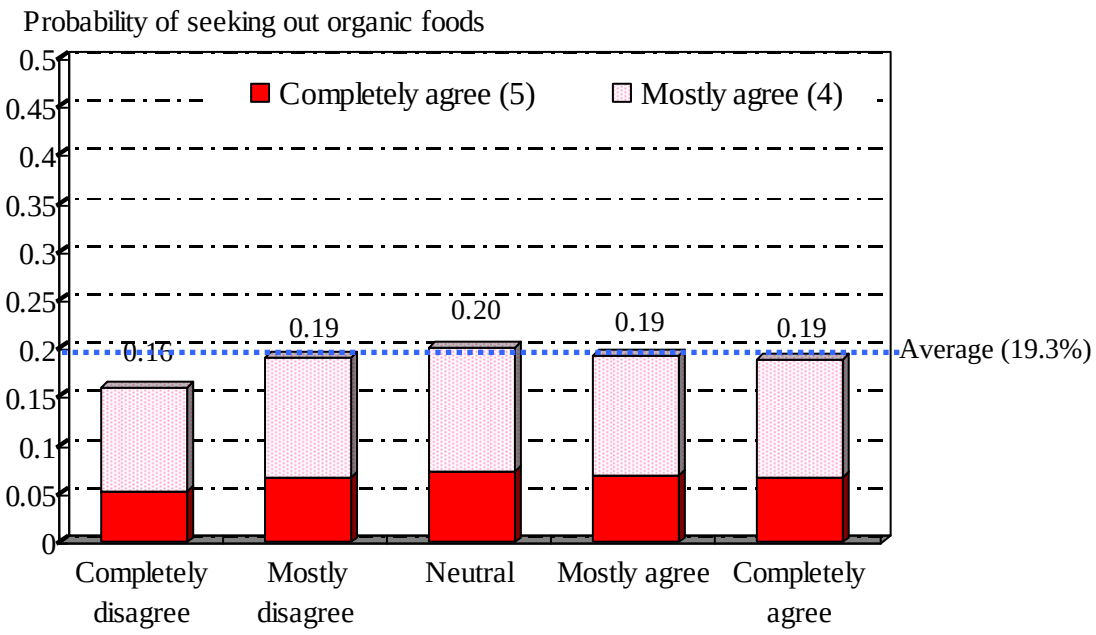


B



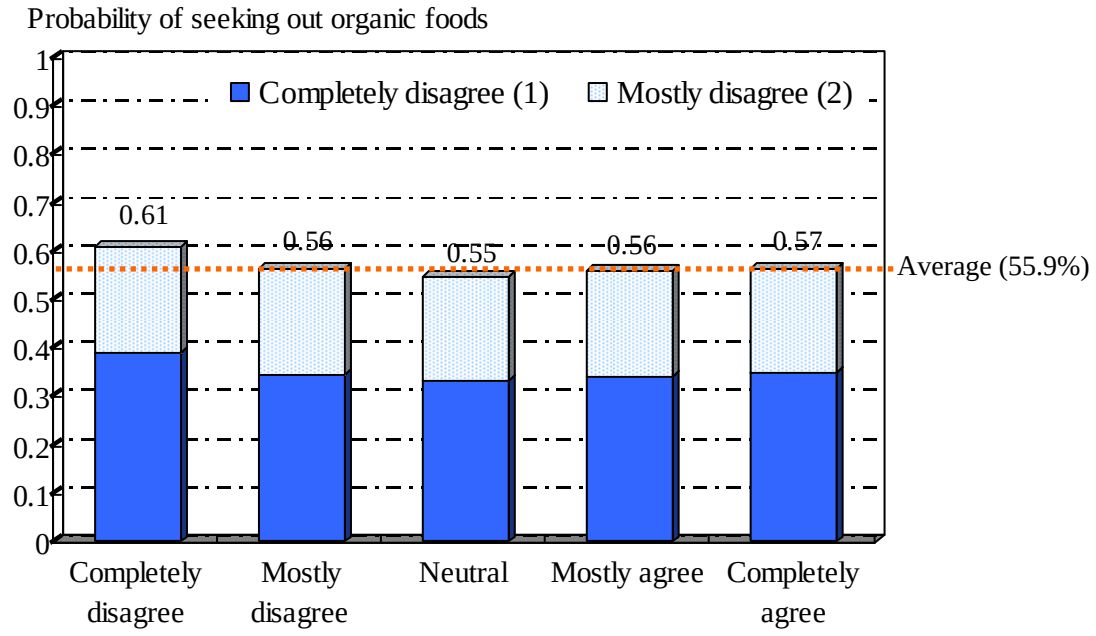
C

Figure 5-19. Continued



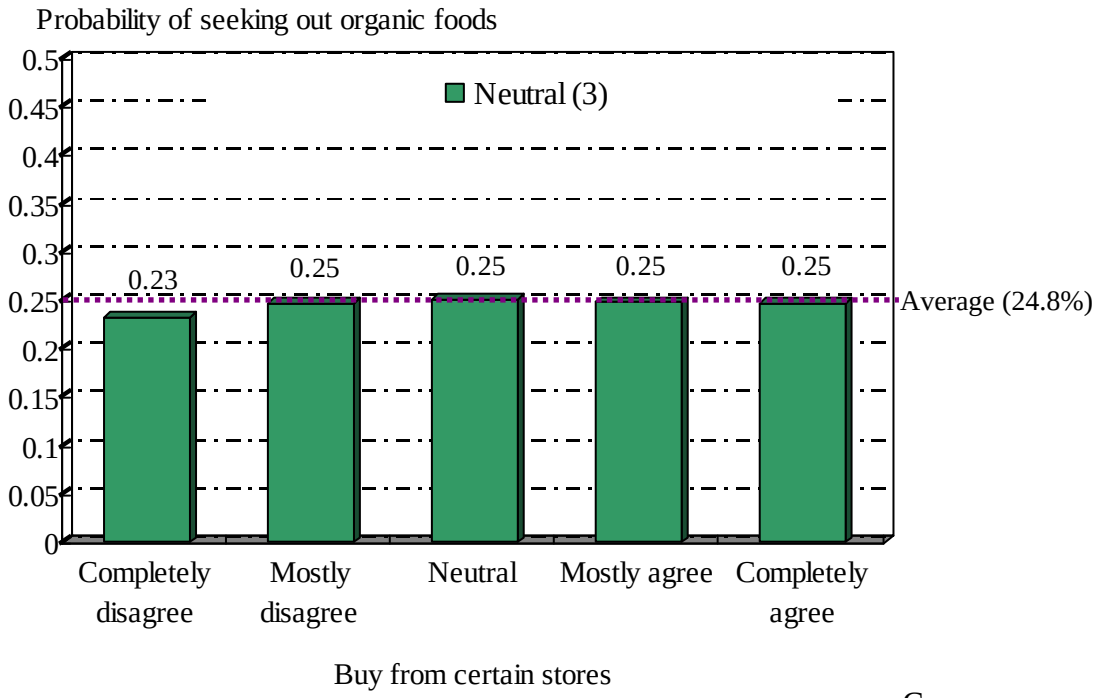
A

Figure 5-20. Impact of "buy from certain stores" on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



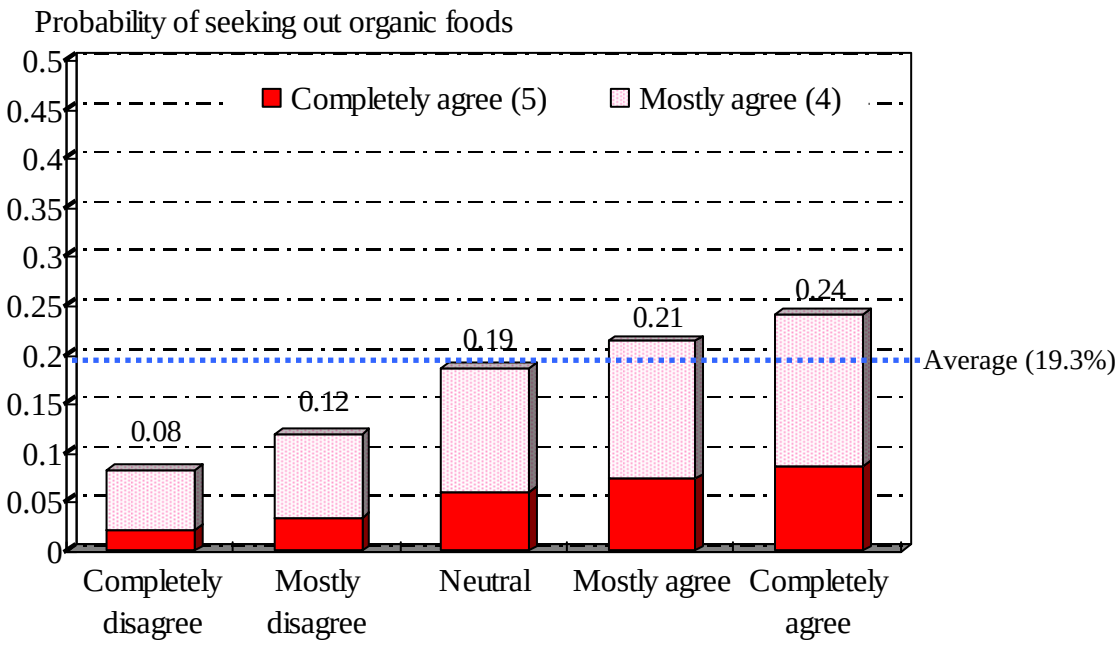
B

Figure 5-20. Continued



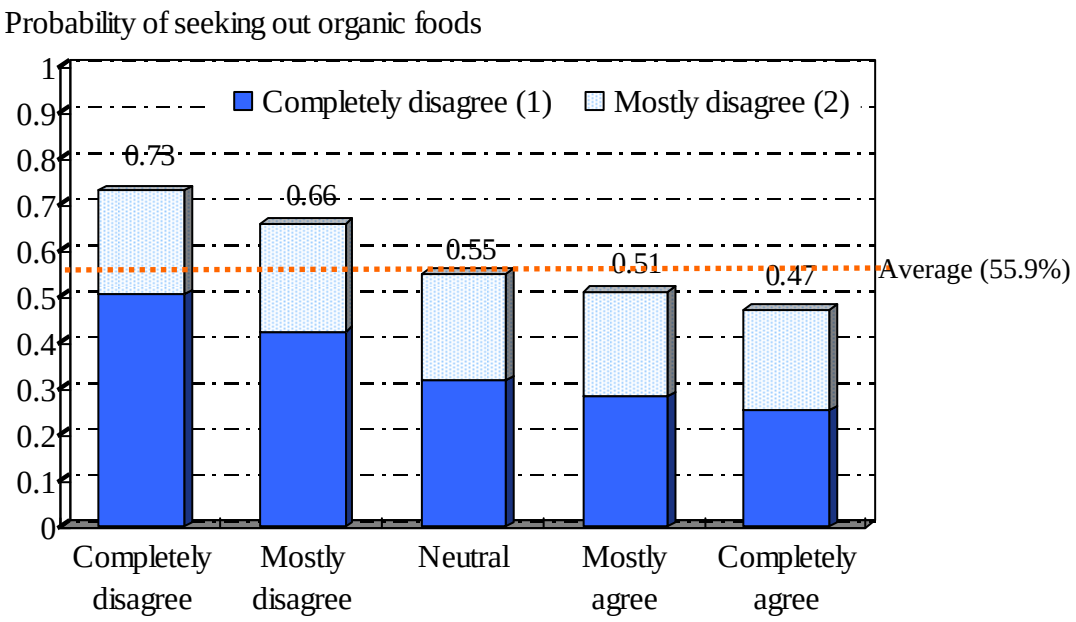
C

Figure 5-20. Continued



A

Figure 5-21. Impact of "go out of way to get certain types of produce" on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



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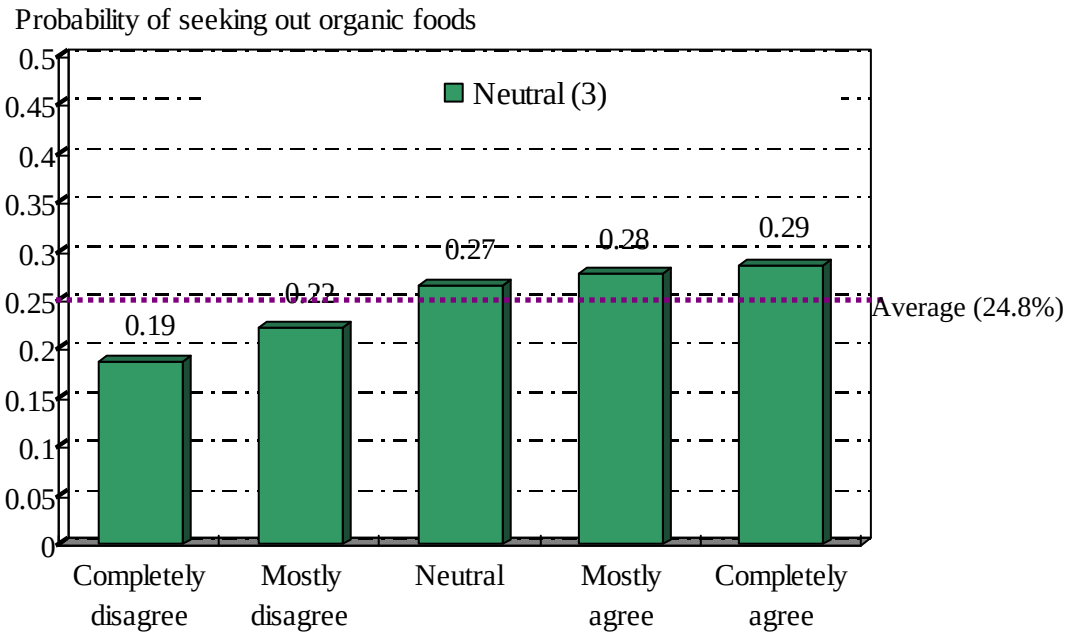
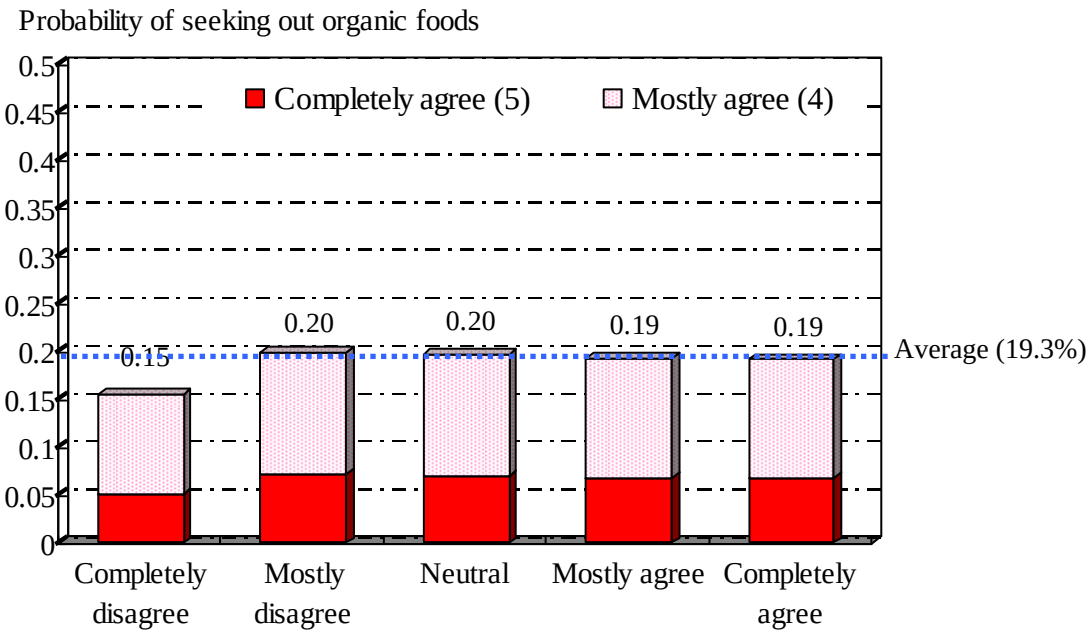


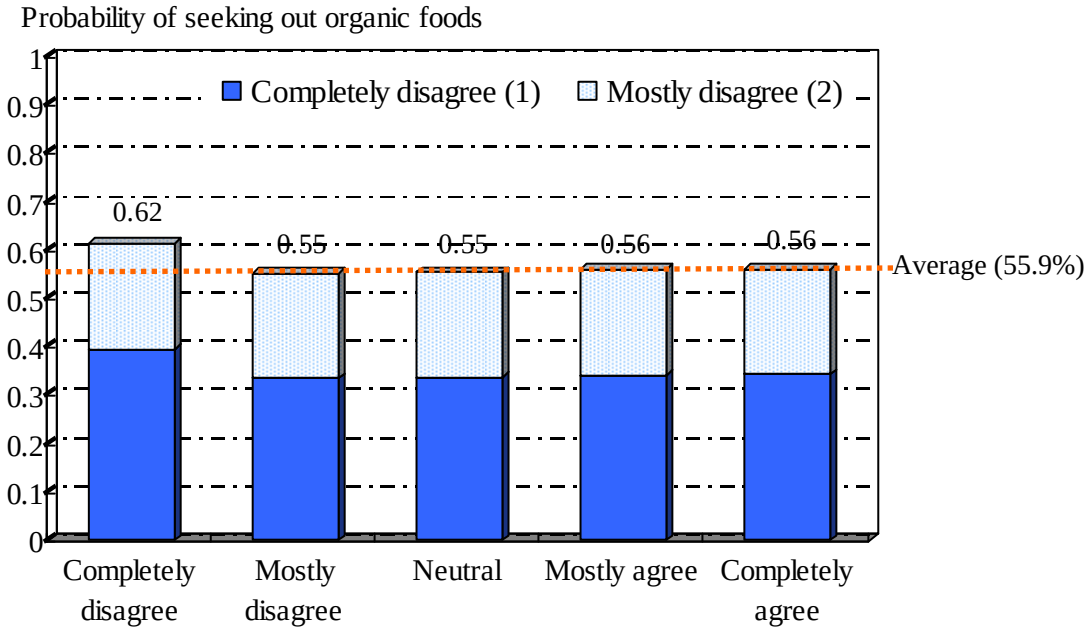
C

Figure 5-21. Continued



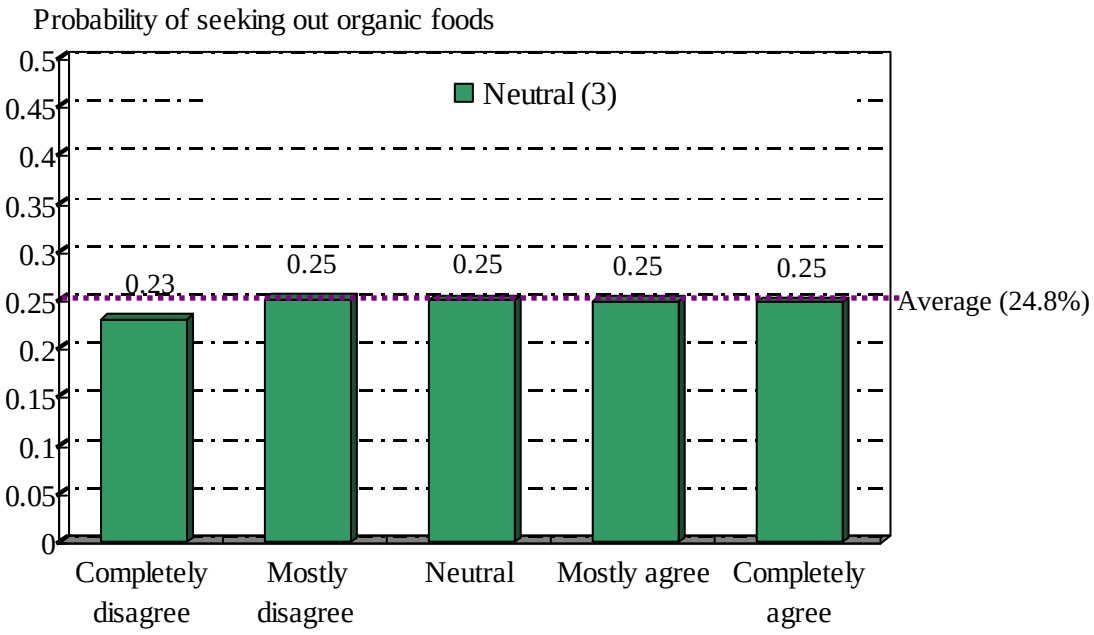
A

Figure 5-22. Impact of "eat fresh fruit and vegetables" on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



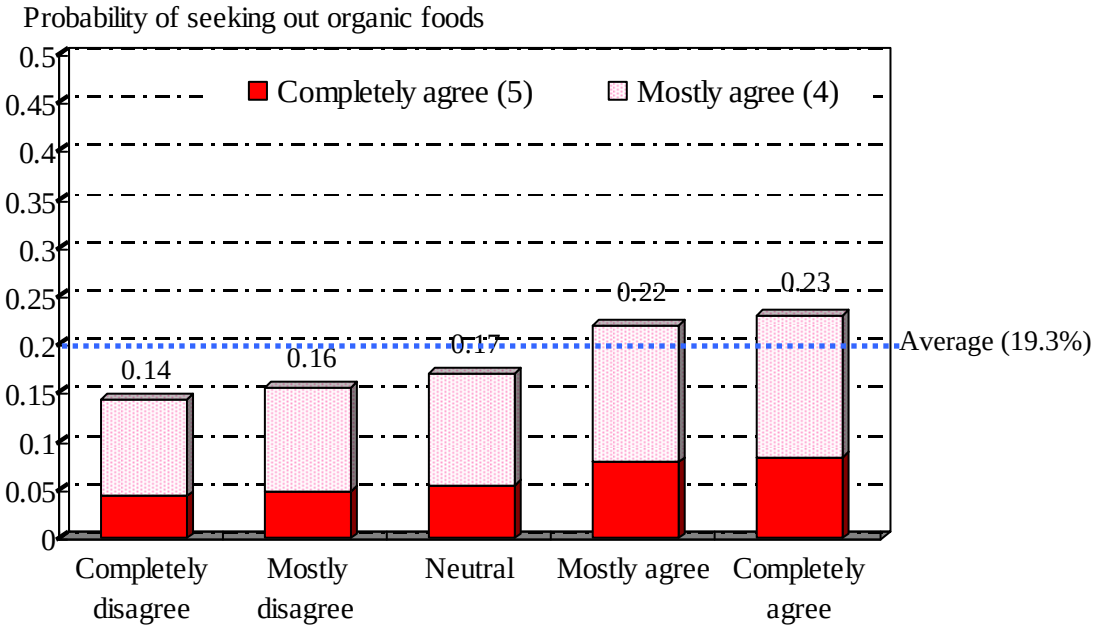
B

Figure 5-22. Continued



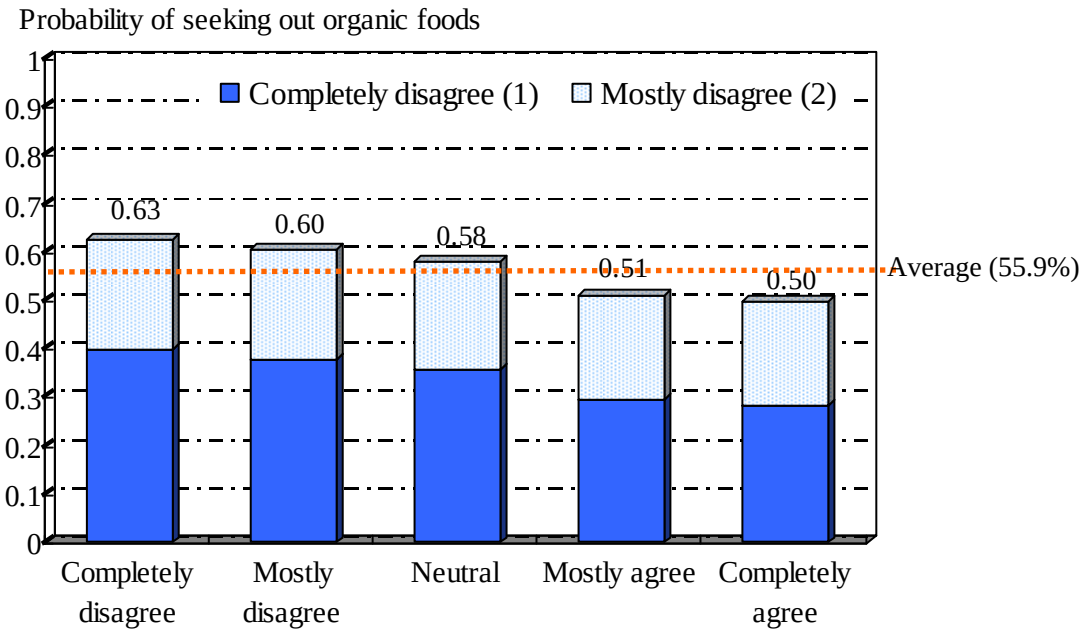
C

Figure 5-22. Continued



A

Figure 5-23. Impact of "feel healthier" on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



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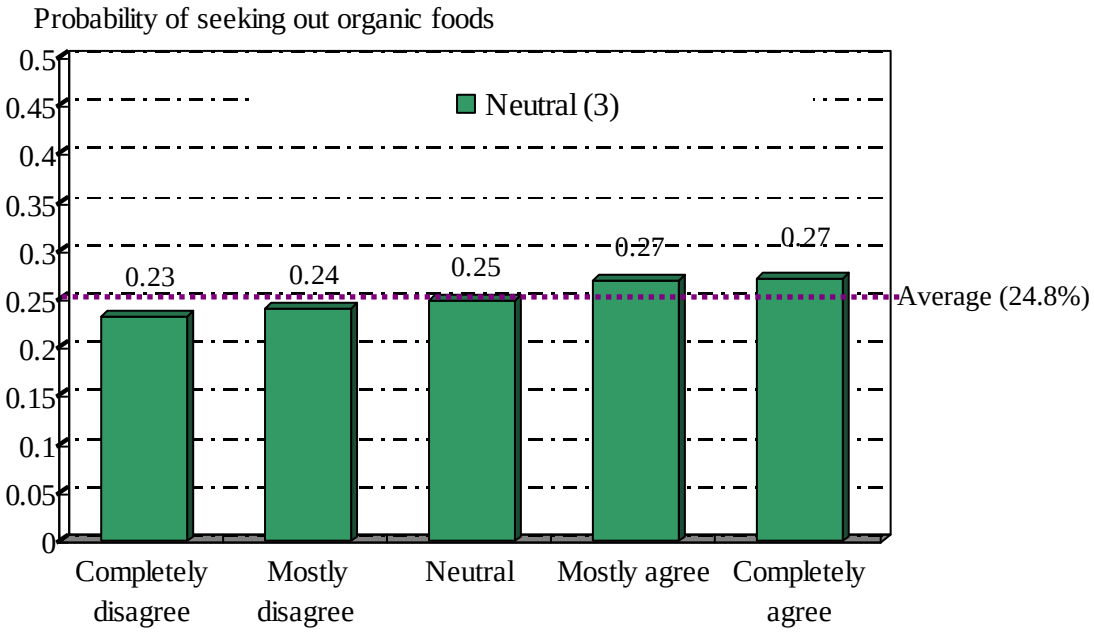
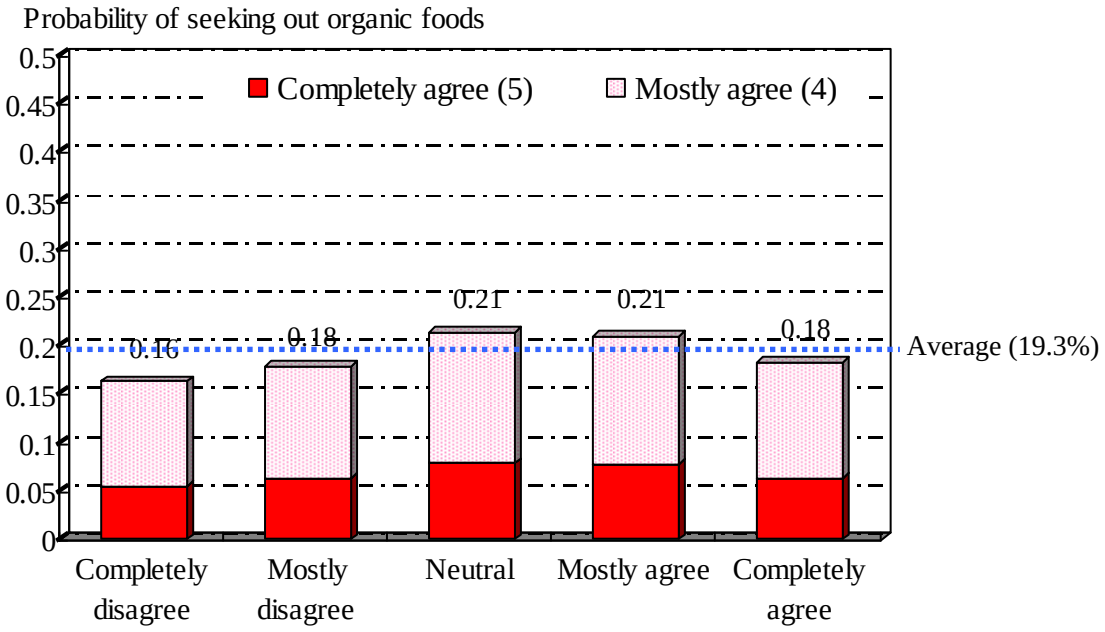


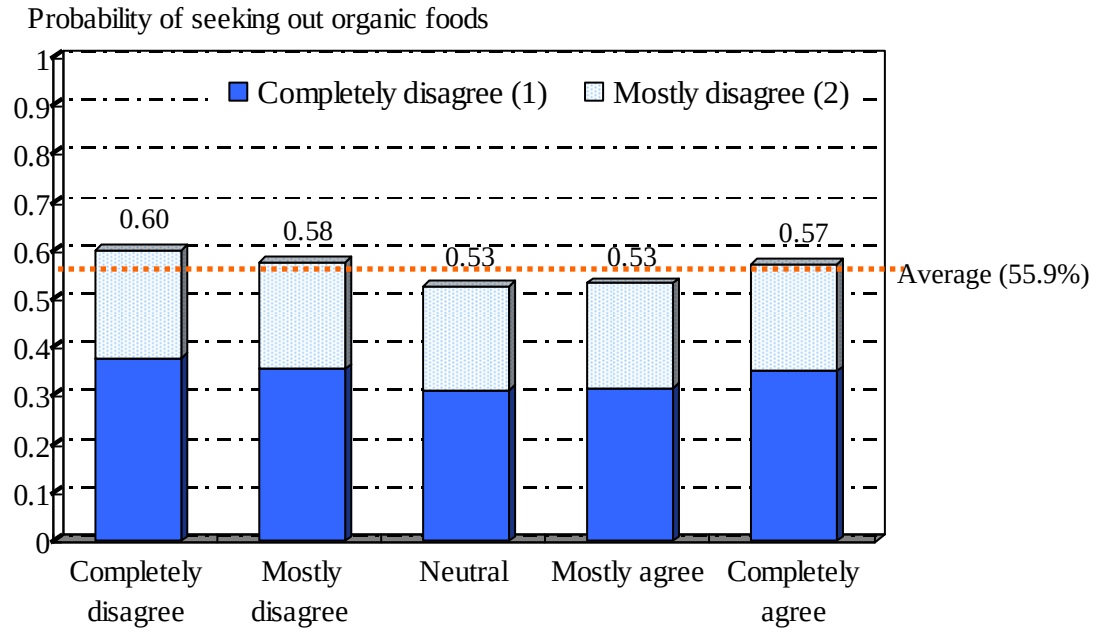
C

Figure 5-23. Continued



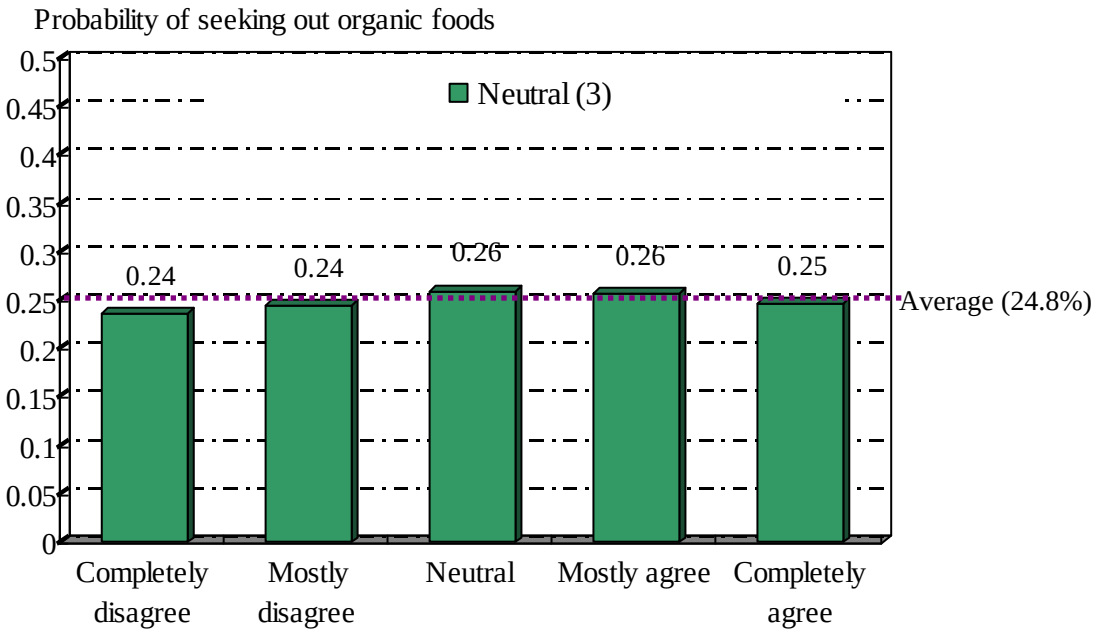
A

Figure 5-24. Impact of "exercise at least 3 times a week" on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



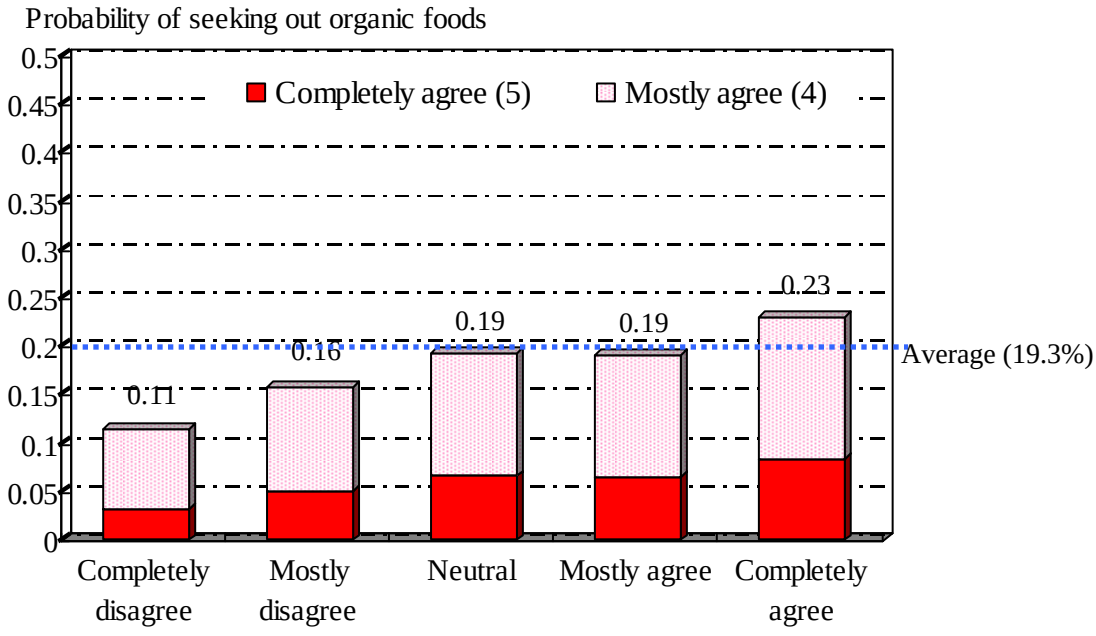
B

Figure 5-24. Continued



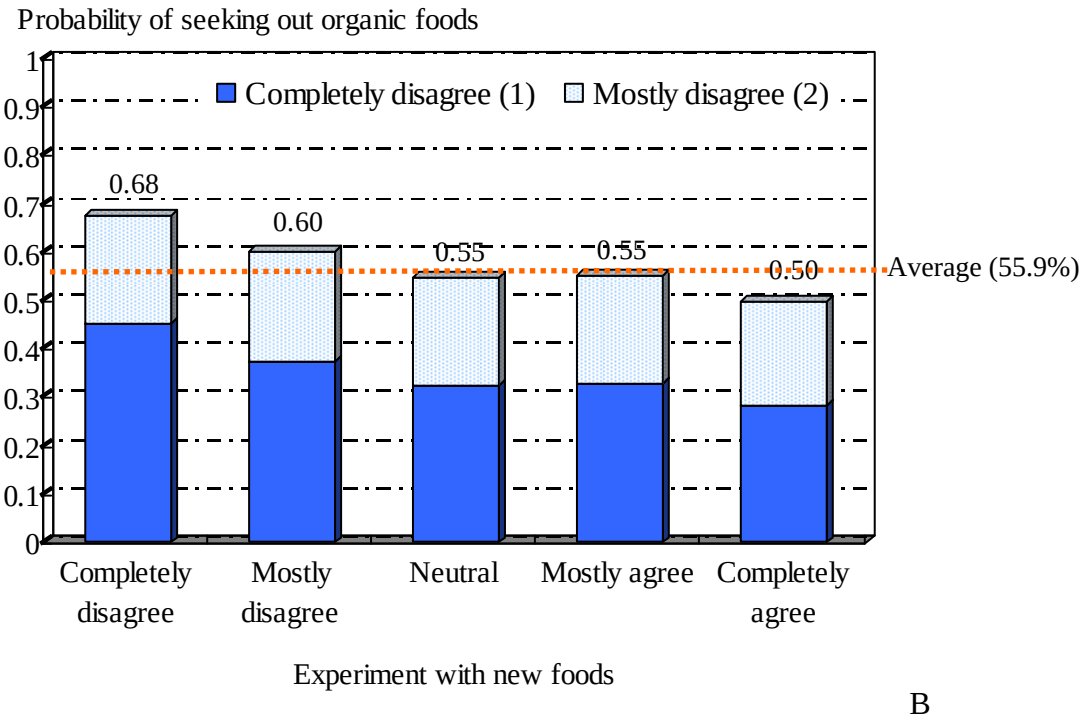
C

Figure 5-24. Continued



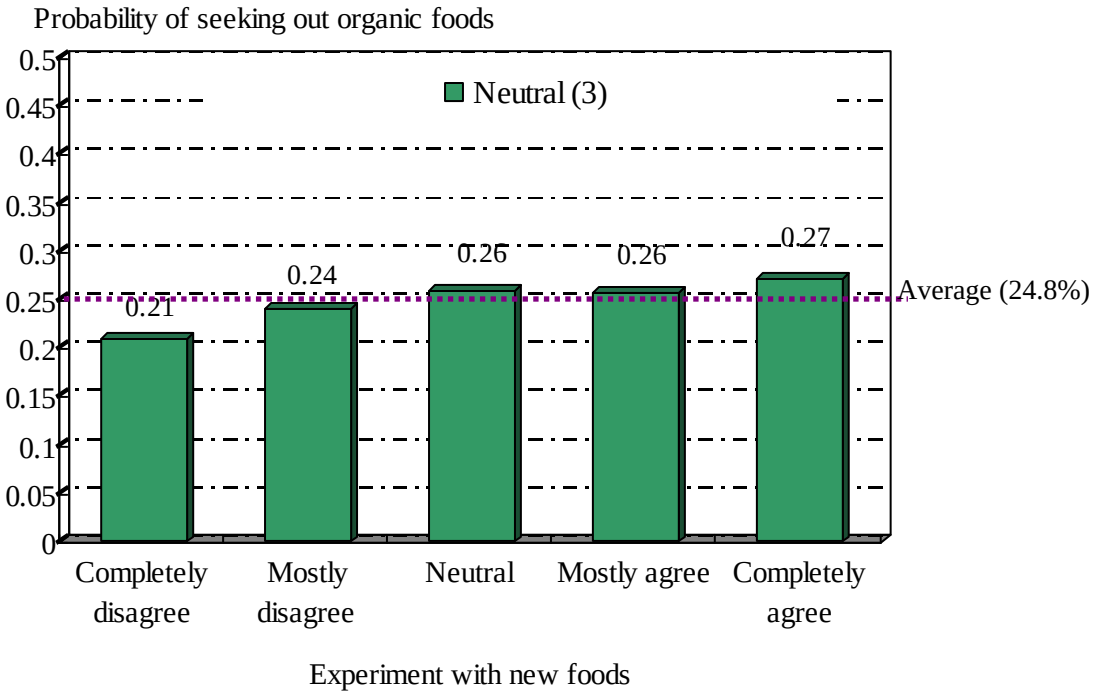
A

Figure 5-25. Impact of "experiment with new foods" on seeking out organic foods. A) completely agree and mostly agree with the statement of "I seek out organic foods". B) neither agree nor disagree with the statement of "I seek out organic foods". C) completely disagree and mostly disagree with the statement of "I seek out organic foods".



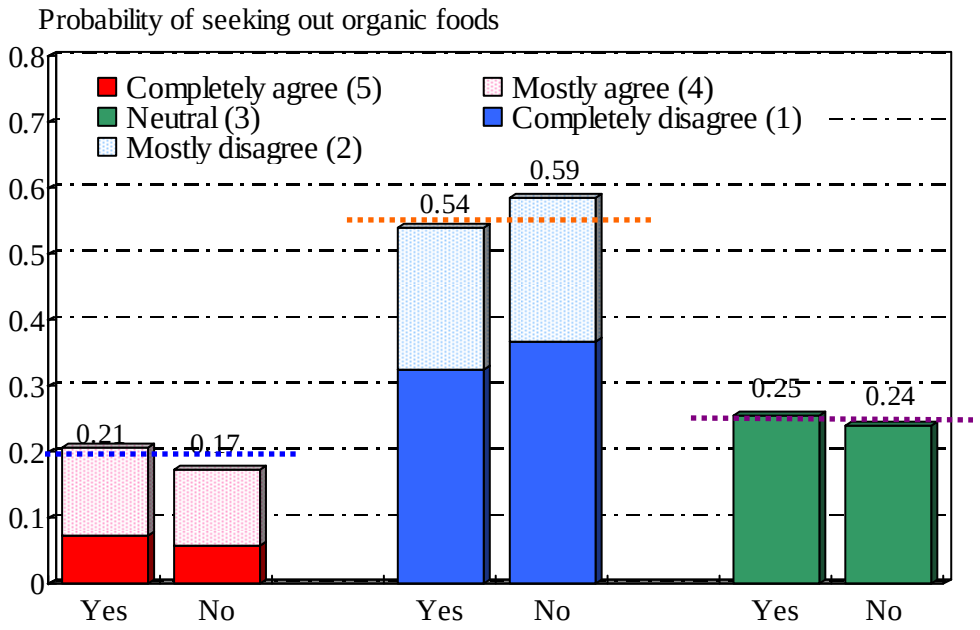
B

Figure 5-25. Continued



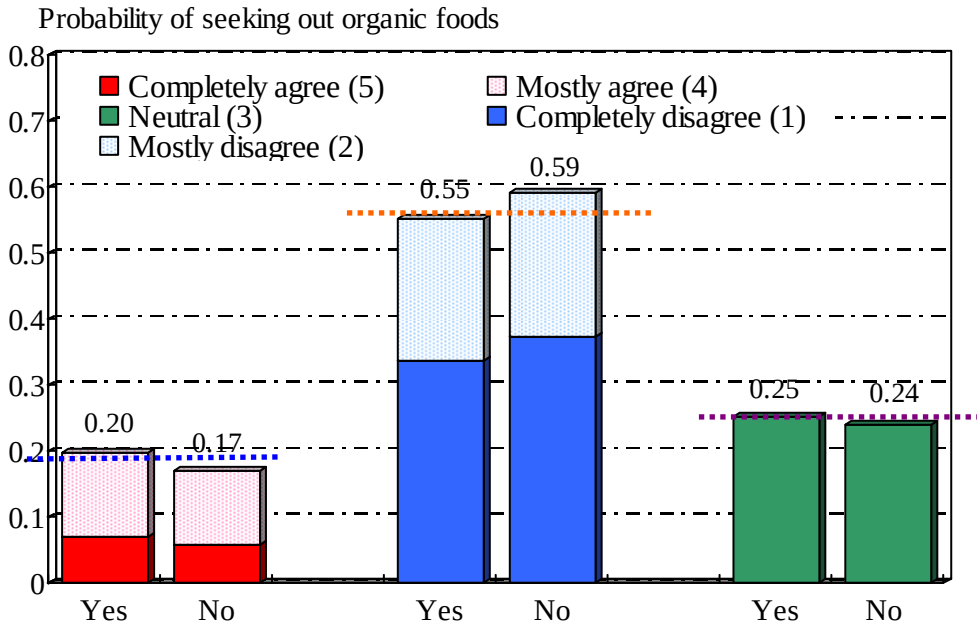
C

Figure 5-25. Continued



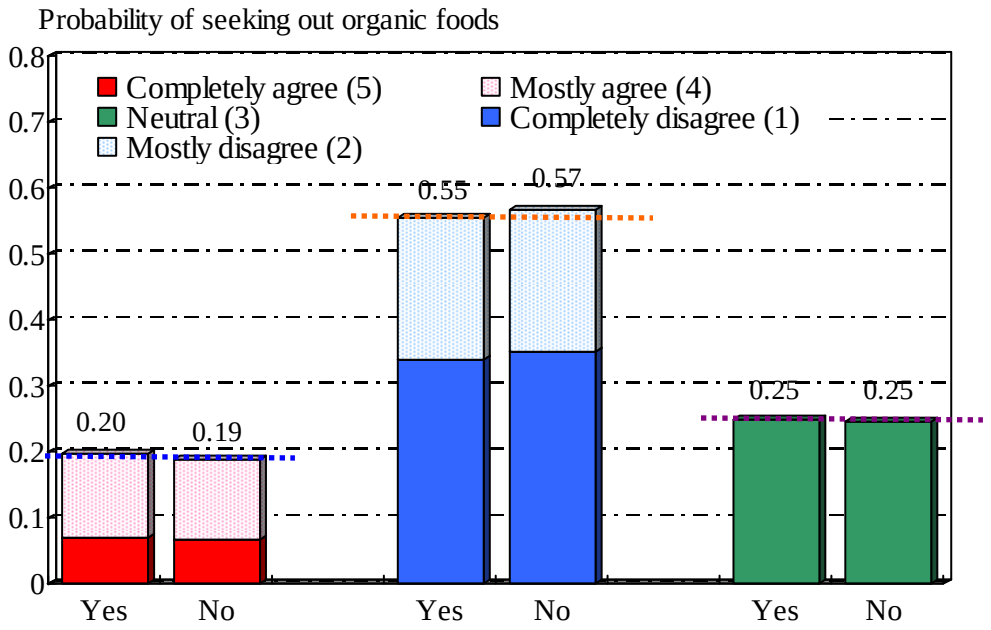
A

Figure 5-26. Impact of health concerns of household on head seeking out organic foods. A) no one in household has blood pressure. B) no one in household has diabetes. C) no one in household has cholesterol problem. D) no one in household has food allergies. E) no one in household has obesity problem. F) no one in household has limited physical mobility problem. G) no one in household has sight/hearing problem.



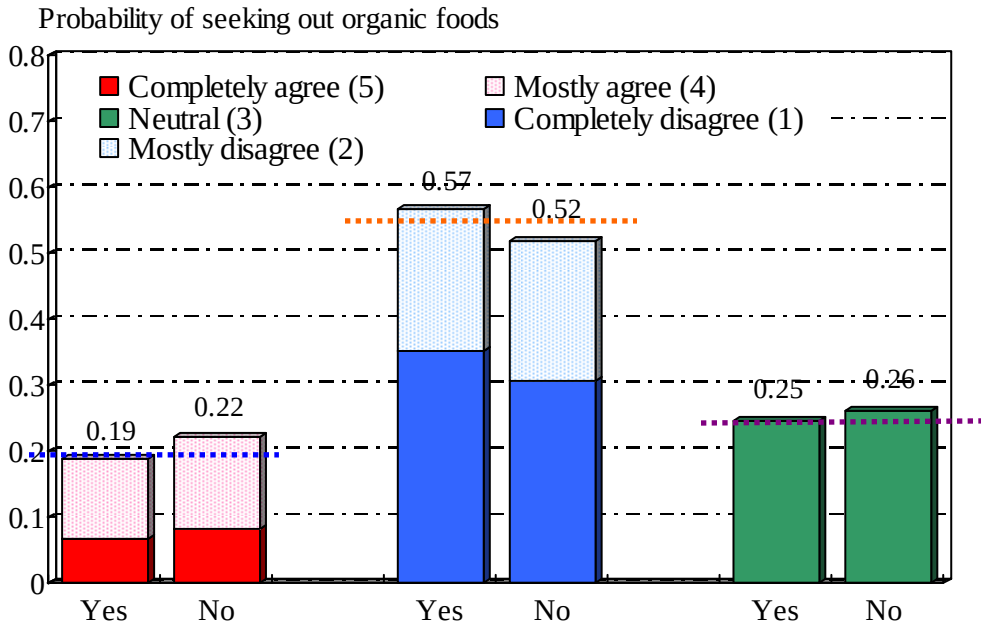
B

Figure 5-26. Continued



Do not have cholesterol problems

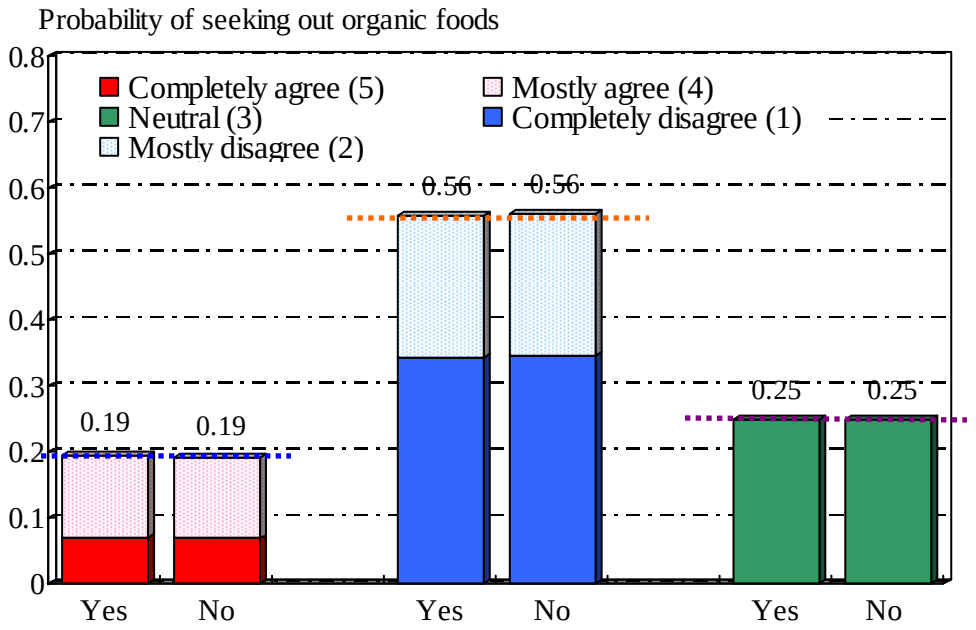
C



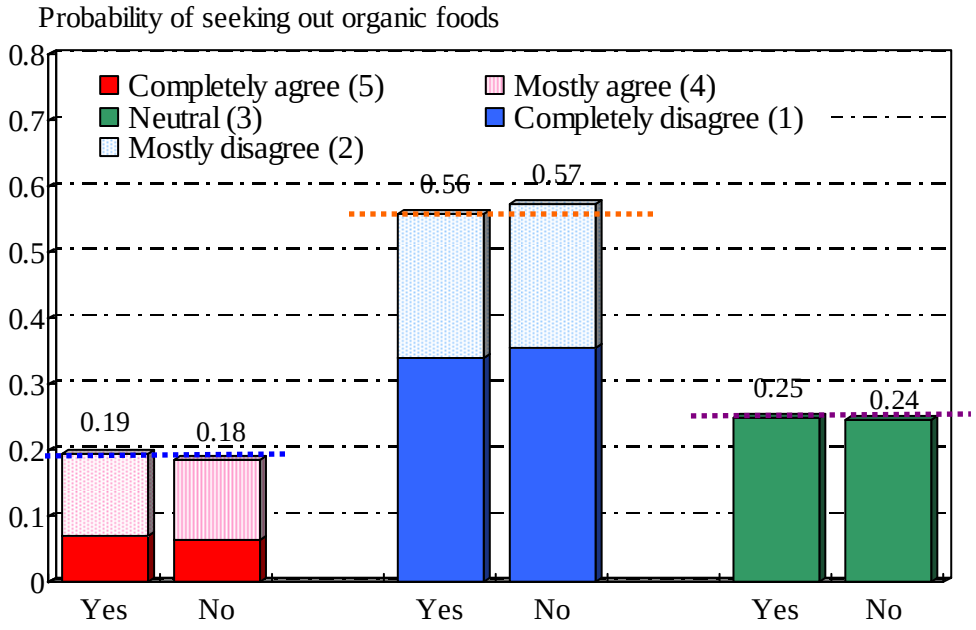
Do not have food allergies

D

Figure 5-26. Continued

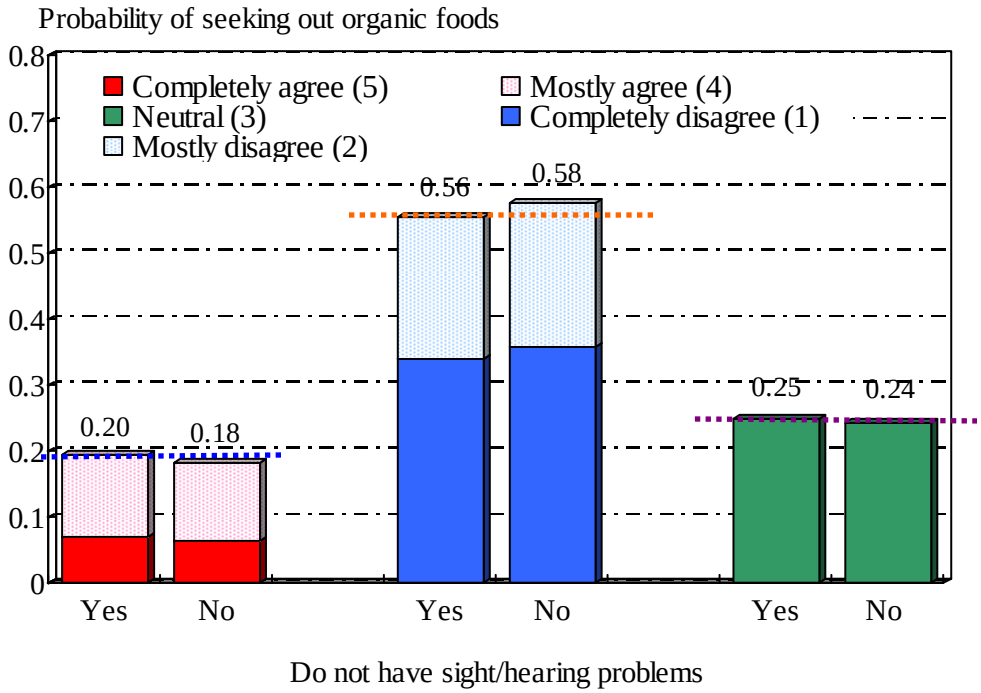


E



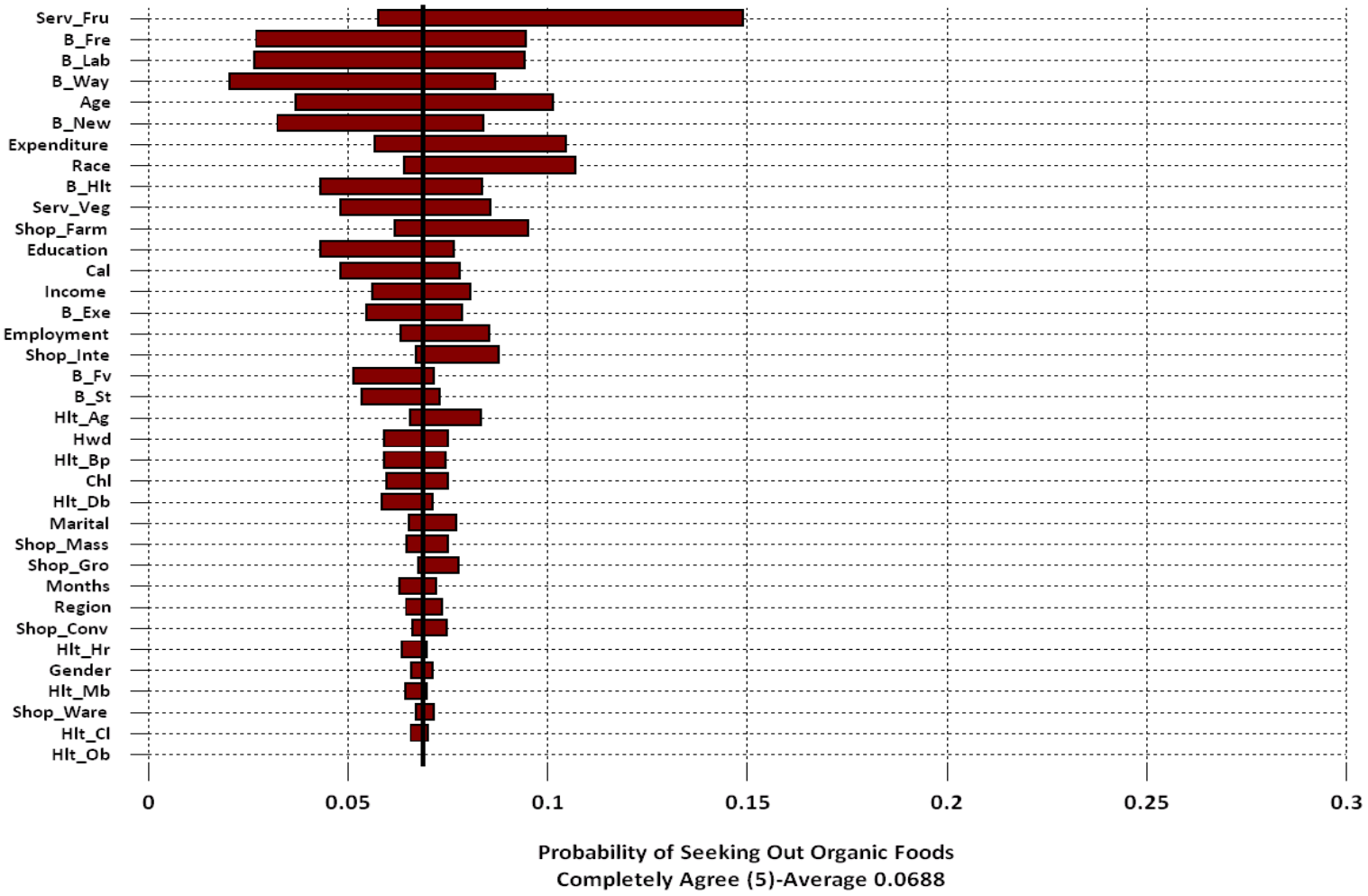
F

Figure 5-26. Continued



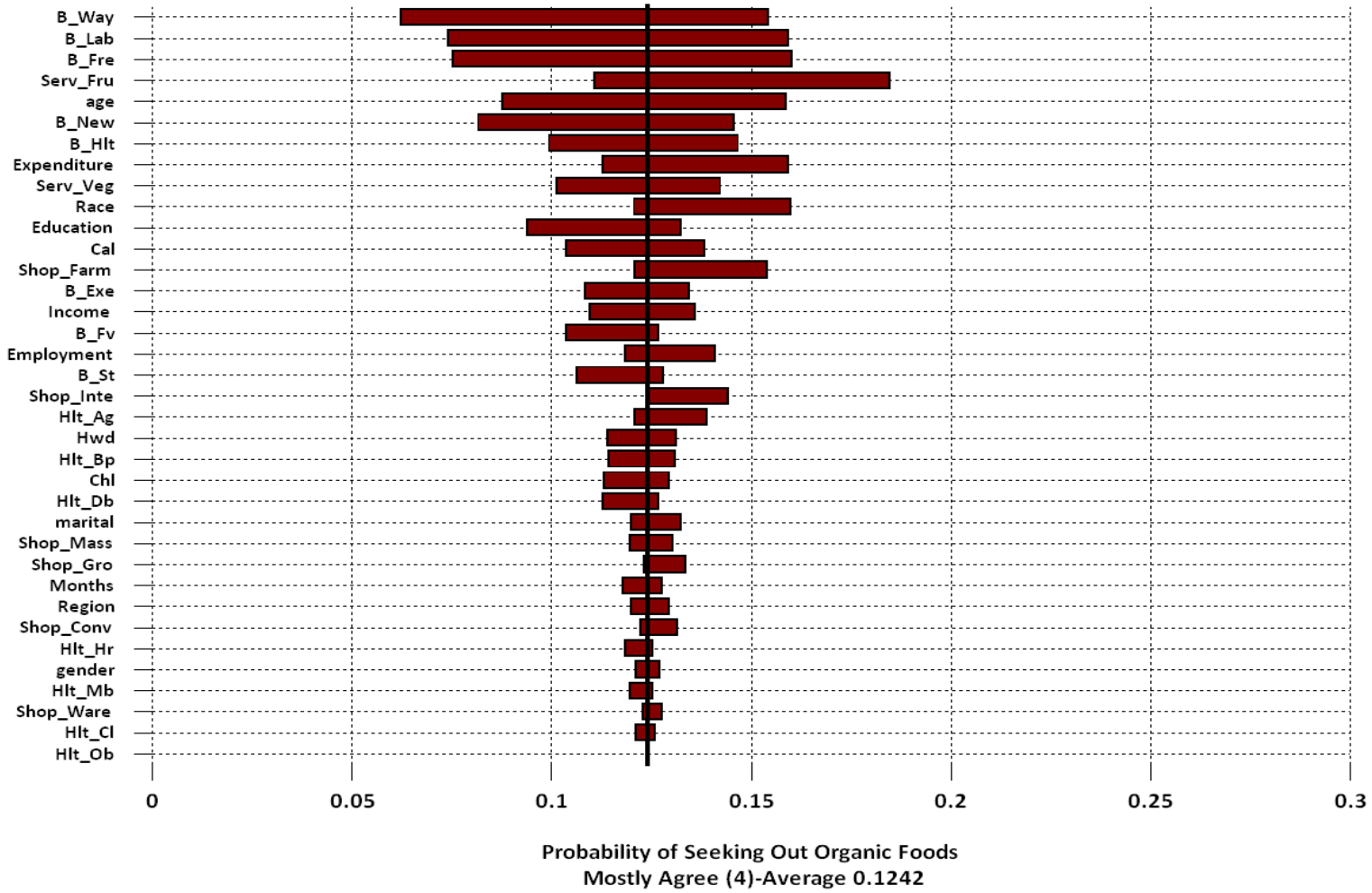
G

Figure 5-26. Continued



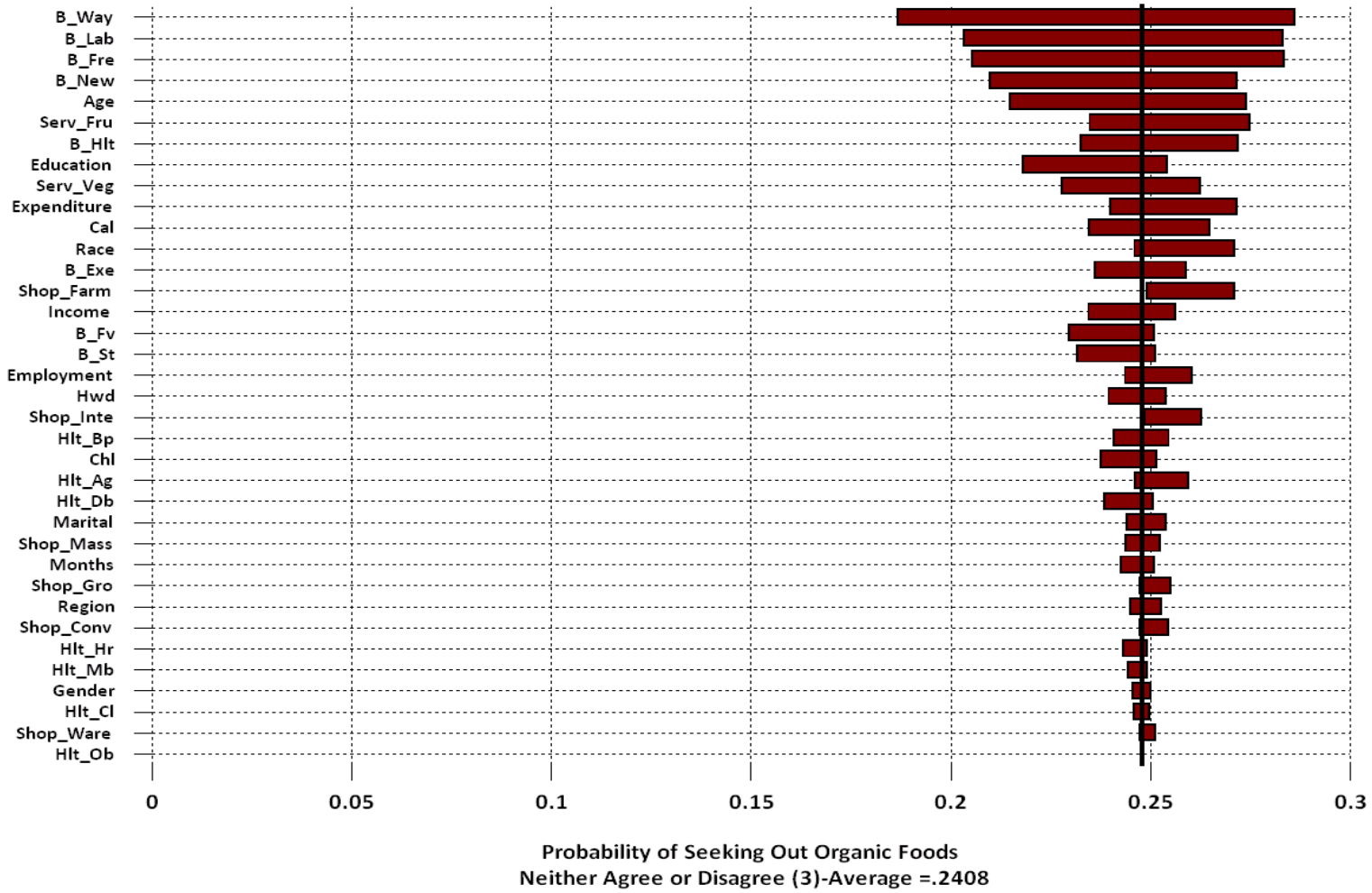
A

Figure 5-27. Ranking of factors impacting the likelihood of seeking out organic foods. A) Completely agree (5). B) Mostly agree (4). C)Neither agree nor disagree. D) Mostly disagree. E) Completely disagree.



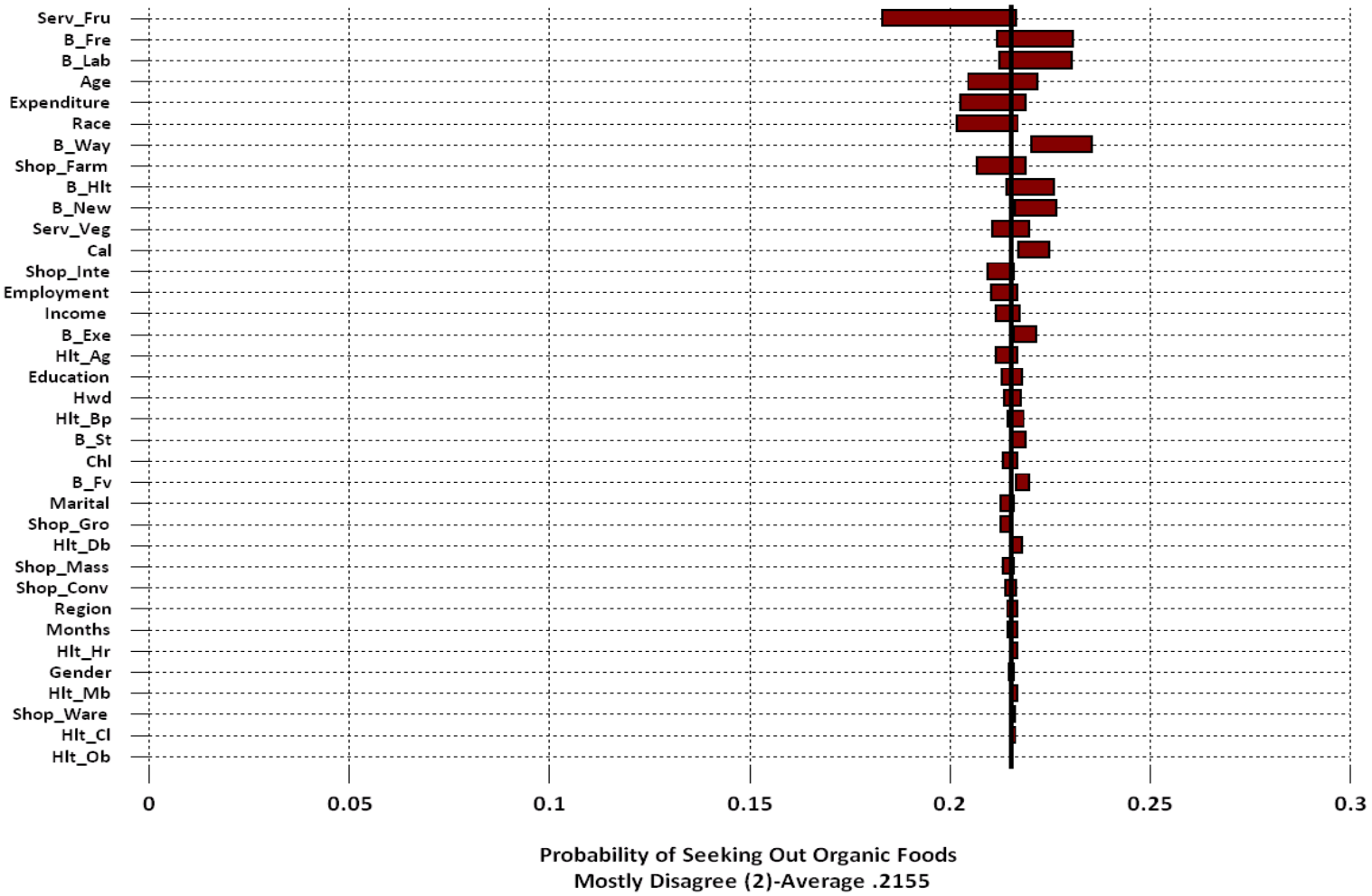
B

Figure 5-27. Continued



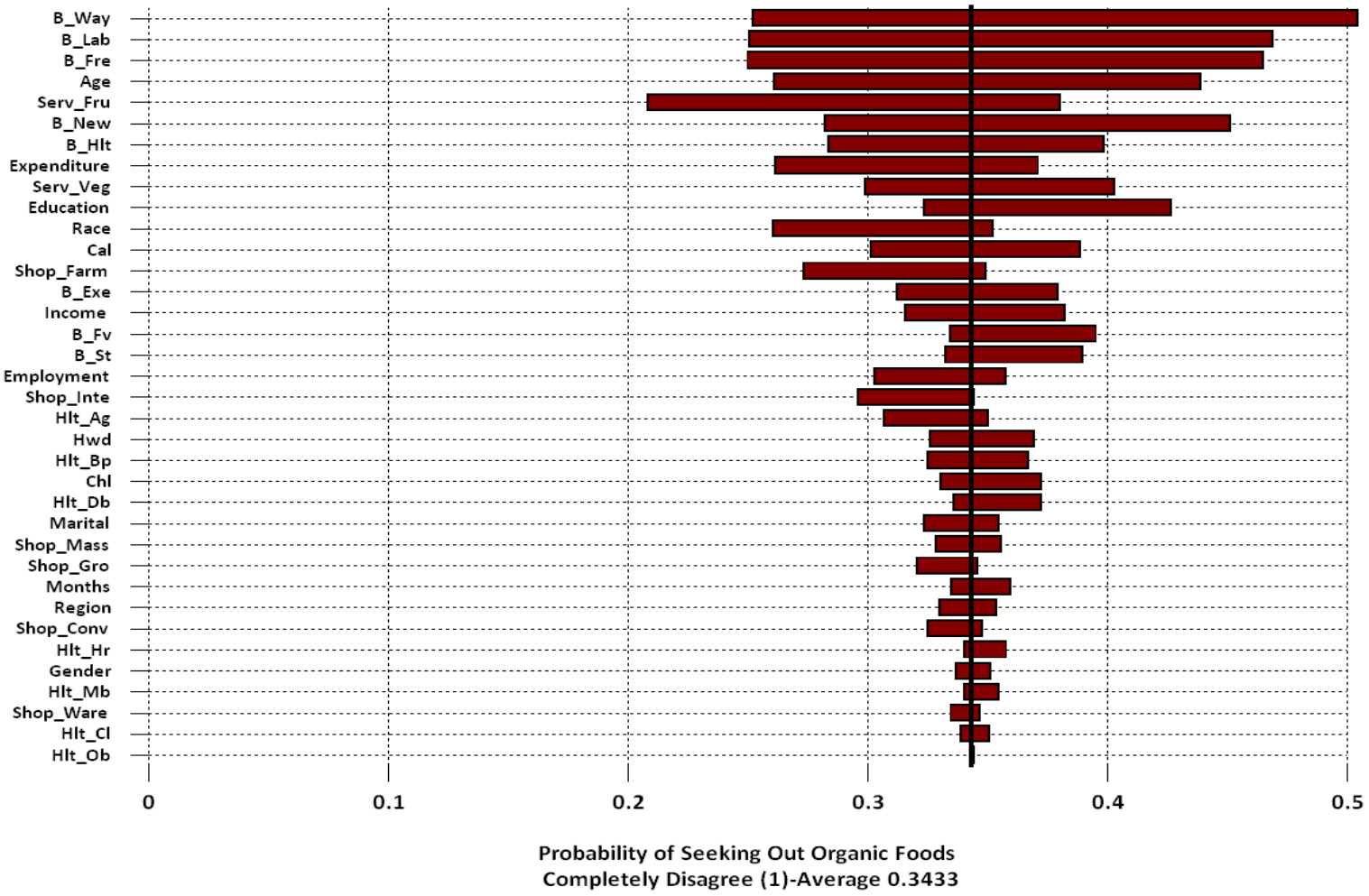
C

Figure 5-27. Continued



D

Figure 5-27. Continued



E

Figure 5-27. Continued

CHAPTER 6
SUMMARY, CONCLUSION AND IMPLICATIONS

With growing availability, organic purchases have been changing from a lifestyle choice of a small group of consumers into a more popular choice with indications from earlier studies that two-thirds of American consumers purchase organic products at least occasionally. But the organic market share at retail food outlets remains still quite small compared to that of conventionally grown products. To aid in the effective marketing of organics, it would be insightful to better understand consumer preferences and identify the underlying motivations behind organic food purchases. This studies shows that among shoppers “seeking out organic food”, the level of purchases within a two-week shopping periods is likely considerable less than the two-thirds suggested above. Granted, a fundamental difference is in the period specified for defining the purchasing time span (i.e., two-week say versus a year). This study concentrates all decisions taking place within the two-week shopping window.

Instead of relying on the simple measure of “did you buy organic foods or not”, an alternative approach was utilized in this study. Consumers were asked if they would like to seek out organic products with a measure of intensity as a response option. An underlying assumption was that the intensity of seeking out organics and organic food purchases were highly correlated, recognizing that within the data set available that assumption could not be tested. Households responded to the statement “I seek out organic foods” with a five-point Likert scale (where a 5 indicates “completely agree” and 1 indicates “completely disagree”) in the questionnaire. Given that intensities were ordered binary values, determining the probabilities of seeking out organics was a classical ordered probit problem. Probabilities for five levels of agreement were simulated based on the probit models given a particular set of conditions of explanatory variables. By

comparing the conditional probabilities, both the direction and magnitude of the effects of the variables being controlled were estimated.

Estimates suggested that demographic variables, except age, were not as important as expected in explaining and predicting households' likelihood of seeking out organic foods. Nevertheless, several other factors were shown to contribute significant effects on seeking out organic foods, especially households' reported behavior and attitude attributes.

Selected demographic variables such as age and ethnicity partially influenced the propensity to value organic products. The results found negative associations between age and the propensity towards organics. The consumer segment with the highest propensity to seek organic products was among the younger population between 18 and 24 years old, whereas consumers over 65 years old were the least likely to seek out organics. Consumers above age 45 became much less likely to seek organics compared to the average likelihood (19.2%). While younger population would be the main marketing target for organic products in general, marketing to older populations could also be beneficial, despite, their lower likelihood of seeking out organics because of the substantial proportion (e.g., people who are older than 45 years represented 44.6% of the total number of respondents, and those over 65 represented nearly 14%) of the population in these age segments.

The Hartman Group (2006) suggested: "more than just advertising products and price, it's an opportunity to connect with the ethnic groups through unique messaging that resonates at the cultural level". Based on the results of this study, two ethnic groups were relatively more likely to seek organic foods: Asian Americans (with a probability of 27%) and, to a lesser extent, Black/African Americans (with a probability of 20%). However, based on the total representation in the population (63%), the Caucasian American consumers was a segment that

organic producers and marketers cannot afford to ignore even though this group tended to show less interest in organics relative to the other ethnicities.

Although specific income and education levels were characteristics that could sometimes be targeted, the impacts of these factors on seeking out organics were mixed and relative small in the differences across each controlled variable. The likelihood of seeking organics declined somewhat in higher-income groups. There was little evidence that education levels were positively correlated to organic propensity owing to the insignificant effect of having college degree, but shoppers with graduate or professional degrees were slightly more inclined to choose organics. Consumers with two or more members in the household were relatively more likely to seek out organics than single household shoppers. Surprisingly, households with children under the age of eighteen displayed much less likelihood of seeking organics.

Store choice was an important factor in explaining propensities to consume organic products. Households who grocery shopped on internet stores and farmer's markets presented the highest likelihood of seeking out organic foods, while those who shopped in grocery stores, mass merchandisers, or convenience stores were less likely to search for organics. These results suggested that supplementary types of retail places with organics availability could promote organic consumption effectively.

The number of daily servings of fruit indicated the most important single factor this study indentified in the propensity to seek out organics, which suggested the promotion in organic fruits could increase the demand for organic products. However, since those respondents who did not consume any fruit per day still had a likelihood higher than average levels, the benefits might not be as incremental as other significant attributes. Despite little evidence of income's impact on the probability of seeking out organic foods, there was evidence supporting that the amount of

expenditures on grocery shopping had a positive impact on organic food preference. Households who spent more money on grocery shopping were more likely to seek organics. Clearly, in the case of organic food consumption, grocery budget constraints played a more important role on explaining the propensity to spend on the less staple goods of which organics most likely fitted. That is, the results suggested that buying organics was a second tier in the consumer preference after spending on the more stable goods. This was true to the extent that expenditures reflected more latitude in the shopper choices.

Most consumers' socio-demographic characteristics had limited influence on explaining and predicting consumer propensity to seek organic foods. However, several reported behavior and attitude attributes turned out to have significant impacts on organic foods choices, such as concerns about calories; eating fresh food rather than packaged foods; reading ingredients of the food on labels when buying; going out of the way for certain types of produce; feeling healthier than his or her peers; and frequently experimenting with new foods. A positive connection was presented between the frequency of eating fresh foods rather than packaged food and likelihood level of seeking out organics. Households who reviewed the ingredients on product labels when buying foods and those who would like to experience new foods are more inclined to seek out organics. Thompson (1998) suggested that the decision of purchasing food away from home could be a potentially important issue. Moreover, our findings confirmed a substantial difference in the probability of seeking organics between households who went out of the way to get certain types of produce and those who did not.

The results also implied that people on diets might be more interested in organic foods, given that households who counted the number of calories they ate each day were more likely to seek out organic foods. A habit of exercising had mixed effect on organics' inclination, given

that people with flexible (less frequent) exercise schedules were slightly more likely to seek organics while those who exercised at least three times a week were less likely to seek organics. In sum, our findings implied that potential gains could result from efforts to target the shoppers with those behavioral characteristics rather than simple economic and demographic traits.

Finally, this study provided weak evidence that health concerns such as high blood pressure, diabetes, etc. were factors explaining the potential for organic food consumption. Health concerns were expected to be significant contributors on the propensity to value organic foods; however, the results indicated that only a concern about food allergies had a positive impact on seeking out organics.

This study was probably the most current in terms of the database and extensiveness of the data since nearly 38,000 observations were included through March 2010. While many factors seemed to confirm results from other studies, the role of health was surprisingly weak given the generally reported perception that organics were healthier. While healthy was a scientific measure and the health aspects of organics might have both factual and perception components, health generally had little impact on the probabilities of "seeking out organic foods."

The main limitation of the study was the stated propensity on seeking out organic foods instead of the actual purchases was evaluated. But, since the awareness of organics was expected to be the significant shifter of the probability of organic consumption, it would have been insightful if we provided additional information about consumers' organic knowledge and subsequent actual purchases of organic foods. Secondly, some additional environmental and social benefits of organically produced products perceived by consumers might also be important factors in explaining organic food demand, which was not confirmed in this study due to the lack of such information available in the survey. In conclusion, organic foods belonged to products

with credence attributes and were generic in nature, hence, cooperation from both the organic industry and government played a critically important role in the promotion of organic food markets.

Finally, there was still much within the reported models that could be discussed and/or simulated in more detail. For example, we did not consider the combined effects of changing several variables. Likewise, a number of additional tests between levels within each category could have been completed although we still feel that the graphed probabilities were more revealing. Some of those tests would be reported in subsequent papers.

APPENDIX A
ORGANIC SURVEY VARIABLES

Table A-1. Organic survey variables

Variable	Description
AGE	age of household head (18+)
GENDER	gender of household head
RACE	ethnicity
CHL	with children under 18 years
EDUC	highest education level
EMPLY	employment
INCOME	household income (dollars)
MARITAL	marital status
HWD	house size (number of members)
STATE0	census region
SERV_FRU	servings of fruit do you consume in typical day (#0-10)
SERV_VEG	servings of vegetable do you consume in typical day (#0-10)
EXPEND	expenditures on grocery shopping within a week (dollars)
SHOP_GRO	shopping for food in grocery store
SHOP_WARE	shopping for food in warehouse
SHOP_INTE	shopping for food in internet grocery store
SHOP_MASS	shopping for food in mass merchandiser
SHOP_CONV	shopping for food in convenience store
SHOP_FARM	shopping for food in farmers' market
BHV_EXERCISE	I exercise at least 3 times a week
CALORIES	I count calories
BHV_LABEL	Read ingredients on labels of the foods I buy
BHV_HLTH	I feel healthier than peers
BHV_NEWFOOD	I frequently experiment with new foods
BHV_FRE	I eat fresh foods much more frequently than packaged food
BHV_FRUVEG	I eat fruits and vegetable more than other people my age
BHV_WAY	I go out of my way to get certain types of produce
BHV_STORE	I prefer to buy produce from certain stores
HLT_BLOOD4	No one has high blood pressure in household
HLT_DIABE4	No one has diabetes in household
HLT_CHOLE4	No one has high cholesterol in household
HLT_ALLEG4	No one has food allergies in household
HLT_OBEST4	No one has obesity in household
HLT_MOBIL4	No one has limited physical mobility in household
HLT_HEAR4	No one has significant sight or hearing impairment in household
MTH_S	Months from January to December

APPENDIX B
CORRELATION COEFFICIENTS

Table B-1. Correlation coefficients of explanatory variables

	XINC	XEDU	RACE	XAGE	XGEN	XMAR
XINC	1.00000					
XEDU	0.22848	1.00000				
RACE	0.00423	0.04732	1.00000			
XAGE	0.06228	0.03379	-0.13037	1.00000		
XGEN	-0.08627	-0.10196	-0.06012	-0.06012	1.00000	
XMAR	-0.06927	-0.04981	-0.02460	0.35995	0.09955	1.00000
XEMPLY	-0.05519	-0.09666	-0.05112	0.25204	0.19017	0.07333
XEXPD	0.13403	0.05154	0.00181	0.00434	-0.03337	0.02585
XSERFRU	0.04641	0.01539	0.05075	-0.03501	0.04574	0.02410
XSERVEG	0.05194	0.05544	-0.01964	0.05445	0.01694	0.03009
XHWD	0.07031	-0.09159	0.09219	-0.30972	0.06689	-0.10156
XCHL	-0.00220	-0.03445	0.08043	-0.31180	0.06208	0.00791
XSHOP_GRO	0.08411	0.02719	-0.03611	0.12073	-0.00522	0.03223
XSHOP_WARE	0.14618	0.11862	0.02192	0.00344	-0.07386	-0.04451
XSHOP_INTE	0.03760	0.07424	0.04104	-0.09907	-0.07756	-0.04458
XSHOP_MASS	-0.09275	0.00737	-0.00947	-0.15880	0.05258	-0.05426
XSHOP_CONV	0.00850	0.04090	0.05229	-0.16897	-0.12506	-0.07431
XSHOP_FARM	0.05784	0.14007	0.02005	-0.06357	-0.00615	-0.02045
CAL	0.05128	0.07257	0.02337	-0.03490	0.02930	-0.03239
B_FRE	0.09565	0.07044	0.03684	0.13158	0.03045	0.07043
B_LAB	0.07245	0.11570	0.00936	0.10280	0.04185	0.02755
B_ST	0.08674	0.11036	0.01230	0.08201	0.03602	0.03854
B_WAY	0.11416	0.10761	0.04384	0.06056	0.01122	0.02463
B_FV	0.06361	0.09912	0.02654	0.02350	0.01576	0.05408
B_HLT	0.10251	0.09252	0.02668	0.02302	-0.06328	0.00666
B_EXE	0.05473	0.12242	0.03067	-0.03367	-0.06504	-0.02062
B_NEW	0.08838	0.10851	0.00044	-0.13474	0.02020	-0.03294
HLT_BP	-0.00117	0.04816	0.00724	-0.31453	0.00048	-0.04009
HLT_DB	0.04449	0.08294	-0.05826	-0.17205	0.04424	-0.01806
HLT_CL	-0.01684	0.06707	0.06522	-0.27354	0.01409	-0.03921
HLT_AG	-0.02978	-0.04871	-0.02903	0.02855	-0.03490	-0.00292
HLT_OB	0.05327	0.02271	-0.00924	-0.05744	-0.03620	0.00485
HLT_MB	0.13269	0.03602	0.03499	-0.21723	0.00334	-0.08340
HLT_HR	0.05278	0.07169	0.01687	-0.15435	-0.00056	-0.02180

Table B-1. Continued

	XEMPLY	XEXPD	XSERFRU	XSERVEG	XHWD	XCHL
XEMPLY	1.00000					
XEXPD	-0.07190	1.00000				
XSERFRU	0.01782	0.18296	1.00000			
XSERVEG	0.03281	0.16842	0.47123	1.00000		
XHWD	-0.03163	0.34562	0.10262	0.05019	1.00000	
XCHL	-0.11603	0.27832	0.09183	0.03926	0.72993	1.00000
XSHOP_GRO	-0.01004	0.04810	0.02498	0.01548	-0.03691	-0.04370
XSHOP_WARE	-0.05498	0.20343	0.07236	0.08692	0.11481	0.05103
XSHOP_INTE	-0.04859	0.14234	0.12534	0.08042	0.11215	0.10173
XSHOP_MASS	-0.01377	0.07421	0.05311	0.04815	0.13760	0.13465
XSHOP_CONV	-0.11619	0.09594	0.08260	0.04431	0.08840	0.08022
XSHOP_FARM	-0.06677	0.15046	0.12625	0.13540	0.04550	0.02877
CAL	-0.06042	0.11203	0.25103	0.17789	0.02914	0.02847
B_FRE	0.03931	0.14461	0.29877	0.20511	0.01813	-0.00564
B_LAB	0.05352	0.06485	0.25116	0.21860	-0.05345	-0.05503
B_ST	0.03639	0.15162	0.21831	0.16900	0.02953	-0.00076
B_WAY	0.01557	0.20443	0.29741	0.21880	0.04540	0.03222
B_FV	0.03497	0.13336	0.35927	0.29751	0.02883	0.03026
B_HLT	-0.07465	0.05442	0.19512	0.14944	-0.02347	-0.01083
B_EXE	-0.04762	0.02291	0.19448	0.14186	-0.03317	-0.00254
B_NEW	-0.10412	0.17271	0.20537	0.21862	0.11489	0.09473
HLT_BP	-0.19015	-0.06456	-0.00487	-0.02396	0.01329	0.12245
HLT_DB	-0.13511	-0.09351	-0.06150	-0.06419	-0.03257	0.06427
HLT_CL	-0.16582	-0.05795	-0.00589	-0.00808	-0.00432	0.07874
HLT_AG	-0.00197	-0.02410	-0.02408	-0.03627	-0.10646	-0.07885
HLT_OB	-0.04818	-0.11460	-0.02314	-0.03644	-0.08940	-0.04194
HLT_MB	-0.18572	-0.01451	-0.03838	-0.05153	0.03974	0.14380
HLT_HR	-0.11669	-0.00688	-0.01958	-0.01717	-0.01651	0.07234

Table B-1. Continued

	XSHOP_GRO	XSHOP_WARE	XSHOP_INTE	XSHOP_MASS	XSHOP_CONV	XSHOP_FARM
XSHOP_GRO	1.00000					
XSHOP_WARE	0.04802	1.00000				
XSHOP_INTE	0.00930	0.16045	1.00000			
XSHOP_MASS	-0.20577	0.12074	0.10166	1.00000		
XSHOP_CONV	0.04124	0.09355	0.21737	0.13223	1.00000	
XSHOP_FARM	0.06121	0.18769	0.31875	0.09149	0.23120	1.00000
CAL	-0.00041	0.09270	0.15385	0.08414	0.13161	0.16510
B_FRE	0.04667	0.12702	0.07275	-0.00270	0.01919	0.15776
B_LAB	0.05442	0.10125	0.08128	0.00365	0.07884	0.15293
B_ST	0.05227	0.10716	0.06299	0.02600	0.04714	0.18133
B_WAY	0.04642	0.15197	0.11336	0.08269	0.11890	0.22541
B_FV	0.02106	0.11226	0.10376	0.06558	0.08483	0.17531
B_HLT	0.00436	0.14226	0.12244	0.01410	0.07115	0.12799
B_EXE	0.01528	0.11685	0.09504	0.03423	0.08658	0.13277
B_NEW	0.02236	0.14089	0.12760	0.08134	0.15969	0.18042
HLT_BP	-0.01557	-0.02650	0.04383	0.00814	0.03708	0.01690
HLT_DB	-0.01056	-0.04424	-0.06091	-0.02391	-0.01945	-0.01307
HLT_CL	-0.00305	-0.04116	0.02159	0.00057	0.03726	0.02764
HLT_AG	-0.02055	0.00564	-0.04937	0.02273	0.00646	-0.01573
HLT_OB	0.00607	-0.02914	-0.00207	-0.02425	-0.00548	-0.00524
HLT_MB	0.01836	0.04654	-0.03713	0.00569	0.01673	0.01428
HLT_HR	0.00133	0.00466	-0.02433	0.00748	0.01283	0.01194

Table B-1. Continued

	CAL	B_FRE	B_LAB	B_ST	B_WAY	B_FV
CAL	1.00000					
B_FRE	0.31488	1.00000				
B_LAB	0.45958	0.41693	1.00000			
B_ST	0.23412	0.43901	0.37174	1.00000		
B_WAY	0.33545	0.49818	0.40898	0.50734	1.00000	
B_FV	0.33147	0.62256	0.41820	0.39578	0.51860	1.00000
B_HLT	0.27463	0.43302	0.29925	0.30006	0.34644	0.54384
B_EXE	0.34440	0.37598	0.32011	0.24835	0.31225	0.39220
B_NEW	0.30035	0.37627	0.33083	0.28284	0.44102	0.41422
HLT_BP	-0.04866	-0.03388	-0.09131	-0.03558	-0.03377	0.00112
HLT_DB	-0.05680	-0.06336	-0.07545	-0.04512	-0.05158	-0.02426
HLT_CL	-0.01630	-0.03368	-0.04606	-0.01644	-0.01981	0.04286
HLT_AG	-0.02425	-0.03264	-0.08487	-0.00927	-0.02733	0.00646
HLT_OB	0.00545	0.10203	-0.00228	0.01025	0.01437	0.09637
HLT_MB	0.00681	-0.03629	-0.05120	-0.01930	0.01709	0.00379
HLT_HR	0.00172	-0.07827	-0.02877	-0.02200	-0.01736	-0.01129

Table B-1. Continued

	B_HLT	B_EXE	B_NEW	HLT_BP	HLT_DB	HLT_CL
B_HLT	1.00000					
B_EXE	0.49226	1.00000				
B_NEW	0.31983	0.26318	1.00000			
HLT_BP	0.10866	0.09982	0.07279	1.00000		
HLT_DB	0.07371	0.03557	0.05083	0.37219	1.00000	
HLT_CL	0.10578	0.09904	0.06879	0.47702	0.30612	1.00000
HLT_AG	-0.00272	-0.00436	-0.01791	0.08186	0.05075	0.05783
HLT_OB	0.23708	0.16367	0.06624	0.28508	0.23534	0.24220
HLT_MB	0.16626	0.15347	0.05438	0.29528	0.24880	0.25442
HLT_HR	0.05771	0.05620	0.02861	0.22322	0.20676	0.24184

Table B-1. Continued

	HLT_AG	HLT_OB	HLT_MB	HLT_HR
HLT_AG	1.00000			
HLT_OB	0.09750	1.00000		
HLT_MB	0.13032	0.27704	1.00000	
HLT_HR	0.12553	0.17287	0.32027	1.00000

APPENDIX C
TSP CODE

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? Organics#02.tsp
?=========================================================;
? READING STAT VERSION 7.0
?=========================================================;
IN 'D:\ZZORGANIC\Organics\ORGANICDATA';
? ?V105_A  I SEEK OUT ORGANIC FOODS;
? 5= completely agree
? 4= somewhat agree
? 3= neutral
? 2= somewhat disagree
? 1= completely disagree
?============================================================;
? NOTES
?============================================================;
?  FOR EACH HEALTH VARIABLE USED THE LAST CODE WITH 4 - MEANING THAT
YOU DO NOT THIS HEALTH PROBLEM IN YOUR FAMILY;
?  Q10OUTLE IS NOT IN YOUR DATASET - THAT IS WHERE YOU PURCHASED A
SPECIFIC FRUIT;
?  EXCLUSIVE HAS NO MEANING IN YOUR FILE SO IGNORE IT;
?END;

LIST ZVARZ
RD        PERIOD      IDD3        YEAR        MONTH       YRS_S       MTH_S
ORGANIC     AGE         GENDER      ETHNIC      HISPANIC    DEVICE
SHOP_GRO
SHOP_WARE   SHOP_INTE   SHOP_MASS   SHOP_CONV   SHOP_FARM
SHOP_NONE   EXPEND
SERV_FRU    SERV_VEG    CALORIES    BHV_ORG     BHV_FRESH
BHV_LABEL   BHV_STORE   BHV_WAY     BHV_FRUVEG  BHV_HLTH
BHV_EXERCISE  BHV_NEWFOOD
HLT_BLOOD1  HLT_BLOOD2  HLT_BLOOD3  HLT_BLOOD4  HLT_DIABE1
HLT_DIABE2  HLT_DIABE3
HLT_DIABE4  HLT_CHOLE1  HLT_CHOLE2  HLT_CHOLE3  HLT_CHOLE4
HLT_ALLEG1  HLT_ALLEG2
HLT_ALLEG3  HLT_ALLEG4  HLT_OBEST1  HLT_OBEST2  HLT_OBEST3
HLT_OBEST4  HLT_MOBIL1
HLT_MOBIL2  HLT_MOBIL3  HLT_MOBIL4  HLT_HEAR1   HLT_HEAR2
HLT_HEAR3   HLT_HEAR4
RACE        MARITAL     HWD1        HWD2        HWD3        HWD4        HWD5
STATE0      STATE1      Q21STATE    EDUC        EMPLY       INCOME
PERIODS     PERIODE     ;
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? DOC RD          'HOUSEHOLD IDENTITICATION';
? DOC PERIOD      'REPORTING PERIODS';
? DOC IDD3        'IDD3=1 TO REMOVE BAD HOUSEHOLDS';
? DOC YEAR        'REPORTING YEAR';
? DOC MONTH       'REPORTING MONTH';
? DOC YRS_S       'REPORTING YEAR';
? DOC MTH_S       'REPORTING MONTH';
? DOC ORGANIC     'SEEKING OUT ORGANIC FOODS';
? DOC AGE         'AGE OF HOUSEHOLD HEAD';
? DOC GENDER      'GENDER OF HOUSEHOLD HEAD';
? DOC ETHNIC      'RACE OF HOUSEHOLD HEAD';
? DOC HISPANIC    'HISPANIC';
? DOC DEVICE      'ELECTRONIC DEVICES';
? DOC SHOP_GRO    'Grocery store Where have you personally shopped for food in';
? DOC SHOP_WARE   'Warehouse club store (Costco, Sams Club, etc) Where have you
personally shopped for food in';
? DOC SHOP_INTE   'Internet grocery store (Peapod, Fresh Direct, etc) Where have you
personally shopped for food in';
? DOC SHOP_MASS   'Mass merchandiser (Wal-Mart, Target, etc) Where have you
personally shopped for food in';
? DOC SHOP_CONV   'Convenience Store (Gas station, 7-11, Quik Check etc.) Where have
you personally shopped for food in';
? DOC SHOP_FARM   'Farmer's market / Produce stand (including free-standing carts) Where
have you personally shopped for food in';
? DOC SHOP_NONE   'None of the above Where have you personally shopped for food in';
? DOC EXPEND      'Weekly grocery spending $ In a typical week, about how much money do
you spend on groceries';
? DOC SERV_FRU    '# How many servings of fruit do you consume in typical day?';
? DOC SERV_VEG    '# How many servings of vegetables do you consume in typical day?';
? DOC CALORIES    'I count calories';
? DOC BHV_ORG     'I seek out organic foods Please tell us how much you agree on';
? DOC BHV_FRESH   'I eat fresh foods much more frequently than packaged foods Please tell
us how much you agree on';
? DOC BHV_LABEL   'I read ingredients on labels of the foods I buy Please tell us how much
you agree on';
? DOC BHV_STORE   'I prefer to buy my produce from certain stores/outlets Please tell us
how much you agree on';
? DOC BHV_WAY     'I go out of my way to get certain types of produce Please tell us how
much you agree on';
? DOC BHV_FRUVEG  'I eat fruits and vegetables more than other people my age Please tell
us how much you agree on';
? DOC BHV_HLTH    'I feel that I am healthier than my peers Please tell us how much you
agree on';
? DOC BHV_EXERCISE  'I exercise at least 3 times a week Please tell us how much you agree
on';
? DOC BHV_NEWFOOD   'I frequently experiment with new foods Please tell us how much
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you agree on';
? DOC HLT_BLOOD1 'High blood pressure Do you or does anyone in your household have any of';
? DOC HLT_BLOOD2 'High blood pressure Do you or does anyone in your household have any of';
? DOC HLT_BLOOD3 'High blood pressure Do you or does anyone in your household have any of';
? DOC HLT_BLOOD4 'High blood pressure Do you or does anyone in your household have any of';
? DOC HLT_DIABE1 'Diabetes Do you or does anyone in your household have any of';
? DOC HLT_DIABE2 'Diabetes Do you or does anyone in your household have any of';
? DOC HLT_DIABE3 'Diabetes Do you or does anyone in your household have any of';
? DOC HLT_DIABE4 'Diabetes Do you or does anyone in your household have any of';
? DOC HLT_CHOLE1 'High cholesterol Do you or does anyone in your household have any of';
? DOC HLT_CHOLE2 'High cholesterol Do you or does anyone in your household have any of';
? DOC HLT_CHOLE3 'High cholesterol Do you or does anyone in your household have any of';
? DOC HLT_CHOLE4 'High cholesterol Do you or does anyone in your household have any of';
? DOC HLT_ALLEG1 'Food allergies Do you or does anyone in your household have any of';
? DOC HLT_ALLEG2 'Food allergies Do you or does anyone in your household have any of';
? DOC HLT_ALLEG3 'Food allergies Do you or does anyone in your household have any of';
? DOC HLT_ALLEG4 'Food allergies Do you or does anyone in your household have any of';
? DOC HLT_OBEST1 'Obesity Do you or does anyone in your household have any of';
? DOC HLT_OBEST2 'Obesity Do you or does anyone in your household have any of';
? DOC HLT_OBEST3 'Obesity Do you or does anyone in your household have any of';
? DOC HLT_OBEST4 'Obesity Do you or does anyone in your household have any of';
? DOC HLT_MOBIL1 'Limited physical mobility Do you or does anyone in your household have any of';
? DOC HLT_MOBIL2 'Limited physical mobility Do you or does anyone in your household have any of';
? DOC HLT_MOBIL3 'Limited physical mobility Do you or does anyone in your household have any of';
? DOC HLT_MOBIL4 'Limited physical mobility Do you or does anyone in your household have any of';
? DOC HLT_HEAR1 'Significant sight or hearing impairment Do you or does anyone in your household have any of';
? DOC HLT_HEAR2 'Significant sight or hearing impairment Do you or does anyone in your household have any of';
? DOC HLT_HEAR3 'Significant sight or hearing impairment Do you or does anyone in your household have any of';
? DOC HLT_HEAR4 'Significant sight or hearing impairment Do you or does anyone in your household have any of';
? DOC RACE 'Which of the following most closely describes your family heritage';

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?  DOC MARITAL       'Marital Status Which one of the following best describes yours';
?  DOC HWD1          '5 years of age and younger Household Composition Including youself,
how many people currently linving in your household';
?  DOC HWD2          '6-8 years of age Household Composition Including youself, how many
people currently linving in your household';
?  DOC HWD3          '9-12 years of age Household Composition Including youself, how many
people currently linving in your household';
?  DOC HWD4          '13-17 years of age Household Composition Including youself, how many
people currently linving in your household';
?  DOC HWD5          '18 years of age and older Household Composition Including youself, how
many people currently linving in your household';
?  DOC STATE0        'State of Residence In which state do you currently live?';
?  DOC STATE1        'Do have another state that you consider your primary residence';
?  DOC EDUC0         'Education What is the highest level of education you have completed';
?  DOC EMPLY         'Employment Status Which one of the following best describes yours';
?  DOC INCOME        'Household Income Which one of the following ranges includes your total
yearly household income before tax';
?  DOC PERIODS       'Time Period Start Date';
?  DOC PERIODE       'Time Period End Date';
SELECT PERIOD>2 & IDD3=1;
?===============;
? AGE;
?===============;
? Q1AGE   17 or younger 1[SCREEN OUT];
? Q1AGE   18-24        2          ;
? Q1AGE   25-34        3          ;
? Q1AGE   35-44        4          ;
? Q1AGE   45-54        5          ;
? Q1AGE   55-64        6          ;
? Q1AGE   65-70        7          ;
? Q1AGE   Over 70      8          ;
?HIST(DISCRETE,PERCENT) AGE;
XAGE=(AGE<3) + ((AGE=3)|(AGE=4))*2 + ((AGE=5)|(AGE=6))*3 + (AGE>6)*4;
DUMMY XAGE;
?HIST(DISCRETE,PERCENT) XAGE;
DOT 1-3;
DAGE.=XAGE.-XAGE4; ENDDOT;
?===============;
? GENDER;
?===============;
?GENDER=Q2GENDER;
? Q2GENDER    1     MALE  ;
? Q2GENDER    2     FEMALE;
XGEN =(GENDER=2);
?HIST(DISCRETE,PERCENT) XGEN;
DGEN =(XGEN=1) + (XGEN=0)*-1;
```

```
?==============;
? MARITAL;
?==============;
? Q19MARIT   1  SINGLE, NEVER MARRIED;
? Q19MARIT   2  MARRIED           ;
? Q19MARIT   3  LIVING WITH PARENTS  ;
? Q19MARIT   4  SEPARATED          ;
? Q19MARIT   5  DIVORCED           ;
? Q19MARIT   6  WIDOWED            ;
? Q19MARIT   7  PREFER NOT TO ANSWER ;
XMAR =(MARITAL=1) +(MARITAL=2)*2 +(MARITAL=3)*3 +(MARITAL>3)*4;
DUMMY XMAR;
?HIST(DISCRETE,PERCENT) XMAR;
DOT 1-3;
DMAR.=XMAR.-XMAR4;ENDDOT;
?==============;
? ETHNICITY;
?==============;
? Q3ETHNIC   1      White/Caucasian      ;
? Q3ETHNIC   2      Black/African American;
? Q3ETHNIC   3      Asian                ;
? Q3ETHNIC   4      Pacific Islander     ;
? Q3ETHNIC   5      Native American      ;
? Q3ETHNIC   6      Other                ;
? Q3ETHNIC   7      Prefer not to answer  ;
?DUMMY ETHNIC;
?HIST(DISCRETE,PERCENT) ETHNIC;
?DOT 1-6;
?ZETHN.= ETHNIC.-ETHNIC7;ENDDOT;
? HISPANIC;
? Q4ETHNIC    1     HISPANIC           ;
? Q4ETHNIC    2     NOT HISPANIC       ;
? Q4ETHNIC    3     Prefer not to answer;
?DUMMY HISPANIC;
?HIST(DISCRETE,PERCENT) HISPANIC;
?DOT 1-2;
?ZHISP.=HISPANIC.-HISPANIC3; ENDDOT;
HISP =(HISPANIC=1);
RACE =((ETHNIC=1)&(HISP=0))*1 +((ETHNIC=1)&(HISP=1))*2 +(ETHNIC=2)*3
     +(ETHNIC=3)*4 +(ETHNIC>=4)*5;
?HIST(DISCRETE,PERCENT) RACE;
DUMMY RACE;
DOT 1-4;
DRACE.=RACE.-RACE5;ENDDOT;
```

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?==================;
? INCOME CATEGORIES  ;
?==================;
? Q26INCOM   1       Under $15,000      ;
? Q26INCOM   2       $15,000-$24,999    ;
? Q26INCOM   3       $25,000-$34,999    ;
? Q26INCOM   4       $35,000-$49,999    ;
? Q26INCOM   5       $50,000-$74,999    ;
? Q26INCOM   6       $75,000-$99,999    ;
? Q26INCOM   7       $100,000-$149,999   ;
? Q26INCOM   8       $150,000 and over   ;
? Q26INCOM   9       Prefer not to answer;
XINC=(INCOME<4) + ((INCOME>=4)&(INCOME<=5))*2 + (INCOME=6)*3 +
((INCOME>6)&(INCOME<9))*4
    + (INCOME=9)*5;
DUMMY XINC;
?HIST(DISCRETE,PERCENT) XINC;
DOT 1-4;
DINC. =XINC.-XINC5;ENDDOT;
?==============;
? EDUCATION    ;
?==============;
?EDUC=Q14GS_ED;
? Q24GS_ED  1       Less than 9th grade            ;
? Q24GS_ED  2       9th to 12th grade, no diploma     ;
? Q24GS_ED  3       High school graduate or equivalent;
? Q24GS_ED  4       Some college, no degree          ;
? Q24GS_ED  5       Associate degree               ;
? Q24GS_ED  6       Bachelor's degree              ;
? Q24GS_ED  7       Graduate or professional degree   ;
? Q24GS_ED  8       Other, please specify           ;
? Q24GS_ED  9       Prefer not to answer           ;
XEDU=(EDUC<=3) + ((EDUC>=4)&(EDUC<=6))*2 + (EDUC=7)*3 + (EDUC>=8)*4;
DUMMY XEDU;
?HIST(DISCRETE,PERCENT) XEDU;
DOT 1-3;
DEDU.=XEDU.-XEDU4; ENDDOT;
?====================;
? HOUSEHOLD SIZE     ;
?====================;
?Q20HHCOM;
?HWD1   5 years of age and younger~Household Composition (Including yourself);
?HWD2   6-8 years of age~Household Composition (Including yourself)         ;
?HWD3   9-12 years of age~Household Composition (Including yourself)        ;
?HWD4   13-17 years of age~Household Composition (Including yourself)       ;
?HWD5   18 years of age and older~Household Composition (Including yourself) ;
```

```
HWD =HWD1 + HWD2 + HWD3 + HWD4 + HWD5;
CHL=((HWD1 + HWD2 + HWD3 + HWD4)>0); ?WITH CHILDREN UNDER 18 YEARS;
XHWD =(HWD=1) +(HWD=2)*2 +(HWD=3)*3 +(HWD=4)*4 +(HWD>4)*5;
DUMMY XHWD;
?HIST(DISCRETE,PERCENT) XHWD;
DOT 1-4;
DHWD.=XHWD.-XHWD5; ENDDOT;
XCHL =(CHL=1);
?HIST(DISCRETE,PERCENT) XCHL;
DCHL =(XCHL=1) +(XCHL=0)*-1;
?==================;
? EMPLOYMENT      ;
?==================;
?EMPLY=Q25EMPLO;
? Q25EMPLO   1    EMPLOYED FULL TIME;
? Q25EMPLO   2    EMPLOYED PART TIME;
? Q25EMPLO   3    SELF-EMPLOYED;
? Q25EMPLO   4    NOT EMPLOYED, BUT LOOKING FOR WORK;
? Q25EMPLO   5    NOT EMPLOYED, AND NOT LOOKING FOR WORK;
? Q25EMPLO   6    RETIRED;
? Q25EMPLO   7    STUDENT;
? Q25EMPLO   8    HOMEMAKER;
? Q25EMPLO   9    PREFER NOT TO ANSWER;
XEMPLY=((EMPLY=1)|(EMPLY=3)) + (EMPLY=2)*2 + ((EMPLY=4)|(EMPLY=5))*3 +
(EMPLY>=6)*4;
DUMMY XEMPLY;
? 1=EMPLOYED FULL TIME & SELF-EMPLOYED 2=EMPLOYED PART TIME 3=NOT
EMPLOYED 4=OTHERS;
?HIST(DISCRETE,PERCENT) XEMPLY;
DOT 1-3;
DEMPLY.=XEMPLY.-XEMPLY4; ENDDOT;
?============================;
? MONTHS ;
?============================;
MTH=MTH_S;
DUMMY MTH;
?HIST(DISCRETE,PERCENT) MTH;
DOT 2-12;
DMTH.=MTH.-MTH1;ENDDOT;
?================================;
? GROCERY SHOPPING STORE Q7GROCER  ;
?================================;
? SHOP_GRO;
XSHOP_GRO=(SHOP_GRO=1);
?HIST(DISCRETE,PERCENT) XSHOP_GRO;
DSHOP_GRO=(SHOP_GRO=1) + (SHOP_GRO=0)*-1;
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```
? SHOP_WARE;
XSHOP_WARE=(SHOP_WARE=1);
?HIST(DISCRETE,PERCENT) XSHOP_WARE;
DSHOP_WARE=(SHOP_WARE=1) + (SHOP_WARE=0)*-1;
? SHOP_INTE;
XSHOP_INTE=(SHOP_INTE=1);
?HIST(DISCRETE,PERCENT) XSHOP_INTE;
DSHOP_INTE=(SHOP_INTE=1) + (SHOP_INTE=0)*-1;
? SHOP_MASS;
XSHOP_MASS=(SHOP_MASS=1);
?HIST(DISCRETE,PERCENT) XSHOP_MASS;
DSHOP_MASS=(SHOP_MASS=1) + (SHOP_MASS=0)*-1;
? SHOP_CONV;
XSHOP_CONV=(SHOP_CONV=1);
?HIST(DISCRETE,PERCENT) XSHOP_CONV;
DSHOP_CONV=(SHOP_CONV=1) + (SHOP_CONV=0)*-1;
? SHOP_FARM;
XSHOP_FARM=(SHOP_FARM=1);
?HIST(DISCRETE,PERCENT) XSHOP_FARM;
DSHOP_FARM=(SHOP_FARM=1) + (SHOP_FARM=0)*-1;
? SHOP_NONE[EXCLUSIVE][SCREEN OUT];
XSHOP_NONE=(SHOP_NONE=1);
?HIST(DISCRETE,PERCENT) XSHOP_NONE;
DSHOP_NONE=(SHOP_NONE=1) + (SHOP_NONE=0)*-1;
?=========================================;
? EXPENDITURES ON GROCERY SHOPPING Q13DOLLA ;
?=========================================;
? TITLE 'WEEKLY GROCERY SPENDING DOLLARS';
?SELECT PERIOD>2 & IDD3=1;
?HIST(NBINS=30) EXPEND;
?HIST(NBINS=30,PERCENT) EXPEND; MSD EXPEND;
?MAT HIST_EXPD=@HIST;
?MAT NR=NROW(@HIST);
?PRINT NR;
XEXPD =(EXPEND<50) +((EXPEND>=50)&(EXPEND<100))*2
+((EXPEND>=100)&(EXPEND<200))*3+((EXPEND>=200)&(EXPEND<400))*4
+((EXPEND>=400))*5;
DUMMY XEXPD;
?HIST(DISCRETE,PERCENT) XEXPD;
DOT 1-4;
DEXPD. =XEXPD.-XEXPD5;ENDDOT;
?=====================================;
? SERVING OF FRUIT & VEG #0-10        ;
?=====================================;
? TITLE 'HOW MANY SERVINGS OF FRUIT DO YOU CONSUME IN TYPICAL DAY?';
? Q11 SERV_FRU #0-10;
```

```
XSERFRU =(SERV_FRU=0) +((SERV_FRU>=1)&(SERV_FRU<=3))*2 +
((SERV_FRU>=4)&(SERV_FRU<=6))*3+(SERV_FRU>=7)*4;
DUMMY XSERFRU;
?HIST(DISCRETE,PERCENT) XSERFRU;
DOT 1-3;
DSERVF. =XSERFRU.-XSERFRU4;ENDDOT;
? TITLE 'HOW MANY SERVINGS OF VEG DO YOU CONSUME IN TYPICAL DAY?';
? Q12 SERV_VEG #0-10;
XSERVEG =(SERV_VEG=0) +((SERV_VEG>=1)&(SERV_VEG<=3))*2 +
((SERV_VEG>=4)&(SERV_VEG<=6))*3+(SERV_VEG>=7)*4;
DUMMY XSERVEG;
?HIST(DISCRETE,PERCENT) XSERVEG;
DOT 1-3;
DSERVV. =XSERVEG.-XSERVEG4;ENDDOT;
?<<<<<<<<<<<<<< BEHAVIOR & ATTITUDE >>>>>>>>>>>>>>>>>>>>;
?======================;
? COUNT CALORIES      ;
?======================;
?CALORIES;
?5=COMPLETE AGREE 1=TOTALLY DISAGREE;
?TITLE 'I TRY TO COUNT THE NUMBER OF CALORIES I EAT EACH DAY AND BUY
MANGOS';
?  Q15AGREE   5      Completely agree (5)   ;
?  Q15AGREE   4      Somewhat agree         ;
?  Q15AGREE   3      Neither                ;
?  Q15AGREE   2      Somewhat disagree      ;
?  Q15AGREE   1      Completely disagree (1);
CAL =CALORIES; ?VARIABLE CONSISTENT;
DUMMY CAL;
?HIST(DISCRETE,PERCENT) CAL;
DOT 1,2,4,5;
DCAL.=CAL.-CAL3; ENDDOT;
?======================;
? EATING FRESH FOODS    ;
?======================;
?BHV_FRESH;
?TITLE 'I EAT FRESH FOODS MORE FREQUENTLY THAN PACKAGED FOODS';
?  Q15AGREE   5      Completely agree (5)    ;
?  Q15AGREE   4      Somewhat agree         ;
?  Q15AGREE   3      Neither               ;
?  Q15AGREE   2      Somewhat disagree      ;
?  Q15AGREE   1      Completely disagree (1) ;
B_FRE =BHV_FRESH; ?VARIABLE CONSISTENT;
DUMMY B_FRE;
?HIST(DISCRETE,PERCENT) B_FRE;
DOT 1,2,4,5;
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```
DB_FRE.=B_FRE.-B_FRE3; ENDDOT;
?======================;
? READ LABEL          ;
?======================;
?BHV_LABEL;
?TITLE 'I READ INGREDIENTS ON LABELS OF THE FOODS I BUY';
?  Q15AGREE   5      Completely agree (5)   ;
?  Q15AGREE   4      Somewhat agree         ;
?  Q15AGREE   3      Neither                ;
?  Q15AGREE   2      Somewhat disagree      ;
?  Q15AGREE   1      Completely disagree (1) ;
B_LAB =BHV_LABEL; ?VARIABLE CONSISTENT;
DUMMY B_LAB;
?HIST(DISCRETE,PERCENT) B_LAB;
DOT 1,2,4,5;
DB_LAB.=B_LAB.-B_LAB3; ENDDOT;
?===================================;
? BUY FROM CERTAIN STORES          ;
?===================================;
?BHV_STORE;
?TITLE 'I PREFER TO BUY PRODUCE FROM CERTAIN STORES';
?  Q15AGREE   5      Completely agree (5)   ;
?  Q15AGREE   4      Somewhat agree         ;
?  Q15AGREE   3      Neither                ;
?  Q15AGREE   2      Somewhat disagree      ;
?  Q15AGREE   1      Completely disagree (1) ;
B_ST =BHV_STORE; ?VARIABLE CONSISTENT;
DUMMY B_ST;
?HIST(DISCRETE,PERCENT) B_ST;
DOT 1,2,4,5;
DB_ST.=B_ST.-B_ST3; ENDDOT;
?================================================;
? WAY TO GET CERTAIN TAYPES OF PRODUCE           ;
?================================================;
?BHV_WAY;
?TITLE 'I GO OUT OF WAY TO GET CERTAIN TYPES OF PRODUCE';
?  Q15AGREE   5      Completely agree (5)   ;
?  Q15AGREE   4      Somewhat agree         ;
?  Q15AGREE   3      Neither                ;
?  Q15AGREE   2      Somewhat disagree      ;
?  Q15AGREE   1      Completely disagree (1) ;
B_WAY =BHV_WAY; ?VARIABLE CONSISTENT;
DUMMY B_WAY;
?HIST(DISCRETE,PERCENT) B_WAY;
DOT 1,2,4,5;
DB_WAY.=B_WAY.-B_WAY3; ENDDOT;
```

```
?====================================;
? EATING FRESH FRUITS AND VEGETABLES   ;
?====================================;
?BHV_FRUVEG;
?TITLE 'I EAT FRUITS AND VEGETABLES MORE THAN OTHER PEOPLE MY AGE';
?  Q15AGREE   5      Completely agree (5)   ;
?  Q15AGREE   4      Somewhat agree         ;
?  Q15AGREE   3      Neither                ;
?  Q15AGREE   2      Somewhat disagree      ;
?  Q15AGREE   1      Completely disagree (1) ;
B_FV =BHV_FRUVEG; ?VARIABLE CONSISTENT;
DUMMY B_FV;
?HIST(DISCRETE,PERCENT) B_FV;
DOT 1,2,4,5;
DB_FV.=B_FV.-B_FV3; ENDDOT;
?================================;
? FEEL HEATLHIER THAN MY PEERS    ;
?================================;
?BHV_HLTH;
?TITLE 'I FEEL THAT I AM HEALTHIER THAN MY PEERS';
?  Q15AGREE   5      Completely agree (5)    ;
?  Q15AGREE   4      Somewhat agree          ;
?  Q15AGREE   3      Neither                 ;
?  Q15AGREE   2      Somewhat disagree       ;
?  Q15AGREE   1      Completely disagree (1)  ;
B_HLT =BHV_HLTH; ?VARIABLE CONSISTENT;
DUMMY B_HLT;
?HIST(DISCRETE,PERCENT) B_HLT;
DOT 1,2,4,5;
DB_HLT.=B_HLT.-B_HLT3; ENDDOT;
?================================;
? EXERCISE                    ;
?================================;
?BHV_EXERCISE;
?TITLE 'I EXERCISE AT LEAST 3 TIMES A WEEK'    ;
?  Q15AGREE   5      Completely agree (5)   ;
?  Q15AGREE   4      Somewhat agree         ;
?  Q15AGREE   3      Neither                ;
?  Q15AGREE   2      Somewhat disagree      ;
?  Q15AGREE   1      Completely disagree (1) ;
B_EXE =BHV_EXERCISE; ?VARIABLE CONSISTENT;
DUMMY B_EXE;
?HIST(DISCRETE,PERCENT) B_EXE;
DOT 1,2,4,5;
DB_EXE.=B_EXE.-B_EXE3; ENDDOT;
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```
?================================;
? EXPERIMENT WITH FOODS         ;
?================================;
?BHV_NEWFOOD;
?TITLE 'I FREQUENTLY EXPERIMENT WITH NEW FOODS' ;
?  Q15AGREE   5      Completely agree (5)   ;
?  Q15AGREE   4      Somewhat agree         ;
?  Q15AGREE   3      Neither                ;
?  Q15AGREE   2      Somewhat disagree      ;
?  Q15AGREE   1      Completely disagree (1) ;
B_NEW =BHV_NEWFOOD; ?VARIABLE CONSISTENT;
DUMMY B_NEW;
?HIST(DISCRETE,PERCENT) B_NEW;
DOT 1,2,4,5;
DB_NEW.=B_NEW.-B_NEW3; ENDDOT;
?<<<<<<<<<<<<<< HEALTH CONDITIONS >>>>>>>>>>>>>>>>>>>>;
?=============================================================;
? HIGH BLOOD PRESSURE - V119_A  DO NOT HAVE BLOOD PRESSURE ;
?=============================================================;
? HLT_BLOOD1   YOU
? HLT_BLOOD2   YOU SPONSE
? HLT_BLOOD3   OTHER
? HLT_BLOOD4   NONE [EXCLUSIVE]
? HLT_BLOOD4;
HLT_BP=(HLT_BLOOD4=1);
?HIST(DISCRETE,PERCENT) HLT_BP;
DHLT_BP=(HLT_BP=1) + (HLT_BP=0)*-1;
?=============================================================;
? DIABETES - V123_A  DO NOT HAVE DIABETES                ;
?=============================================================;
? HLT_DIABE1   YOU
? HLT_DIABE2   YOU SPONSE
? HLT_DIABE3   OTHER
? HLT_DIABE4   NONE [EXCLUSIVE]
? HLT_DIABE4;
HLT_DB=(HLT_DIABE4=1);
?HIST(DISCRETE,PERCENT) HLT_DB;
DHLT_DB=(HLT_DB=1) + (HLT_DB=0)*-1;
?=============================================================;
? HIGH CHOLESTEROL- V127_A  DO NOT HAVE CHOLESTEROL PROBLEMS ;
?=============================================================;
? HLT_CHOLE1   YOU
? HLT_CHOLE2   YOU SPONSE
? HLT_CHOLE3   OTHER
? HLT_CHOLE4   NONE [EXCLUSIVE]
? HLT_CHOLE4;
```

```
HLT_CL=(HLT_CHOLE4=1);
?HIST(DISCRETE,PERCENT) HLT_CL;
DHLT_CL=(HLT_CL=1) + (HLT_CL=0)*-1;
?=========================================================;
? HIGH FOOD ALLERGIES- V131_A  DO NOT HAVE FOOD ALLERGIES    ;
?=========================================================;
? HLT_ALLEG1   YOU
? HLT_ALLEG2   YOU SPONSE
? HLT_ALLEG3   OTHER
? HLT_ALLEG4   NONE [EXCLUSIVE]
? HLT_ALLEG4;
HLT_AG=(HLT_ALLEG4=1);
?HIST(DISCRETE,PERCENT) HLT_AG;
DHLT_AG=(HLT_AG=1) + (HLT_AG=0)*-1;
?=========================================================;
? OBESITY - V135_A  DO NOT HAVE OBESITY PROBLEMS           ;
?=========================================================;
? HLT_OBEST1   YOU
? HLT_OBEST2   YOU SPONSE
? HLT_OBEST3   OTHER
? HLT_OBEST4   NONE [EXCLUSIVE]
? HLT_OBEST4;
HLT_OB=(HLT_OBEST4=1);
?HIST(DISCRETE,PERCENT) HLT_OB;
DHLT_OB=(HLT_OB=1) + (HLT_OB=0)*-1;
?=========================================================;
? MOBILITY - V139_A  DO NOT HAVE MOBILITHY PROBLEMS        ;
?=========================================================;
? HLT_MOBIL1   YOU
? HLT_MOBIL2   YOU SPONSE
? HLT_MOBIL3   OTHER
? HLT_MOBIL4   NONE [EXCLUSIVE]
? HLT_MOBIL4;
HLT_MB=(HLT_MOBIL4=1);
?HIST(DISCRETE,PERCENT) HLT_MB;
DHLT_MB=(HLT_MB=1) + (HLT_MB=0)*-1;
?=========================================================;
? SIGHT - V143_A  DO NOT HAVE SIGHT/HEARING PROBLEMS       ;
?=========================================================;
? HLT_HEAR1   YOU
? HLT_HEAR2   YOU SPONSE
? HLT_HEAR3   OTHER
? HLT_HEAR4   NONE [EXCLUSIVE]
? HLT_HEAR4;
HLT_HR=(HLT_HEAR4=1);
?HIST(DISCRETE,PERCENT) HLT_HR;
```

```
DHLT_HR=(HLT_HR=1) + (HLT_HR=0)*-1;
?============================================================;
? US REGIONS                                 ;
?============================================================;
? STATE0 =Q21STATE
WSTATE=STATE0;
? HIST(DISCRETE) WSTATE;
DIVISION=[ WSTATE= 7 | WSTATE=22 | WSTATE = 20| WSTATE =31 | WSTATE =40|
WSTATE =47]*1 +
[ WSTATE= 32| WSTATE=35 | WSTATE = 39]*2 +
[ WSTATE= 16| WSTATE=15 | WSTATE = 23| WSTATE =36 | WSTATE =49]*3 +
[ WSTATE= 13  | WSTATE= 17  | WSTATE = 24 | WSTATE = 25 | WSTATE =  30| WSTATE
= 29 | WSTATE = 42]*4 +
[ WSTATE= 9  | WSTATE= 8  | WSTATE =10 | WSTATE = 11| WSTATE =21 | WSTATE =
28
| WSTATE = 41| WSTATE =46 | WSTATE = 50]*5 +
[ WSTATE= 2  | WSTATE= 18  | WSTATE = 26 | WSTATE =43 ]*6 +
[ WSTATE= 3  | WSTATE= 19  | WSTATE = 37 | WSTATE = 44 ]*7 +
[ WSTATE= 4   | WSTATE= 6  | WSTATE = 14 | WSTATE = 33 | WSTATE = 27 | WSTATE =
45 | WSTATE =34| WSTATE = 51 ]*8 +
[ WSTATE= 1  | WSTATE= 5  | WSTATE = 12| WSTATE = 38 | WSTATE = 48 ]*9;

? DIVISION =1 NORTHEAST(1):NEW ENGLAND
? DIVISION =2 NORTHEAST(1):MIDDLE ATLANTIC
? DIVISION =3 MIDWEST(2): EAST NORTH CENTRAL
? DIVISION =4 MIDWEST(2): WEST NORTH CENTRAL
? DIVISION =5 SOUTH(3): SOUTH ATLANTIC
? DIVISION =6 SOUTH(3): EAST SOUTH CENTRAL
? DIVISION =7 SOUTH(3): WEST SOUTH CENTRAL
? DIVISION =8 WEST(4): MOUNTAIN
? DIVISION =9 WEST(4): PACIFIC

REGION = [ DIVISION=1 | DIVISION=2 ]  + [ DIVISION=3 | DIVISION=4 ]*2
+ [ DIVISION=5 | DIVISION=6 | DIVISION=7]*3 +[ DIVISION=8 | DIVISION=9 ]*4;

?  1      AK  |  10      FL  |  19      LA |  27      MT   |36      OH    | 45      UT
?  2      AL  |  11      GA  |  20      MA |  28      NC   |37      OK    | 46      VA
?  3      AR  |  12      HI  |  21      MD |  29      ND   |38      OR    | 47      VT
?  4      AZ  |  13      IA  |  22      ME |  30      NE   |39      PA    | 48      WA
?  5      CA  |  14      ID  |  23      MI |  31      NH   |40      RI    | 49      WI
?  6      CO  |  15      IL  |  24      MN |  32      NJ   |41      SC    | 50      WV
?  7      CT  |  16      IN  |  25      MO |  33      NM   |42      SD    | 51      WY
?  8      DC  |  17      KS  |  26      MS |  34      NV   |43      TN    |
?  9      DE  |  18      KY  |           |  35      NY   |44      TX    |

?DUMMY DIVISION;
```

```
?HIST(DISCRETE) DIVISION;
?DOT 2-9;
?WDIV. = DIVISION. - DIVISION1;
?ZDIV. = DIVISION.;
?ENDDOT;

DUMMY REGION;
?HIST(DISCRETE,PERCENT) REGION;
DOT 2-4;
DREG.= REGION.-REGION1;ENDDOT;

? CORRELATIONS AMONG ALL VARIABLES;
 ?CORR(COVA,MSD,PRINT) XINC XEDU RACE XAGE XGEN XMAR XEMPLY XEXPD
XSERFRU XSERVEG XHWD XCHL;
 ?XSHOP_GRO XSHOP_WARE XSHOP_INTE XSHOP_MASS XSHOP_CONV
XSHOP_FARM CAL B_FRE B_LAB B_ST;
 ?B_WAY B_FV B_HLT B_EXE B_NEW HLT_BP HLT_DB HLT_CL HLT_AG HLT_OB
HLT_MB HLT_HR;

? HISTOGRAMS OF ALL DUMMIES INCLUDED IN MODEL;
 ?LIST HVARH
  ?XAGE XGEN XMAR RACE XINC XEDU XHWD XCHL XEMPLY REGION MTH
  ?XSHOP_GRO XSHOP_WARE XSHOP_INTE XSHOP_MASS XSHOP_CONV
XSHOP_FARM
  ?XEXPD XSERFRU XSERVEG
  ?CAL1 B_FRE B_LAB B_ST B_WAY B_FV B_HLT B_EXE B_NEW
  ?HLT_BP HLT_DB HLT_CL HLT_AG HLT_OB HLT_MB HLT_HR;
 ?DOT HVARH;
 ?HIST(DISCRETE) .;
 ?HIST(DISCRETE,PERCENT) .;ENDDOT;

?=================================================================;
? ORDERED PROBIT MODEL VARIABLES
?=================================================================;
LIST XMODELX
DAGE1 DAGE2 DAGE3
DGEN DMAR1 DMAR2 DMAR3
DRACE1 DRACE2 DRACE3 DRACE4
DINC1 DINC2 DINC3 DINC4
DEDU1 DEDU2 DEDU3
DHWD1 DHWD2 DHWD3 DHWD4 DCHL
DEMPLY1 DEMPLY2 DEMPLY3
DREG2 DREG3 DREG4
DSHOP_GRO DSHOP_WARE DSHOP_INTE DSHOP_MASS DSHOP_CONV
DSHOP_FARM
DEXPD1 DEXPD2 DEXPD3 DEXPD4
```

```
DSERVF1 DSERVF2 DSERVF3 DSERVV1 DSERVV2 DSERVV3
DCAL1 DCAL2 DCAL4 DCAL5
DB_FRE1 DB_FRE2 DB_FRE4 DB_FRE5
DB_LAB1 DB_LAB2 DB_LAB4 DB_LAB5
DB_ST1 DB_ST2 DB_ST4 DB_ST5
DB_WAY1 DB_WAY2 DB_WAY4 DB_WAY5
DB_FV1 DB_FV2 DB_FV4 DB_FV5
DB_HLT1 DB_HLT2 DB_HLT4 DB_HLT5
DB_EXE1 DB_EXE2 DB_EXE4 DB_EXE5
DB_NEW1 DB_NEW2 DB_NEW4 DB_NEW5
DHLT_BP DHLT_DB DHLT_CL DHLT_AG DHLT_OB DHLT_MB DHLT_HR
DMTH2 DMTH3 DMTH4 DMTH5 DMTH6 DMTH7 DMTH8 DMTH9 DMTH10 DMTH11
DMTH12;

ORDPROB ORGANIC C XMODELX;
WRITE(FORMAT=EXCEL,FILE='D:\ZZORGANIC\Organics\HIST5.XLS') @COEF;
?=================================================================;
MMAKE STATS @COEF @T %T;
print STATS;
SET NU=3;  ? NUMBER OF ORDER CATEGORIES LESS 2;

FIT=@FIT;
SELECT PERIOD>2 & IDD3=1;
DFIT=( (FIT**2)>=0);
MAT BB=@COEF;
MAT NR=NROW(BB); SET RR=NR(1)-NU;
MFORM(TYPE=GEN,NROW=RR,NCOL=1) AA=0;
DO J=1 TO RR; SET AA(J)=BB(J); ENDDO; PRINT AA;
DOT(VALUE=K) 2-4; SET L=RR + K -1;
SET MU.=BB(L); PRINT K L MU.; ENDDOT;

?=================================================================;
? SETTING FOR THE SIMULATION PORTION OF THE ANALYSIS              ;
?=================================================================;
LIST ZVAR2Z
DAGE1 DAGE2 DAGE3
DGEN DMAR1 DMAR2 DMAR3
DRACE1 DRACE2 DRACE3 DRACE4
DINC1 DINC2 DINC3 DINC4
DEDU1 DEDU2 DEDU3
DHWD1 DHWD2 DHWD3 DHWD4 DCHL
DEMPLY1 DEMPLY2 DEMPLY3
DREG2 DREG3 DREG4
DSHOP_GRO DSHOP_WARE DSHOP_INTE DSHOP_MASS DSHOP_CONV
DSHOP_FARM
DEXPD1 DEXPD2 DEXPD3 DEXPD4
```

DSERVF1 DSERVF2 DSERVF3 DSERVV1 DSERVV2 DSERVV3
DCAL1 DCAL2 DCAL4 DCAL5
DB_FRE1 DB_FRE2 DB_FRE4 DB_FRE5
DB_LAB1 DB_LAB2 DB_LAB4 DB_LAB5
DB_ST1 DB_ST2 DB_ST4 DB_ST5
DB_WAY1 DB_WAY2 DB_WAY4 DB_WAY5
DB_FV1 DB_FV2 DB_FV4 DB_FV5
DB_HLT1 DB_HLT2 DB_HLT4 DB_HLT5
DB_EXE1 DB_EXE2 DB_EXE4 DB_EXE5
DB_NEW1 DB_NEW2 DB_NEW4 DB_NEW5
DHLT_BP DHLT_DB DHLT_CL DHLT_AG DHLT_OB DHLT_MB DHLT_HR
DMTH2 DMTH3 DMTH4 DMTH5 DMTH6 DMTH7 DMTH8 DMTH9 DMTH10 DMTH11
DMTH12;

LIST SVARW
WDAGE1 WDAGE2 WDAGE3
WDGEN WDMAR1 WDMAR2 WDMAR3
WDRACE1 WDRACE2 WDRACE3 WDRACE4
WDINC1 WDINC2 WDINC3 WDINC4
WDEDU1 WDEDU2 WDEDU3
WDHWD1 WDHWD2 WDHWD3 WDHWD4 WDCHL
WDEMPLY1 WDEMPLY2 WDEMPLY3
WDREG2 WDREG3 WDREG4
WDSHOP_GRO WDSHOP_WARE WDSHOP_INTE WDSHOP_MASS WDSHOP_CONV
WDSHOP_FARM
WDEXPD1 WDEXPD2 WDEXPD3 WDEXPD4
WDSERVF1 WDSERVF2 WDSERVF3 WDSERVV1 WDSERVV2 WDSERVV3
WDCAL1 WDCAL2 WDCAL4 WDCAL5
WDB_FRE1 WDB_FRE2 WDB_FRE4 WDB_FRE5
WDB_LAB1 WDB_LAB2 WDB_LAB4 WDB_LAB5
WDB_ST1 WDB_ST2 WDB_ST4 WDB_ST5
WDB_WAY1 WDB_WAY2 WDB_WAY4 WDB_WAY5
WDB_FV1 WDB_FV2 WDB_FV4 WDB_FV5
WDB_HLT1 WDB_HLT2 WDB_HLT4 WDB_HLT5
WDB_EXE1 WDB_EXE2 WDB_EXE4 WDB_EXE5
WDB_NEW1 WDB_NEW2 WDB_NEW4 WDB_NEW5
WDHLT_BP WDHLT_DB WDHLT_CL WDHLT_AG WDHLT_OB WDHLT_MB
WDHLT_HR
WDMTH2 WDMTH3 WDMTH4 WDMTH5 WDMTH6 WDMTH7 WDMTH8 WDMTH9
WDMTH10 WDMTH11 WDMTH12;

LIST SVARS
SDAGE1 SDAGE2 SDAGE3
SDGEN SDMAR1 SDMAR2 SDMAR3
SDRACE1 SDRACE2 SDRACE3 SDRACE4
SDINC1 SDINC2 SDINC3 SDINC4

```
SDEDU1 SDEDU2 SDEDU3
SDHWD1 SDHWD2 SDHWD3 SDHWD4 SDCHL
SDEMPLY1 SDEMPLY2 SDEMPLY3
SDREG2 SDREG3 SDREG4
SDSHOP_GRO SDSHOP_WARE SDSHOP_INTE SDSHOP_MASS SDSHOP_CONV
SDSHOP_FARM
SDEXPD1 SDEXPD2 SDEXPD3 SDEXPD4
SDSERVF1 SDSERVF2 SDSERVF3 SDSERVV1 SDSERVV2 SDSERVV3
SDCAL1 SDCAL2 SDCAL4 SDCAL5
SDB_FRE1 SDB_FRE2 SDB_FRE4 SDB_FRE5
SDB_LAB1 SDB_LAB2 SDB_LAB4 SDB_LAB5
SDB_ST1 SDB_ST2 SDB_ST4 SDB_ST5
SDB_WAY1 SDB_WAY2 SDB_WAY4 SDB_WAY5
SDB_FV1 SDB_FV2 SDB_FV4 SDB_FV5
SDB_HLT1 SDB_HLT2 SDB_HLT4 SDB_HLT5
SDB_EXE1 SDB_EXE2 SDB_EXE4 SDB_EXE5
SDB_NEW1 SDB_NEW2 SDB_NEW4 SDB_NEW5
SDHLT_BP SDHLT_DB SDHLT_CL SDHLT_AG SDHLT_OB SDHLT_MB SDHLT_HR
SDMTH2 SDMTH3 SDMTH4 SDMTH5 SDMTH6 SDMTH7 SDMTH8 SDMTH9 SDMTH10
SDMTH11 SDMTH12;

DOT ZVAR2Z;
SET S.=0; SET W.=0; SET IHH=1; ENDDOT;
SET I=0;

?=====================;
PROC INIT;
?=====================;
DOT ZVAR2Z;  SET S.=0; SET W.=0; SET IHH=1; ENDDOT;
ENDPROC;
MFORM(TYPE=GEN,NROW=150,NCOL=12) MSIM=0;
SET SIMNUM=0;
?=====================;
PROC ZSIMZ;
?=====================;
SELECT PERIOD>2 & IDD3=1;
IZZ=1;
SET IWW=0;
SET I=I+1;
MMAKE SX1 IZZ ZVAR2Z  ;
MMAKE SX2 IWW SVARS ;
MMAKE SX3 IWW SVARW ;
MAT X2= SX1%(IZZ#SX2');
MAT X3= IZZ#SX3';
MAT X1 = SX1 - X2 + X3;
MAT NRX1=NROW(X1);
```

```
MAT XB=X1*AA;
MAT PROB1= CNORM(-XB);
MAT PROB2= CNORM( MU2 - XB) - CNORM(-XB);
MAT PROB3= CNORM( MU3 - XB) - CNORM( MU2 - XB);
MAT PROB4= CNORM( MU4 - XB) - CNORM( MU3 - XB);
MAT PROB5= 1- CNORM(MU4 - XB);

MAT NN=NROW(PROB1);
DOT 1-5; UNMAKE PROB. LPROB.;   DLPROB. = LPROB.*DFIT;  ENDDOT;
MSD(NOPRINT) DLPROB1 DLPROB2 DLPROB3 DLPROB4 DLPROB5;
SET MSIM(I,1)=I;
SET MSIM(I,2)=SIMNUM;
SET MSIM(I,3)=VARNUM;
SET MSIM(I,4)= @MEAN(1);
SET MSIM(I,5)= @MEAN(2);
SET MSIM(I,6)= @MEAN(3);
SET MSIM(I,7)= @MEAN(4);
SET MSIM(I,8)= @MEAN(5);
ENDPROC;
?=======================;
? STARTING THE SIMULATIONS;
?=======================;
?================================================;
?   SIMULATION #1 - AVERAGE PERSON RESPONDING     ;
?================================================;
SET SIMNUM=1;
SET VARNUM=1;
INIT; ZSIMZ;
?================================================;
?   SIMULATION #2 - AGE OF RESPONDENT            ;
?================================================;
SET SIMNUM=2;
SET VARNUM=1; INIT;
SET SDAGE1=1; SET SDAGE2=1; SET SDAGE3=1;
SET WDAGE1=1; SET WDAGE2=0; SET WDAGE3=0;  ? XAGE=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDAGE1=1; SET SDAGE2=1; SET SDAGE3=1;
SET WDAGE1=0; SET WDAGE2=1; SET WDAGE3=0;  ? XAGE=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDAGE1=1; SET SDAGE2=1; SET SDAGE3=1;
SET WDAGE1=0; SET WDAGE2=0; SET WDAGE3=1;  ? XAGE=3;
ZSIMZ;
```

```
SET VARNUM=4; INIT;
SET SDAGE1=1; SET SDAGE2=1; SET SDAGE3=1;
SET WDAGE1=-1; SET WDAGE2=-1; SET WDAGE3=-1;  ? XAGE=4;
ZSIMZ;
?================================================;
?   SIMULATION #3 - GENDER                      ;
?================================================;
SET SIMNUM=3;
SET VARNUM=1; INIT;
SET SDGEN=1;
SET WDGEN=1;  ? XGEN=1 [GENDER=FEMALE];
ZSIMZ;

SET VARNUM=2; INIT;
SET SDGEN=1;
SET WDGEN=-1;  ? XGEN=0 [GENDER=MALE];
ZSIMZ;
?================================================;
?   SIMULATION #4 - MARITAL STATUS OF RESPONDENT   ;
?================================================;
SET SIMNUM=4;
SET VARNUM=1; INIT;
SET SDMAR1=1; SET SDMAR2=1; SET SDMAR3=1;
SET WDMAR1=1; SET WDMAR2=0; SET WDMAR3=0;  ? XMAR=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDMAR1=1; SET SDMAR2=1; SET SDMAR3=1;
SET WDMAR1=0; SET WDMAR2=1; SET WDMAR3=0;  ? XMAR=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDMAR1=1; SET SDMAR2=1; SET SDMAR3=1;
SET WDMAR1=0; SET WDMAR2=0; SET WDMAR3=1;  ? XMAR=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDMAR1=1; SET SDMAR2=1; SET SDMAR3=1;
SET WDMAR1=-1; SET WDMAR2=-1; SET WDMAR3=-1;  ? XMAR=4;
ZSIMZ;
?================================================;
?   SIMULATION #5 - RACE OF RESPONDENT          ;
?================================================;
SET SIMNUM=5;
SET VARNUM=1; INIT;
SET SDRACE1=1; SET SDRACE2=1; SET SDRACE3=1; SET SDRACE4=1;
```

```
SET WDRACE1=1; SET WDRACE2=0; SET WDRACE3=0; SET WDRACE4=0; ? RACE=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDRACE1=1; SET SDRACE2=1; SET SDRACE3=1; SET SDRACE4=1;
SET WDRACE1=0; SET WDRACE2=1; SET WDRACE3=0; SET WDRACE4=0; ? RACE=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDRACE1=1; SET SDRACE2=1; SET SDRACE3=1; SET SDRACE4=1;
SET WDRACE1=0; SET WDRACE2=0; SET WDRACE3=1; SET WDRACE4=0; ? RACE=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDRACE1=1; SET SDRACE2=1; SET SDRACE3=1; SET SDRACE4=1;
SET WDRACE1=0; SET WDRACE2=0; SET WDRACE3=0; SET WDRACE4=1; ? RACE=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDRACE1=1; SET SDRACE2=1; SET SDRACE3=1; SET SDRACE4=1;
SET WDRACE1=-1; SET WDRACE2=-1; SET WDRACE3=-1; SET WDRACE4=-1; ?
RACE=5;
ZSIMZ;
?================================================;
?   SIMULATION #6 - INCOME                      ;
?================================================;
SET SIMNUM=6;
SET VARNUM=1; INIT;
SET SDINC1=1; SET SDINC2=1; SET SDINC3=1; SET SDINC4=1;
SET WDINC1=1; SET WDINC2=0; SET WDINC3=0; SET WDINC4=0; ? XINC=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDINC1=1; SET SDINC2=1; SET SDINC3=1; SET SDINC4=1;
SET WDINC1=0; SET WDINC2=1; SET WDINC3=0; SET WDINC4=0; ? XINC=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDINC1=1; SET SDINC2=1; SET SDINC3=1; SET SDINC4=1;
SET WDINC1=0; SET WDINC2=0; SET WDINC3=1; SET WDINC4=0; ? XINC=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDINC1=1; SET SDINC2=1; SET SDINC3=1; SET SDINC4=1;
SET WDINC1=0; SET WDINC2=0; SET WDINC3=0; SET WDINC4=1; ? XINC=4;
ZSIMZ;
```

```
SET VARNUM=5; INIT;
SET SDINC1=1; SET SDINC2=1; SET SDINC3=1; SET SDINC4=1;
SET WDINC1=-1; SET WDINC2=-1; SET WDINC3=-1; SET WDINC4=-1; ? XINC=5;
ZSIMZ;
?================================================;
?   SIMULATION #7 - EDUCATION                    ;
?================================================;
SET SIMNUM=7;
SET VARNUM=1; INIT;
SET SDEDU1=1; SET SDEDU2=1; SET SDEDU3=1;
SET WDEDU1=1; SET WDEDU2=0; SET WDEDU3=0;  ? XEDU=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDEDU1=1; SET SDEDU2=1; SET SDEDU3=1;
SET WDEDU1=0; SET WDEDU2=1; SET WDEDU3=0;  ? XEDU=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDEDU1=1; SET SDEDU2=1; SET SDEDU3=1;
SET WDEDU1=0; SET WDEDU2=0; SET WDEDU3=1;  ? XEDU=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDEDU1=1; SET SDEDU2=1; SET SDEDU3=1;
SET WDEDU1=-1; SET WDEDU2=-1; SET WDEDU3=-1;  ? XEDU=4;
ZSIMZ;
?================================================;
?   SIMULATION #8 - HOUSEHOLD SIZE               ;
?================================================;
SET SIMNUM=8;
SET VARNUM=1; INIT;
SET SDHWD1=1; SET SDHWD2=1; SET SDHWD3=1; SET SDHWD4=1;
SET WDHWD1=1; SET WDHWD2=0; SET WDHWD3=0; SET WDHWD4=0; ? XHWD=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDHWD1=1; SET SDHWD2=1; SET SDHWD3=1; SET SDHWD4=1;
SET WDHWD1=0; SET WDHWD2=1; SET WDHWD3=0; SET WDHWD4=0; ? XHWD=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDHWD1=1; SET SDHWD2=1; SET SDHWD3=1; SET SDHWD4=1;
SET WDHWD1=0; SET WDHWD2=0; SET WDHWD3=1; SET WDHWD4=0; ? XHWD=3;
ZSIMZ;
```

```
SET VARNUM=4; INIT;
SET SDHWD1=1; SET SDHWD2=1; SET SDHWD3=1; SET SDHWD4=1;
SET WDHWD1=0; SET WDHWD2=0; SET WDHWD3=0; SET WDHWD4=1; ? XHWD=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDHWD1=1; SET SDHWD2=1; SET SDHWD3=1; SET SDHWD4=1;
SET WDHWD1=-1; SET WDHWD2=-1; SET WDHWD3=-1; SET WDHWD4=-1; ? XHWD=5;
ZSIMZ;
?================================================;
?   SIMULATION #9 - WITH CHILDREN UNDER 18       ;
?================================================;
SET SIMNUM=9;
SET VARNUM=1; INIT;
SET SDCHL=1;
SET WDCHL=1;  ? XCHL=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDCHL=1;
SET WDCHL=-1;  ? XCHL=0;
ZSIMZ;
?================================================;
?   SIMULATION #10 - EMPLOYMENT                  ;
?================================================;
SET SIMNUM=10;
SET VARNUM=1; INIT;
SET SDEMPLY1=1; SET SDEMPLY2=1; SET SDEMPLY3=1;
SET WDEMPLY1=1; SET WDEMPLY2=0; SET WDEMPLY3=0;  ? XEMPLY=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDEMPLY1=1; SET SDEMPLY2=1; SET SDEMPLY3=1;
SET WDEMPLY1=0; SET WDEMPLY2=1; SET WDEMPLY3=0;  ? XEMPLY=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDEMPLY1=1; SET SDEMPLY2=1; SET SDEMPLY3=1;
SET WDEMPLY1=0; SET WDEMPLY2=0; SET WDEMPLY3=1;  ? XEMPLY=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDEMPLY1=1; SET SDEMPLY2=1; SET SDEMPLY3=1;
SET WDEMPLY1=-1; SET WDEMPLY2=-1; SET WDEMPLY3=-1;  ? XEMPLY=4;
ZSIMZ;
```

```
?================================================;
?   SIMULATION #11 - REGION                     ;
?================================================;
SET SIMNUM=11;
SET VARNUM=1; INIT;
SET SDREG2=1; SET SDREG3=1; SET SDREG4=1;
SET WDREG2=-1; SET WDREG3=-1; SET WDREG4=-1;  ? REGION=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDREG2=1; SET SDREG3=1; SET SDREG4=1;
SET WDREG2=1; SET WDREG3=0; SET WDREG4=0;  ? REGION=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDREG2=1; SET SDREG3=1; SET SDREG4=1;
SET WDREG2=0; SET WDREG3=1; SET WDREG4=0;  ? REGION=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDREG2=1; SET SDREG3=1; SET SDREG4=1;
SET WDREG2=0; SET WDREG3=0; SET WDREG4=1;  ? REGION=4;
ZSIMZ;
?================================================;
?   SIMULATION #12 - STORE CHOICES        ;
?================================================;
SET SIMNUM=12.1;
SET VARNUM=1; INIT;
SET SDSHOP_GRO=1;
SET WDSHOP_GRO=1;  ? XSHOP_GRO=1;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDSHOP_GRO=1;
SET WDSHOP_GRO=-1;  ? XSHOP_GRO=0;
ZSIMZ;

SET SIMNUM=12.2;
SET VARNUM=1; INIT;
SET SDSHOP_WARE=1;
SET WDSHOP_WARE=1;  ? XSHOP_WARE=1;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDSHOP_WARE=1;
SET WDSHOP_WARE=-1;  ? XSHOP_WARE=0;
ZSIMZ;
```

```
SET SIMNUM=12.3;
SET VARNUM=1; INIT;
SET SDSHOP_INTE=1;
SET WDSHOP_INTE=1;  ? XSHOP_INTE=1;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDSHOP_INTE=1;
SET WDSHOP_INTE=-1;  ? XSHOP_INTE=0;
ZSIMZ;

SET SIMNUM=12.4;
SET VARNUM=1; INIT;
SET SDSHOP_MASS=1;
SET WDSHOP_MASS=1;  ? XSHOP_MASS=1;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDSHOP_MASS=1;
SET WDSHOP_MASS=-1;  ? XSHOP_MASS=0;
ZSIMZ;

SET SIMNUM=12.5;
SET VARNUM=1; INIT;
SET SDSHOP_CONV=1;
SET WDSHOP_CONV=1;  ? XSHOP_CONV=1;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDSHOP_CONV=1;
SET WDSHOP_CONV=-1;  ? XSHOP_CONV=0;
ZSIMZ;

SET SIMNUM=12.6;
SET VARNUM=1; INIT;
SET SDSHOP_FARM=1;
SET WDSHOP_FARM=1;  ? XSHOP_FARM=1;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDSHOP_FARM=1;
SET WDSHOP_FARM=-1;  ? XSHOP_FARM=0;
ZSIMZ;

?================================================;
?   SIMULATION #13 - EXPENDITURE ON GROCERIES     ;
?================================================;
SET SIMNUM=13;
SET VARNUM=1; INIT;
SET SDEXPD1=1; SET SDEXPD2=1; SET SDEXPD3=1; SET SDEXPD4=1;
```

```
SET WDEXPD1=1; SET WDEXPD2=0; SET WDEXPD3=0; SET WDEXPD4=0; ? XEXPD=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDEXPD1=1; SET SDEXPD2=1; SET SDEXPD3=1; SET SDEXPD4=1;
SET WDEXPD1=0; SET WDEXPD2=1; SET WDEXPD3=0; SET WDEXPD4=0; ? XEXPD=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDEXPD1=1; SET SDEXPD2=1; SET SDEXPD3=1; SET SDEXPD4=1;
SET WDEXPD1=0; SET WDEXPD2=0; SET WDEXPD3=1; SET WDEXPD4=0; ? XEXPD=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDEXPD1=1; SET SDEXPD2=1; SET SDEXPD3=1; SET SDEXPD4=1;
SET WDEXPD1=0; SET WDEXPD2=0; SET WDEXPD3=0; SET WDEXPD4=1; ? XEXPD=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDEXPD1=1; SET SDEXPD2=1; SET SDEXPD3=1; SET SDEXPD4=1;
SET WDEXPD1=-1; SET WDEXPD2=-1; SET WDEXPD3=-1; SET WDEXPD4=-1; ?
XEXPD=5;
ZSIMZ;
?================================================;
?   SIMULATION #14 - SERVINGS OF FRUIT&VEG PER DAY ;
?================================================;
SET SIMNUM=14.1; ? SERVINGS OF FRUIT;
SET VARNUM=1; INIT;
SET SDSERVF1=1; SET SDSERVF2=1; SET SDSERVF3=1;
SET WDSERVF1=1; SET WDSERVF2=0; SET WDSERVF3=0; ? XSERFRU=1;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDSERVF1=1; SET SDSERVF2=1; SET SDSERVF3=1;
SET WDSERVF1=0; SET WDSERVF2=1; SET WDSERVF3=0; ? XSERFRU=2;
ZSIMZ;
SET VARNUM=3; INIT;
SET SDSERVF1=1; SET SDSERVF2=1; SET SDSERVF3=1;
SET WDSERVF1=0; SET WDSERVF2=0; SET WDSERVF3=1; ? XSERFRU=3;
ZSIMZ;
SET VARNUM=4; INIT;
SET SDSERVF1=1; SET SDSERVF2=1; SET SDSERVF3=1;
SET WDSERVF1=-1; SET WDSERVF2=-1; SET WDSERVF3=-1; ? XSERFRU=4;
ZSIMZ;

SET SIMNUM=14.2; ? SERVINGS OF VEG;
SET VARNUM=1; INIT;
```

```
SET SDSERVV1=1; SET SDSERVV2=1; SET SDSERVV3=1;
SET WDSERVV1=1; SET WDSERVV2=0; SET WDSERVV3=0; ? XSERVEG=1;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDSERVV1=1; SET SDSERVV2=1; SET SDSERVV3=1;
SET WDSERVV1=0; SET WDSERVV2=1; SET WDSERVV3=0; ? XSERVEG=2;
ZSIMZ;
SET VARNUM=3; INIT;
SET SDSERVV1=1; SET SDSERVV2=1; SET SDSERVV3=1;
SET WDSERVV1=0; SET WDSERVV2=0; SET WDSERVV3=1; ? XSERVEG=3;
ZSIMZ;
SET VARNUM=4; INIT;
SET SDSERVV1=1; SET SDSERVV2=1; SET SDSERVV3=1;
SET WDSERVV1=-1; SET WDSERVV2=-1; SET WDSERVV3=-1; ? XSERVEG=4;
ZSIMZ;
?================================================;
?   SIMULATION #15 - COUNT CALORIES              ;
?================================================;
SET SIMNUM=15;
SET VARNUM=1; INIT;
SET SDCAL1=1; SET SDCAL2=1; SET SDCAL4=1; SET SDCAL5=1;
SET WDCAL1=1; SET WDCAL2=0; SET WDCAL4=0; SET WDCAL5=0; ? CAL=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDCAL1=1; SET SDCAL2=1; SET SDCAL4=1; SET SDCAL5=1;
SET WDCAL1=0; SET WDCAL2=1; SET WDCAL4=0; SET WDCAL5=0; ? CAL=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDCAL1=1; SET SDCAL2=1; SET SDCAL4=1; SET SDCAL5=1;
SET WDCAL1=-1; SET WDCAL2=-1; SET WDCAL4=-1; SET WDCAL5=-1; ? CAL=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDCAL1=1; SET SDCAL2=1; SET SDCAL4=1; SET SDCAL5=1;
SET WDCAL1=0; SET WDCAL2=0; SET WDCAL4=1; SET WDCAL5=0; ? CAL=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDCAL1=1; SET SDCAL2=1; SET SDCAL4=1; SET SDCAL5=1;
SET WDCAL1=0; SET WDCAL2=0; SET WDCAL4=0; SET WDCAL5=1; ? CAL=5;
ZSIMZ;
?================================================;
?   SIMULATION #16 - EATING FRESH FOODS          ;
?================================================;
```

```
SET SIMNUM=16;
SET VARNUM=1; INIT;
SET SDB_FRE1=1; SET SDB_FRE2=1; SET SDB_FRE4=1; SET SDB_FRE5=1;
SET WDB_FRE1=1; SET WDB_FRE2=0; SET WDB_FRE4=0; SET WDB_FRE5=0; ?
B_FRE=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDB_FRE1=1; SET SDB_FRE2=1; SET SDB_FRE4=1; SET SDB_FRE5=1;
SET WDB_FRE1=0; SET WDB_FRE2=1; SET WDB_FRE4=0; SET WDB_FRE5=0; ?
B_FRE=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDB_FRE1=1; SET SDB_FRE2=1; SET SDB_FRE4=1; SET SDB_FRE5=1;
SET WDB_FRE1=-1; SET WDB_FRE2=-1; SET WDB_FRE4=-1; SET WDB_FRE5=-1; ?
B_FRE=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDB_FRE1=1; SET SDB_FRE2=1; SET SDB_FRE4=1; SET SDB_FRE5=1;
SET WDB_FRE1=0; SET WDB_FRE2=0; SET WDB_FRE4=1; SET WDB_FRE5=0; ?
B_FRE=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDB_FRE1=1; SET SDB_FRE2=1; SET SDB_FRE4=1; SET SDB_FRE5=1;
SET WDB_FRE1=0; SET WDB_FRE2=0; SET WDB_FRE4=0; SET WDB_FRE5=1; ?
B_FRE=5;
ZSIMZ;
?================================================;
?   SIMULATION #17 - READ LABEL                  ;
?================================================;
SET SIMNUM=17;
SET VARNUM=1; INIT;
SET SDB_LAB1=1; SET SDB_LAB2=1; SET SDB_LAB4=1; SET SDB_LAB5=1;
SET WDB_LAB1=1; SET WDB_LAB2=0; SET WDB_LAB4=0; SET WDB_LAB5=0; ?
B_LAB=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDB_LAB1=1; SET SDB_LAB2=1; SET SDB_LAB4=1; SET SDB_LAB5=1;
SET WDB_LAB1=0; SET WDB_LAB2=1; SET WDB_LAB4=0; SET WDB_LAB5=0; ?
B_LAB=2;
ZSIMZ;
```

```
SET VARNUM=3; INIT;
SET SDB_LAB1=1; SET SDB_LAB2=1; SET SDB_LAB4=1; SET SDB_LAB5=1;
SET WDB_LAB1=-1; SET WDB_LAB2=-1; SET WDB_LAB4=-1; SET WDB_LAB5=-1; ?
B_LAB=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDB_LAB1=1; SET SDB_LAB2=1; SET SDB_LAB4=1; SET SDB_LAB5=1;
SET WDB_LAB1=0; SET WDB_LAB2=0; SET WDB_LAB4=1; SET WDB_LAB5=0; ?
B_LAB=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDB_LAB1=1; SET SDB_LAB2=1; SET SDB_LAB4=1; SET SDB_LAB5=1;
SET WDB_LAB1=0; SET WDB_LAB2=0; SET WDB_LAB4=0; SET WDB_LAB5=1; ?
B_LAB=5;
ZSIMZ;
?================================================;
?   SIMULATION #18 - BUY FROM CERTAIN STORES      ;
?================================================;
SET SIMNUM=18;
SET VARNUM=1; INIT;
SET SDB_ST1=1; SET SDB_ST2=1; SET SDB_ST4=1; SET SDB_ST5=1;
SET WDB_ST1=1; SET WDB_ST2=0; SET WDB_ST4=0; SET WDB_ST5=0; ? B_ST=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDB_ST1=1; SET SDB_ST2=1; SET SDB_ST4=1; SET SDB_ST5=1;
SET WDB_ST1=0; SET WDB_ST2=1; SET WDB_ST4=0; SET WDB_ST5=0; ? B_ST=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDB_ST1=1; SET SDB_ST2=1; SET SDB_ST4=1; SET SDB_ST5=1;
SET WDB_ST1=-1; SET WDB_ST2=-1; SET WDB_ST4=-1; SET WDB_ST5=-1; ? B_ST=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDB_ST1=1; SET SDB_ST2=1; SET SDB_ST4=1; SET SDB_ST5=1;
SET WDB_ST1=0; SET WDB_ST2=0; SET WDB_ST4=1; SET WDB_ST5=0; ? B_ST=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDB_ST1=1; SET SDB_ST2=1; SET SDB_ST4=1; SET SDB_ST5=1;
SET WDB_ST1=0; SET WDB_ST2=0; SET WDB_ST4=0; SET WDB_ST5=1; ? B_ST=5;
ZSIMZ;
```

```
?================================================;
?   SIMULATION #19 - WAY TO GET CERTAIN PRODUCE    ;
?================================================;
SET SIMNUM=19;
SET VARNUM=1; INIT;
SET SDB_WAY1=1; SET SDB_WAY2=1; SET SDB_WAY4=1; SET SDB_WAY5=1;
SET WDB_WAY1=1; SET WDB_WAY2=0; SET WDB_WAY4=0; SET WDB_WAY5=0; ?
B_WAY=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDB_WAY1=1; SET SDB_WAY2=1; SET SDB_WAY4=1; SET SDB_WAY5=1;
SET WDB_WAY1=0; SET WDB_WAY2=1; SET WDB_WAY4=0; SET WDB_WAY5=0; ?
B_WAY=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDB_WAY1=1; SET SDB_WAY2=1; SET SDB_WAY4=1; SET SDB_WAY5=1;
SET WDB_WAY1=-1; SET WDB_WAY2=-1; SET WDB_WAY4=-1; SET WDB_WAY5=-1; ?
B_WAY=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDB_WAY1=1; SET SDB_WAY2=1; SET SDB_WAY4=1; SET SDB_WAY5=1;
SET WDB_WAY1=0; SET WDB_WAY2=0; SET WDB_WAY4=1; SET WDB_WAY5=0; ?
B_WAY=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDB_WAY1=1; SET SDB_WAY2=1; SET SDB_WAY4=1; SET SDB_WAY5=1;
SET WDB_WAY1=0; SET WDB_WAY2=0; SET WDB_WAY4=0; SET WDB_WAY5=1; ?
B_WAY=5;
ZSIMZ;
?================================================;
?   SIMULATION #20 - EATING FRESH FRUITS & VEG     ;
?================================================;
SET SIMNUM=20;
SET VARNUM=1; INIT;
SET SDB_FV1=1; SET SDB_FV2=1; SET SDB_FV4=1; SET SDB_FV5=1;
SET WDB_FV1=1; SET WDB_FV2=0; SET WDB_FV4=0; SET WDB_FV5=0; ? B_FV=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDB_FV1=1; SET SDB_FV2=1; SET SDB_FV4=1; SET SDB_FV5=1;
SET WDB_FV1=0; SET WDB_FV2=1; SET WDB_FV4=0; SET WDB_FV5=0; ? B_FV=2;
ZSIMZ;
```

```
SET VARNUM=3; INIT;
SET SDB_FV1=1; SET SDB_FV2=1; SET SDB_FV4=1; SET SDB_FV5=1;
SET WDB_FV1=-1; SET WDB_FV2=-1; SET WDB_FV4=-1; SET WDB_FV5=-1; ? B_FV=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDB_FV1=1; SET SDB_FV2=1; SET SDB_FV4=1; SET SDB_FV5=1;
SET WDB_FV1=0; SET WDB_FV2=0; SET WDB_FV4=1; SET WDB_FV5=0; ? B_FV=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDB_FV1=1; SET SDB_FV2=1; SET SDB_FV4=1; SET SDB_FV5=1;
SET WDB_FV1=0; SET WDB_FV2=0; SET WDB_FV4=0; SET WDB_FV5=1; ? B_FV=5;
ZSIMZ;
?================================================;
?   SIMULATION #21 - FEEL HEALTHIER THAN PEERS     ;
?================================================;
SET SIMNUM=21;
SET VARNUM=1; INIT;
SET SDB_HLT1=1; SET SDB_HLT2=1; SET SDB_HLT4=1; SET SDB_HLT5=1;
SET WDB_HLT1=1; SET WDB_HLT2=0; SET WDB_HLT4=0; SET WDB_HLT5=0; ?
B_HLT=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDB_HLT1=1; SET SDB_HLT2=1; SET SDB_HLT4=1; SET SDB_HLT5=1;
SET WDB_HLT1=0; SET WDB_HLT2=1; SET WDB_HLT4=0; SET WDB_HLT5=0; ?
B_HLT=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDB_HLT1=1; SET SDB_HLT2=1; SET SDB_HLT4=1; SET SDB_HLT5=1;
SET WDB_HLT1=-1; SET WDB_HLT2=-1; SET WDB_HLT4=-1; SET WDB_HLT5=-1; ?
B_HLT=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDB_HLT1=1; SET SDB_HLT2=1; SET SDB_HLT4=1; SET SDB_HLT5=1;
SET WDB_HLT1=0; SET WDB_HLT2=0; SET WDB_HLT4=1; SET WDB_HLT5=0; ?
B_HLT=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDB_HLT1=1; SET SDB_HLT2=1; SET SDB_HLT4=1; SET SDB_HLT5=1;
SET WDB_HLT1=0; SET WDB_HLT2=0; SET WDB_HLT4=0; SET WDB_HLT5=1; ?
```

```
B_HLT=5;
ZSIMZ;
?================================================;
?   SIMULATION #22 - EXERCISE                    ;
?================================================;
SET SIMNUM=22;
SET VARNUM=1; INIT;
SET SDB_EXE1=1; SET SDB_EXE2=1; SET SDB_EXE4=1; SET SDB_EXE5=1;
SET WDB_EXE1=1; SET WDB_EXE2=0; SET WDB_EXE4=0; SET WDB_EXE5=0; ?
B_EXE=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDB_EXE1=1; SET SDB_EXE2=1; SET SDB_EXE4=1; SET SDB_EXE5=1;
SET WDB_EXE1=0; SET WDB_EXE2=1; SET WDB_EXE4=0; SET WDB_EXE5=0; ?
B_EXE=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDB_EXE1=1; SET SDB_EXE2=1; SET SDB_EXE4=1; SET SDB_EXE5=1;
SET WDB_EXE1=-1; SET WDB_EXE2=-1; SET WDB_EXE4=-1; SET WDB_EXE5=-1; ?
B_EXE=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDB_EXE1=1; SET SDB_EXE2=1; SET SDB_EXE4=1; SET SDB_EXE5=1;
SET WDB_EXE1=0; SET WDB_EXE2=0; SET WDB_EXE4=1; SET WDB_EXE5=0; ?
B_EXE=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDB_EXE1=1; SET SDB_EXE2=1; SET SDB_EXE4=1; SET SDB_EXE5=1;
SET WDB_EXE1=0; SET WDB_EXE2=0; SET WDB_EXE4=0; SET WDB_EXE5=1; ?
B_EXE=5;
ZSIMZ;
?================================================;
?   SIMULATION #23 - EXPLORE NEW FOODS           ;
?================================================;
SET SIMNUM=23;
SET VARNUM=1; INIT;
SET SDB_NEW1=1; SET SDB_NEW2=1; SET SDB_NEW4=1; SET SDB_NEW5=1;
SET WDB_NEW1=1; SET WDB_NEW2=0; SET WDB_NEW4=0; SET WDB_NEW5=0; ?
B_NEW=1;
ZSIMZ;

SET VARNUM=2; INIT;
```

```
SET SDB_NEW1=1; SET SDB_NEW2=1; SET SDB_NEW4=1; SET SDB_NEW5=1;
SET WDB_NEW1=0; SET WDB_NEW2=1; SET WDB_NEW4=0; SET WDB_NEW5=0; ?
B_NEW=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDB_NEW1=1; SET SDB_NEW2=1; SET SDB_NEW4=1; SET SDB_NEW5=1;
SET WDB_NEW1=-1; SET WDB_NEW2=-1; SET WDB_NEW4=-1; SET WDB_NEW5=-1; ?
B_NEW=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDB_NEW1=1; SET SDB_NEW2=1; SET SDB_NEW4=1; SET SDB_NEW5=1;
SET WDB_NEW1=0; SET WDB_NEW2=0; SET WDB_NEW4=1; SET WDB_NEW5=0; ?
B_NEW=4;
ZSIMZ;

SET VARNUM=5; INIT;
SET SDB_NEW1=1; SET SDB_NEW2=1; SET SDB_NEW4=1; SET SDB_NEW5=1;
SET WDB_NEW1=0; SET WDB_NEW2=0; SET WDB_NEW4=0; SET WDB_NEW5=1; ?
B_NEW=5;
ZSIMZ;
?================================================;
?   SIMULATION #24 - HEALTH CONDITION            ;
?================================================;
SET SIMNUM=24.1; ? IF ANYONE IN HOUSEHOLD HAS BLOOD PRESSURE;
SET VARNUM=1; INIT;
SET SDHLT_BP=1;
SET WDHLT_BP=1; ? HLT_BP=1  NO ONE IN HOUSEHOLD HAS BLOOD PRESSURE;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDHLT_BP=1;
SET WDHLT_BP=-1; ? HLT_BP=0;
ZSIMZ;

SET SIMNUM=24.2; ? IF ANYONE IN HOUSEHOLD HAS DIABETES;
SET VARNUM=1; INIT;
SET SDHLT_DB=1;
SET WDHLT_DB=1; ? HLT_DB=1  NO ONE IN HOUSEHOLD HAS DIABETES;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDHLT_DB=1;
SET WDHLT_DB=-1; ? HLT_DB=0;
ZSIMZ;

SET SIMNUM=24.3; ? IF ANYONE IN HOUSEHOLD HAS CHOLESTEROL;
```

```
SET VARNUM=1; INIT;
SET SDHLT_CL=1;
SET WDHLT_CL=1; ? HLT_CL=1  NO ONE IN HOUSEHOLD HAS CHLOESTEROL;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDHLT_CL=1;
SET WDHLT_CL=-1; ? HLT_CL=0;
ZSIMZ;

SET SIMNUM=24.4; ? IF ANYONE IN HOUSEHOLD HAS FOOD ALLERGIES;
SET VARNUM=1; INIT;
SET SDHLT_AG=1;
SET WDHLT_AG=1; ? HLT_AG=1  NO ONE IN HOUSEHOLD HAS FOOD ALLERGIES;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDHLT_AG=1;
SET WDHLT_AG=-1; ? HLT_AG=0;
ZSIMZ;

SET SIMNUM=24.5; ? IF ANYONE IN HOUSEHOLD HAS OBESITY PROBLEMS;
SET VARNUM=1; INIT;
SET SDHLT_OB=1;
SET WDHLT_OB=1; ? HLT_OB=1  NO ONE IN HOUSEHOLD HAS OBESITY PROBLEMS;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDHLT_OB=1;
SET WDHLT_OB=-1; ? HLT_OB=0;
ZSIMZ;

SET SIMNUM=24.6; ? IF ANYONE IN HOUSEHOLD HAS MOBILITY PROBLEMS;
SET VARNUM=1; INIT;
SET SDHLT_MB=1;
SET WDHLT_MB=1; ? HLT_MB=1  NO ONE IN HOUSEHOLD HAS MOBILITY
PROBLEMS;
ZSIMZ;
SET VARNUM=2; INIT;
SET SDHLT_MB=1;
SET WDHLT_MB=-1; ? HLT_MB=0;
ZSIMZ;

SET SIMNUM=24.7; ? IF ANYONE IN HOUSEHOLD HAS SIGHT/HEARING PROBLEMS;
SET VARNUM=1; INIT;
SET SDHLT_HR=1;
SET WDHLT_HR=1; ? HLT_HR=1  NO ONE IN HOUSEHOLD HAS SIGHT/HEARING
PROBLEMS;
ZSIMZ;
```

```
SET VARNUM=2; INIT;
SET SDHLT_HR=1;
SET WDHLT_HR=-1; ? HLT_HR=0;
ZSIMZ;
?================================================;
?   SIMULATION #25 - MONTHS                      ;
?================================================;
SET SIMNUM=25;
SET VARNUM=1; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=-1; SET WDMTH3=-1; SET WDMTH4=-1; SET WDMTH5=-1;
SET WDMTH6=-1; SET WDMTH7=-1; SET WDMTH8=-1; SET WDMTH9=-1;
SET WDMTH10=-1; SET WDMTH11=-1; SET WDMTH12=-1;          ? MTH=1;
ZSIMZ;

SET VARNUM=2; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=1; SET WDMTH3=0; SET WDMTH4=0; SET WDMTH5=0;
SET WDMTH6=0; SET WDMTH7=0; SET WDMTH8=0; SET WDMTH9=0;
SET WDMTH10=0; SET WDMTH11=0; SET WDMTH12=0;          ? MTH=2;
ZSIMZ;

SET VARNUM=3; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=0; SET WDMTH3=1; SET WDMTH4=0; SET WDMTH5=0;
SET WDMTH6=0; SET WDMTH7=0; SET WDMTH8=0; SET WDMTH9=0;
SET WDMTH10=0; SET WDMTH11=0; SET WDMTH12=0;          ? MTH=3;
ZSIMZ;

SET VARNUM=4; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=0; SET WDMTH3=0; SET WDMTH4=4; SET WDMTH5=0;
SET WDMTH6=0; SET WDMTH7=0; SET WDMTH8=0; SET WDMTH9=0;
SET WDMTH10=0; SET WDMTH11=0; SET WDMTH12=0;          ? MTH=4;
```

```
ZSIMZ;

SET VARNUM=5; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=0; SET WDMTH3=0; SET WDMTH4=0; SET WDMTH5=1;
SET WDMTH6=0; SET WDMTH7=0; SET WDMTH8=0; SET WDMTH9=0;
SET WDMTH10=0; SET WDMTH11=0; SET WDMTH12=0;          ? MTH=5;
ZSIMZ;

SET VARNUM=6; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=0; SET WDMTH3=0; SET WDMTH4=0; SET WDMTH5=0;
SET WDMTH6=1; SET WDMTH7=0; SET WDMTH8=0; SET WDMTH9=0;
SET WDMTH10=0; SET WDMTH11=0; SET WDMTH12=0;          ? MTH=6;
ZSIMZ;

SET VARNUM=7; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=0; SET WDMTH3=0; SET WDMTH4=0; SET WDMTH5=0;
SET WDMTH6=0; SET WDMTH7=1; SET WDMTH8=0; SET WDMTH9=0;
SET WDMTH10=0; SET WDMTH11=0; SET WDMTH12=0;          ? MTH=7;
ZSIMZ;

SET VARNUM=8; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=0; SET WDMTH3=0; SET WDMTH4=0; SET WDMTH5=0;
SET WDMTH6=0; SET WDMTH7=0; SET WDMTH8=1; SET WDMTH9=0;
SET WDMTH10=0; SET WDMTH11=0; SET WDMTH12=0;          ? MTH=8;
ZSIMZ;

SET VARNUM=9; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;
```

```
SET WDMTH2=0; SET WDMTH3=0; SET WDMTH4=0; SET WDMTH5=0;
SET WDMTH6=0; SET WDMTH7=0; SET WDMTH8=0; SET WDMTH9=1;
SET WDMTH10=0; SET WDMTH11=0; SET WDMTH12=0;          ? MTH=9;
ZSIMZ;

SET VARNUM=10; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=0; SET WDMTH3=0; SET WDMTH4=0; SET WDMTH5=0;
SET WDMTH6=0; SET WDMTH7=0; SET WDMTH8=0; SET WDMTH9=0;
SET WDMTH10=1; SET WDMTH11=0; SET WDMTH12=0;          ? MTH=10;
ZSIMZ;

SET VARNUM=11; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=0; SET WDMTH3=0; SET WDMTH4=0; SET WDMTH5=0;
SET WDMTH6=0; SET WDMTH7=0; SET WDMTH8=0; SET WDMTH9=0;
SET WDMTH10=0; SET WDMTH11=1; SET WDMTH12=0;          ? MTH=11;
ZSIMZ;

SET VARNUM=12; INIT;
SET SDMTH2=1; SET SDMTH3=1; SET SDMTH4=1; SET SDMTH5=1;
SET SDMTH6=1; SET SDMTH7=1; SET SDMTH8=1; SET SDMTH9=1;
SET SDMTH10=1; SET SDMTH11=1; SET SDMTH12=1;

SET WDMTH2=0; SET WDMTH3=0; SET WDMTH4=0; SET WDMTH5=0;
SET WDMTH6=0; SET WDMTH7=0; SET WDMTH8=0; SET WDMTH9=0;
SET WDMTH10=0; SET WDMTH11=0; SET WDMTH12=1;          ? MTH=12;
ZSIMZ;

WRITE(FORMAT=EXCEL,FILE='D:\ZZORGANIC\Organics\HIST6.XLS') MSIM;
END;
```

LIST OF REFERENCES

Ajzen, I., 1991. The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50, 179-211.

Batte, M.T., Hooker, N.H., Haab, T.C., Beaverson, J., 2007. Putting their money where their mouths are: consumer willingness to pay for multi-ingredient, processed organic food producs. Food Policy 32, 145-159.

Briz, T., Ward, R.W., 2003. Competing supplies of olive oil in the German market: an application of multinomial logit models. Agribusiness 19 (3), 393-406.

Briz, T., Ward, R.W., 2009. Consumer awareness of organic products in Spain: an application of multinomial logit models. Food Policy 34, 295-304.

Darby, M.R., Karni, E., 1973. Free competition and the optimal amount of fraud. J. Law Econ. 16 (1), 67-88.

Dimitri, C., Richman, N., 2000. Organic food markets in transition. Henry A. Wallace Inst. For Altern. Agric. Public Policy, Rep. No. 14. Greenbelt, MD.

Dimitri, C., Richman, N., 2000. Organic foods: niche marketers venture into the mainstream. Economic Research Service, U.S. Department of Agriculture, Agricultural Outlook, June 2000-July 2000. Available: http://www.ers.usda.gov/publications/agoutlook/jun2000/ao272f.pdf

Dimitri, C., Greene, C., 2002. Recent growth patterns in the U.S. organic foods market. U.S. Department of Agriculture, Economic Research Service, Market and Trade Economics Division and Resource Economics Division. Agriculture Information Bulletin Number 777.

Dimitri, C., Oberholtzer, L., 2006. A brief retrospective on the U.S. organic sector: 1997 and 2003. Crop Management doi:10.1094/CM-2006-0921-07-PS.

Dimitri, C., Oberholtzer, L., 2009. Marketing U.S. organic foods: Recent trends from farms to consumers. U.S. Department of Agriculture, Economic Research Service, Economic information Bulletin Number 58.

Food Standard Agency, 2009. Organic review published. Available: http://www.food.gov.uk/news/newsarchive/2009/jul/organic

Hartman Group, 2006. Who's buying organic?: Demographics 2006. Available: http://www.hartman-group.com/hartbeat/who-buying-organic-demographics-2006

Hartman Group, 2008. Who's buying and what's next. Available: http://www.hartman-group.com/hartbeat/organics-today-who-buying-and-what-next

Huang, C.L., 1996. Consumer preferences and attitudes towards organically grown produce. Eur. Rev. Agr. Econ. 23, 331-342.

Kiesel, K., Villas-Boas, S.B., 2010. Got organic milk? Consumer valuations of milk labels after the implementation of the USDA organic seal. In the Berkeley Electronic Press, 2010.

Kremen, A., Greene, C., and Hanson, J., 2004. Organic produce, price premiums, and eco-labeling in U.S. farmers' markets. Economic Research Service, U.S. Department of Agriculture, Outlook Report No. (VGS-301-01). Available: http://www.ers.usda.gov/publications/VGS/Apr04/vgs30101/vgs30101.pdf

Long, J.S., 1997. Regression models for categorical and limited dependent variables. Advanced Quantitative Techniques in the Social Sciences 7.

Lohr, L., Semali, A., 2000. Retailer decision making in organic produce marketing. Page 201-208 in: Integrated view of fruit and vegetable quality. W.J. Florkowski, S.E. Prussia, and R.L. Shewfelt, eds. Technomic Pub.Co., Inc., Lancaster, PA.

Loureiro, M.L., Hine, S., 2002. A comparison of consumer willingness to pay for a local (Colorado-grown), organic, and GMO-free product. Journal of Agricultural & Applied Economics 34 (3), 477-487.

Loureiro, M.L., McCluskey, J.J., Mittelhammer, R.C., 2001. Assessing consumer preferences for organic, eco-labeled, and regular apples. J. Agr. Resour. Econ. 26 (2), 404-416.

Magnusson, M., Arvola, A., Hursti, U., Aberg, L., and Sjoden, P., 2001. Attitudes towards organic foods among Swedish consumers. British Food Journal, 103 (3), 209-226.

Mintel Oxygen, 2008. Organic food – US. Available: http://academic.mintel.com/sinatra/oxygen_academic/search_results/show&&type=RCItem&sort=relevant&access=accessible&archive=hide&source=non_snapshot&list=search_results/display/id=297944

McCluskey, J.J., 2000. A game theoretic approach to organic foods: an analysis of asymmetric information and policy. J. Agr. Resour. Econ. 29, 1-9.

Molyneaux, M., 2007. The changing face of organic consumers. Available: http://webprod.ift.org/NR/rdonlyres/B4EF47E8-48CF-4F1C-A20E-DE60A2052B3B/0/1107changingFaceOrganicConsumers.pdf

Nelson, P., 1970. Information and consumer behavior. J. Polit. Econ. 78 (2) 311-329.

Nelson, P., 1970. Advertising as information. J. Polit. Econ. 82 (4), 729-754.

Ness, M.R., Ness, M., Brennan, M., Oughton, E., Ritson, C., Ruto, E., 2010. Modelling consumer behavioral intensions towards food with implications for marketing quality low-input and organic food. Food Quality and Preference 21, 100-111.

Nutrition Business Journal. 2008. *Organic markets overview*. Volume XIII, No.3/4, March/April.

Organic Trade Association, 2009. The 2009 U.S. Families' Organic Attitudes & Beliefs Study. Available: http://www.ota.com/organic/www.ota.com/pics/documents/01b_FinalOTA-KiwiExecutiveSummary.pdf.

Organic Trade Association, 2009. The OTA's 2009 Organic Industry Survey. Available: http://www.ota.com/pics/documents/01a_OTAExecutiveSummary.pdf.

Smith, S., Paladino, A., 2009. Eating clean & green? Investigation consumer motivations towards the purpose of organic food. In: ANZMAC 2009. Available: http://www.duplication.net.au/ANZMAC09/papers/ANZMAC2009-256.pdf

Steve-Garmon, J., Huang, Chung L., Lin, Biing-Hwan, 2007. Organic demand: a profile of consumers in the fresh produce market. Choices 22 (2), 109-115.

Thompson, G.D., 1998. Consumer demand for organic foods: what we know and what we need to know. Am. J. Agr. Econ. 80 (5), 1113-1118.

Thompson, G.D., Kidwell, J., 1998. Explaining the choice of organic produce: cosmetic defects, prices, and consumer preferences. Am. J. Agr. Econ. 80, 277-287.

The Wall Street Journal. *Review and Outlook: Hard to Swallow*. 10.25.2002: Section W, Column 1, pg. 15.

USDA National Organic Program. 2005. National Organic Program: Information.

BIOGRAPHICAL SKETCH

Yang Zhou was born in Sichuan Province, P. R. China. After she received her Bachelor of Art degree in Public Finance from the School of Economics in Sichuan University in 2005, she enrolled at the University of Florida to pursue graduate study.

In May 2007, Yang Zhou was awarded the Master of Agribusiness degree from the Department of Food and Resource Economics at the University of Florida. She was then admitted into the Ph.D. program in the Food and Resource Economics Department specializing in marketing and econometrics. She received her Ph.D. from the University of Florida in the summer of 2010.