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Demographic and Socioeconomic Influences on the Importance of Food Safety in Food Shopping

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The perceived importance of food safety is instrumental in the success of consumer information programs to promote public health and to market safer foods. This paper examines how the belief of a household's main meal planner about the importance of food safety in food shopping is influenced by the person's or the household's demographic and socioeconomic characteristics. Results suggest food safety is more important to main meal planners who are female, older, more educated, non-working, have at-risk household members (elderly, young children, and pregnant women), or live in the Northeast and the South. Implications of the results on consumer education are discussed.

In recent years, more and more resources are allocated by both public and private sectors to food safety consumer information programs. The primary goal of providing the information is to facilitate or persuade behavior modifications. Consumer information programs may be classified into two categories according to their objectives. The first helps improve public health with information on health-enhancing food selection, handling, and consumption behaviors. Safe food handling labels on uncooked meat and poultry products, food preparation leaflets in grocery stores, and warning signs in restaurants about the risk of eating raw oysters are examples of these programs. According to Fishbein's theory of reasoned action, health behavior is ultimately a function of an individual's salient beliefs and evaluations of the behavior. Consequently, a consumer information program aimed at promoting safe consumption behaviors may be less effective when consumers do not consider safety as a salient attribute of food. Furthermore, consumer information literature suggests perceived personal involvement with a risk, i.e., the extent of a person's interest in the risk, may

influence the effectiveness of warning labels (Earle, Cvetkovich, and Slovic). Perceived importance is one measure of involvement.

The second category of consumer information programs aims at marketing food products based on their real or perceived advantages in improving health. By informing and reminding consumers of a product's safety profiles and how the product can make its users healthier, it is hoped that the information will motivate consumers to select the product. Firms use advertising, point-of-purchase display, certification, and so forth to promote products such as organic produce and irradiated strawberries. The success of this category of consumer information programs depends partly on that consumers consider food safety important enough to actively acquire and process the education materials which in turn can lead to desired attitude and behavior changes. According to the marketing literature, consumer decisions may operate on selection criteria (product attributes) considered important or relevant by the decision maker (Assael; Hawkins, Best, and Coney; Wright).¹ Thus, the second category of consumer information programs may be ineffective when food safety is not

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¹ Hawkins, Best, and Coney describe these rules as follows: (conjunctive rule) "I'll consider all brands that are 'alright' on the attributes I think are important," (disjunctive rule) "I'll consider all brands that perform really well on any attribute I consider to be important," (elimination-by-aspects rule) "I want to buy the brand that has an important attribute that other brands do not have," (lexicographic rule) "I want to get the brand that does best on the attribute of most importance to me," and (compensatory rule) "I'll buy the brand that has the highest combined value of the relevant attributes."

among the selection criteria considered important by consumers.

Past studies have reported or examined how important food safety is perceived by individuals and how the perception influences food-related behaviors (for example, FMI; Lin and Jensen; Schafer et al.; Schutz, Diaz-Knauf, and Zeidler). The findings from these studies generally indicate food safety is an important consideration in food purchase and consumption, though the degree of importance varies depending on the food product or behavior in question.

An individual's demographic and socioeconomic characteristics (e.g., culture, social class, reference groups, etc.) can influence how important he or she thinks the various food attributes are (Wierenga). Yet, as pointed out in Schutz, Judge, and Gentry, the literature about demographic influences on the importance of food attributes is sparse. To the author's knowledge, FMI, Jolly et al., and Schafer et al. are the only published studies that report or investigate the relationship between personal backgrounds and the importance perception of food safety. Except for the first study, they rely on surveys of local population (three counties in California and 11 Iowa communities, respectively). The FMI surveys use a national sample but report only a limited number of demographic and socioeconomic variables (gender, type of household, age, education, medically restricted diet, and physical disability).

Knowledge of the relationship between individual characteristics and perceived importance of food safety is useful for the design and implementation of food safety information programs for four reasons. First, some population subgroups are subject to higher risk of food-related illness. For example, children, pregnant women, and elderly are more vulnerable to foodborne illness (CAST). Infants and children are subject to higher risk than adults from pesticide residues in their diets (NRC). Since the perception of an individual, particularly a household's main meal planner, can affect the health of elderly, children and pregnant women in the household, it is important to identify individuals who may need a greater appreciation for food safety to protect themselves and their household members. Second, food safety knowledge, attitudes, and behaviors vary between population subgroups. From a public health point of view, targeted consumer education is more efficient than generic programs in improving the general health in the nation. As Finnegan et al. suggest, demographic and socioeconomic factors can be used to tailor health interventions to specific subgroups. Third, the demographics in the nation have been

changing over recent years (Senauer, Asp, and Kinsey). We have seen increases in number of people 65 years of age or older, regional population shifts to the West and the South, increases in number of certain ethnic groups, particularly Hispanics and Asians, and the growth in number of working women. Thus, knowledge about how different population segments view food safety becomes more important in public health promotion and food marketing. Fourth, demographics can be used to tailor food marketing programs to various population subgroups. The advantages of demographic segmentation are (1) individual wants and preferences are often highly associated with demographic variables and (2) demographics are easier to identify and to measure empirically (Kotler).

The purpose of this study is to examine how the belief of a household's main meal planner about the importance of food safety in food shopping is influenced by the person's or the household's demographic and socioeconomic characteristics. The study does not examine how the importance perception affects behavior, due to lack of appropriate behavior information in the data. The study analyzes data collected from a sample of 3,824 main meal planners in the nation. A main meal planner can be considered as a household's gatekeeper who selects and determines the content, preparation, and consumption of foods which in turn affect her household members' health. Therefore, main meal planners are often the target of consumer information programs. More knowledge of their beliefs and how beliefs differ should help the design and implementation of more effective programs.

Empirical Model

Before introducing the empirical model, readers are reminded that this study does not examine economic behavior (consumption) nor the relationship between the importance perception of food safety and consumption. Nevertheless, conceptually, how important food safety is can influence food selection and consumption. One possible approach to link the importance perception with consumption behavior may be Lancaster's linear characteristics model. In this model, food safety can be considered one of the food's characteristics from which consumers derive utility. The amount of food safety obtained from all food sources is the sum of each food's level of safety times the corresponding quantity of consumption. In Lancaster's notation, $z_j = \sum_i b_{ji} q_i$ where z_j denotes the amount of the j th characteristic z (food safety), b_{ji} , an objectively determined unit of z_j (e.g., safety

rating) in food i , and q_i quantity of food i consumed.

If b_{ji} is observable (e.g., from a product's safety grade), then consumers who consider food safety important may be more likely to seek information about b_{ji} and select the most satisfactory combination of foods to achieve a desired level of food safety. Here, the importance perception may influence food consumption indirectly through search of the characteristic. When b_{ji} is not observable but exists in consumers' perception (perceived food safety), the importance perception may have both indirect (through variations of perceived safety) and direct impact on consumption since some foods may be believed to be safer than others. The development of such a model, however, is beyond the scope of this study.

There are no theoretical or empirical guidelines that can be found in the literature regarding which and how demographic and socioeconomic factors should be considered in explaining a main meal planner's perception of the importance of food safety in food shopping. The limited literature together with findings about demographic variations in consumers' perception of food-related risks, nevertheless, provide helpful clues to the factors which may be relevant.

The empirical model posits that the importance of food safety to a household's main meal planner's food shopping is influenced by the following factors: gender, age, age-squared, education, education-squared, presence of elderly household members, presence of young children, presence of pregnant women in the household, race, employment status, household income, income-squared, geographic location of residence, and residential setting.

It has been suggested that females are more concerned about human health because they give birth and are socialized to nurture and maintain life (Steger and Witte). FMI's surveys show that food safety is consistently believed to be more important by female shoppers than by male shoppers. Male consumers had more confidence that purchased food was free of chemicals (Schulz, Roberts, and Marquardt), and were less concerned about use of pesticides (Ott and Maligaya).

Generally speaking, younger (under 40 years of age) shoppers do not think food safety as important as older shoppers (FMI). Supermarket shoppers who were older than 50 years of age expressed more concern about use of pesticides (Ott and Maligaya). Schafer *et al.* reported older respondents in their sample, though not more concerned than others about food safety in general, were more concerned about hormone residues in meat and

milk as well as antibiotic residues in meat. On the other hand, Misra and Huang showed that the rise in perceived risk of chemical residues in fresh produce decreased when a consumer reached 63 years of age, i.e., the relationship between age and the perceived risk of chemical residues was increasing at a decreasing rate.

The more education a person attained the more concerned he was about use of pesticides (Ott and Maligaya), about chemical residues in fresh produce (Misra and Huang), or the less safe he perceived oysters were (Lin, Milon, and Babb). In contrast, shoppers with more than high school education appear to not put as much emphasis on food safety as others. Additionally, the more educated were found to be less concerned about hormone residues in meat, in milk, and antibiotic residues in meat, though not less concerned about food safety in general (Schafer *et al.*).

Food safety is more important to shoppers with children in the household (FMI). Misra and Huang reported that consumers in a household with senior citizens perceived chemical residues in fresh produce to be more risky. Research suggests children, elderly, and pregnant women, among others, are more vulnerable to food-related safety problems such as pesticide residues or foodborne pathogens (NRC; CAST). Therefore, food safety may be more important when the household has one or more elderly individuals (older than 64 years of age), children under 6 years old, or pregnant women.

Race may be another individual characteristic associated with variations in risk perception. Flynn, Slovic, Mertz found that nonwhites were particularly more concerned about bacteria and pesticides in food than were white consumers. The study by Misra and Huang showed consumers of European origin perceived the pesticide risk to be higher than consumers of other races (Afro-American, Hispanic, and others). Douglas proposes that full-time homemakers may be more concerned about food safety because of the perception they have of their roles in the home and the increased opportunities they have to obtain and analyze information on food products. Therefore, non-working main meal planners may think food safety is more important than others who work. Regarding income, it has been found that lower income consumers perceived more risk of chemical residues in fresh produce (Misra and Huang). Jussaume and Hudson, however, reason that concern about food safety may not differ between household's income levels because food consumption is such a basic human activity. Finally, the geographic location of residence and residential

setting may have influence on how important a main meal planner feels food safety is in food shopping.

Data and Econometric Model

The data set is the 1990 and 1991 Diet and Health Knowledge Survey (DHKS) conducted for the Agricultural Research Service (ARS) (formerly Human and Nutrition Information Service) of U.S. Department of Agriculture (USDA).² The primary purpose of the DHKS was to relate nutrition attitude and knowledge with food choices and nutrient intakes. The stratified and clustered sample is nationally representative at the household level.

This study uses both components of the sample—the all-income component and the low-income component (for households with gross income for the previous month at or below 130 percent of the Federal poverty thresholds). Both components were selected from the same sample frame; the probabilities of selection, however, were different to oversample the low-income population. This feature of the survey design and other adjustments made to the sample led the ARS to recommend the use of sample weights whenever the all-income and the low-income components are combined for analysis (ARS), as in the present study.

A total of 3,824 households (1,899 households in 1990 and 1,925 households in 1991) were interviewed by telephone or in person if a household had no telephone or an unlisted telephone number. Ninety-seven percent of the respondents were the household's main meal planner or preparer, the designated respondent.

In the survey, respondents were asked:

“Now let's talk a little bit about grocery shopping. I'm going to read some things that may be important when a person shops for food. On a scale from 1 to 6, where '1' is 'not at all important' and '6' is 'very important,' tell me how important each thing is to *you* when you shop for food.”

Six food attributes were read, starting with a randomly chosen attribute for each interview: product

safety, nutrition, price, how well food keeps, how easy the food is to prepare, and taste.³

Only 94 observations were excluded for analysis due to incomplete data. Table 1 contains the SAS-generated descriptive statistics of the weighted data for all variables used in this study.⁴ Two thirds of the respondents gave a rating of 6 (the highest possible score) to the importance of food safety; the top two ratings (5 and 6) account for 85 percent of the sample. It appears then that the overwhelming majority of respondents thought food safety was “very important” to them in food shopping.⁵ This pattern of responses is consistent with the FMI's national surveys of supermarket shoppers. On the other hand, the clustering of responses exhibits a relatively high degree of skewness, a common problem in surveys asking for intensity of subjects' concern or perceived importance of food safety topics (e.g., FMI, Ott and Maligaya.). The skewed distribution may be a result of social desirability bias (Fisher) or question wording bias (Sterngold, Warland, and Herrmann) or both.⁶ Consequently, the true belief and its variations may be imperfectly measured in the elicited ratings.

Three quarters of the respondents were female. Four in five respondents were white. Seven percent of the respondents claimed to be of Hispanic origin. The typical respondent was 47 years of age, had attended 13 years of regular school, came from a household with \$35,000 annual income. The sample covered all four census geographic regions and various types of community.

The importance perception was measured on a

³ As a reviewer commented, food safety and other food attributes, particularly nutrition, are not independent in their influences (over food consumption behaviors). Nevertheless, given the objective of this study and the nature of the data, food safety is considered separate from other food attributes. On the one hand, consumption behavior is not being investigated. On the other hand, the survey question was not posed in such a way that asked the respondents to rank the importance of these attributes.

⁴ Since the data came from a household sample, most sample statistics cannot be compared to the population individual statistics reported in the *Statistical Abstract of the United States*. Nevertheless, after weighting, the distributions of household income, census region, and household size match almost exactly with the census data (U.S. Bureau of the Census), as expected.

⁵ Taste, however, is still the most important attribute as numerous consumer surveys have indicated.

⁶ Social desirability bias occurs when there exist systematic errors in self-report measures because survey respondents desire to avoid embarrassment and project a favorable image to others. Question wording bias refers to the problem that when individuals are asked to indicate a particular attitude, without first being asked whether the attitude exists, many of them may sense the question presupposes that they have the attitude or they should hold certain kind of attitude (e.g., they should be concerned about the object). Consequently, some respondents may accommodate this expectation by overstating their actual attitude.

² The 1989 DHKS provided information similar to that obtained in the 1990 and 1991 surveys. The 1989 data are not used because (1) many questions on food safety were revised after 1989, and (2) likelihood ratio tests about cross-year data aggregation for econometric estimation indicate the 1989 data should not be combined with the other two years' data.

Table 1. Descriptive Statistics of the Weighted Sample; n = 3,730

Variable	Frequency ¹	Percentage	Mean	Std. Dev.
Importance of Product Safety ²			5.36	7.87
1 = Not important at all	72	1.9		
2	67	1.8		
3	183	4.9		
4	257	6.9		
5	688	18.4		
6 = Very important	2,463	66.0		
Female	2,903	77.8	—	—
Age (Years)	—	—	46.7	121.8
Schooling (highest year of regular school attended)	—	—	12.7	19.9
Over 64 (One or more household members are older than 64 years old, excluding main meal planner)	382	10.2	—	—
Under 6 (Presence of children under 6 years old)	725	19.4	—	—
Pregnant (Presence of pregnant women)	83	2.2	—	—
Black	421	11.3	—	—
Other races (Asian and Pacific, Eskimo and Indian, etc.)	171	4.6	—	—
White	3,138	84.1	—	—
Hispanic-origin	239	6.4	—	—
Employed (during the previous week)	2,090	56.0	—	—
Annual Household Income (\$10,000)	—	—	3.5	19.7
Northeast	767	20.6	—	—
South	1,297	34.8	—	—
West	742	19.9	—	—
Midwest	924	24.8	—	—
City	1,174	31.5	—	—
Nonmetropolitan area	831	22.3	—	—
Suburban	1,725	46.2	—	—

¹Adjusted to equal the raw sample size.²The median rating is 6.

rating scale that is discrete and ordinal (1, 2, . . . , 6), and may be considered an imperfect measure of an object of a continuous nature (perception). Hence, this study uses the ordered probit model (McKelvey and Zavoina) to investigate the influences of demographic and socioeconomic characteristics on perceived importance of food safety in food shopping. Briefly, the unobserved perception (y_i^*) held by individual i is influenced by a vector of independent variables (X_i) such that

$$(1) \quad y_i^* = B'X_i + \epsilon_i$$

where B is the vector of unknown parameters and ϵ_i the independently and identically normally distributed error term. Assume Z is a set of zero-one indicator variables with J responses categories R_1, R_2, \dots, R_J and M a vector of real numbers $\mu_0 \leq \mu_1 \leq \dots \leq \mu_J$ with $\mu_0 = -\infty$ and $\mu_J = +\infty$. Then the relationship between the indicator Z_i and the unobserved y_i^* can be written as

$$(2) \quad Z_i \in R_j \Leftrightarrow \mu_{j-1} < y_i^* \leq \mu_j$$

where $1 \leq i \leq N$ (the sample size). With μ_1 normalized to zero for identification purpose, the probability of $Z_{ij} = 1$ becomes

$$(3) \quad \text{Probability } (Z_{ij} = 1) = \Phi_i(\mu_j - B'X_i) - \Phi_i(\mu_{j-1} - B'X_i)$$

where $\Phi(\cdot)$ is the standardized cumulative distribution function. The log-likelihood function L is

$$(4) \quad L(Z|B, M) = \sum_{i=1}^N \sum_{j=1}^J Z_{ij} \log(\Phi_i(\mu_j - B'X_i) - \Phi_i(\mu_{j-1} - B'X_i))$$

The parameters to be estimated are μ_2, \dots, μ_{J-1} and B . In the present case, $J = 6$ (the number of response categories).

This study uses the LIMDEP software package (Greene 1991) to apply the ordered probit model on the weighted data. When a sample is complex and the probabilities of selection are different between subjects, unweighted regression produces biased results (Jolliffe; Lee, Forthofer, Lorimer). Weights are used in many studies that investigate similarly designed surveys such as the National Health and Nutrition Examination Survey (for example, Korn and Graubard; Sandler, Jordan, and Shelton). This paper reports weighted results.

Empirical Findings

A total of 3,730 observations, all with complete information on the variables included in the empirical model, were analyzed. Results of the ordered probit model appear in Table 2. All statistically significant coefficients, based on a two-tailed test at the $\alpha = 0.01$ level, are marked.

In analyzing the results of an ordered probit model, three things should be kept in mind. First, the marginal effects of independent variables on the probabilities are computed from estimated coefficients (Greene 1990). Second, the directions of marginal effects do not necessarily conform to that of estimated coefficients except that on probabilities of $Z \in R_1$ and $Z \in R_j$ (Greene 1990). Third, the directions of marginal effects in the model have the same meaning as that in a continuous-variable model; a positive effect means the dependent vari-

able varies in the same direction as a change in an independent variable. Yet, the magnitudes of marginal effects in a probability context may be harder to interpret than the magnitudes of coefficients in a continuous-variable context (e.g., amount of expenditures). In the former case, the observed probabilities are either one (an event occurs) or zero (the event does not occur), without any intermediate values. Thus, marginal effects imply the affected probabilities may lie outside the $[0,1]$ interval.

The model predicted 66.38% of the observed ratings correctly. Yet, all but 1 of the correct predictions are in observations with the highest rating (6). This phenomenon reflects the impact of a skewed distribution of the observed ratings (see Table 1). The clustering of responses on a single point may hinder the model's ability to discern more clearly the effects of independent variables as

Table 2. Weighted Demographic and Socioeconomic Influences on Perceived Importance of Product Safety in Food Shopping

Variable	Coefficient	z-ratio	Marginal Effect on "Very Important" ¹
Female (1 = yes; 0 = otherwise)	0.380*	11.667	0.143
Age (years)	0.049*	9.396	0.018
Age-squared	-0.001*	-8.375	-0.001
Schooling (years)	0.161*	5.059	0.058
Schooling-squared	-0.008*	-6.316	-0.003
Over 64 (1 = yes; 0 = otherwise)	0.233*	4.091	0.081
Under 6 (1 = yes; 0 = otherwise)	0.150*	3.961	0.053
Pregnant (1 = yes; 0 = otherwise)	0.354*	3.206	0.117
Black ² (1 = yes; 0 = otherwise)	0.074	1.778	—
Other races ² (1 = yes; 0 = otherwise)	-0.089	-1.300	—
Hispanic (1 = yes; 0 = otherwise)	-0.085	-1.503	—
Employed (1 = yes; 0 = otherwise)	-0.173*	-5.054	-0.062
Income (\$10,000)	0.020	1.773	—
Income-squared	-0.001	-0.760	—
Northeast ³ (1 = yes; 0 = otherwise)	0.227*	5.353	0.080
South ³ (1 = yes; 0 = otherwise)	0.091*	2.663	0.033
West ³ (1 = yes; 0 = otherwise)	0.019	0.462	—
City ⁴ (1 = yes; 0 = otherwise)	-0.027	-0.839	—
Nonmetropolitan ⁴ (1 = yes; 0 = otherwise)	-0.064	-1.683	—
Constant	-0.108	-0.458	—
μ_1	0.293	11.971	—
μ_2	0.735	23.775	—
μ_3	1.102	33.396	—
μ_4	1.736	50.726	—
Sample size	3,730		
Value of log-likelihood function	-3,385.017		
McFadden's R-square	0.040		
Correct Prediction (%)	66.380		
Chi-squared (df = 19)	315.107		

*Significant at the $\alpha = 0.01$ level.

¹The marginal effects are shown for statistically significant variables only. Marginal effects on response categories other than "very important" are not shown. The estimates indicate, for all these categories, the directions of influence are uniformly opposite to the influence on "very important."

²Omitted category for this group of dummy variables is main meal planners who were white.

³Omitted category for this group of dummy variables is main meal planners who lived in the Midwest.

⁴Omitted category for this group of dummy variables is main meal planners who lived in suburban areas.

their variations are not always observed in the ratings.

More importantly, the skewness suggests interpretation of the regression results must be considered in the context of the prevailing response pattern. Even for independent variables that are statistically significant, the observed response differences between subgroups of respondents may be relatively small. For example, one subgroup may be found to have a statistically significantly higher probability than another of giving a rating of 6; the subgroups' mean ratings, however, may be apart only by a small distance (say, 5.4 for the former and 5.2 for the latter). Therefore, the second subgroup should not be characterized as considering food safety unimportant but less important than the first.

The influences of a main meal planner's gender and age on perceived importance of food safety are generally consistent with what FMI surveys found. Gender had a statistically significant impact on the importance perception; females were more likely to believe food safety was very important in food shopping than were males, holding other things constant. The older a main meal planner was, the more likely was food safety very important to her. Nevertheless, similar to Misra and Huang, the effect of the age-squared variable on perceived importance is negative, implying the perceived importance does not rise monotonically with age. Due to the skewness of the rating responses, it is not possible to use medians or modes to delineate at what age the decrease of increasing probabilities takes place. Based on the mean ratings, however, the data indicate the highest ratings were given by the 50–64 subgroup (mean = 5.61), next by the 40–49 subgroup (mean = 5.47), and followed by the 65 + subgroup (mean = 5.40).⁷

The negative sign of the age-squared variable appears to suggest that food safety can become a less important consideration after main meal planners reach 65 years of age. As discussed above, the result should not be interpreted to mean that these individuals do not care about food safety. The decline in perceived importance can occur if some of them feel they already know enough to control their exposure to food safety problems. Therefore the safety consideration becomes not as important as when they were younger.

There is a positive but decreasing influence of the length of regular schooling. The positive impact may reflect that more educated main meal

planners are more exposed to news or reports of food safety or more capable of recognizing the relationship between food safety and health or both. Those main meal planners with the most education, however, appear to consider food safety less seriously as others with fewer number of years in education. The data reveal that the importance ratings are highest for main meal planners who attended 12 to 15 years of regular school (mean = 5.46), followed by those who went to school for less than 12 years (mean = 5.33), and those with 16 or more years of education (mean = 5.13). As suggested by Schafer et al., the curvilinear relationship can occur when the most educated main meal planners (1) believe they know a lot about how to control the safety of the food they eat or (2) are more capable of analyzing media reports of food safety problems and distinguishing validity from sensationalism. Furthermore, highly educated individuals may be more inclined to participate in risky behaviors (e.g., eating rare hamburgers or raw oysters) despite the fact that they are aware of the risks.

As expected, food safety was significantly more important to main meal planners when one or more of their household members belonged to the at-risk subgroups—elderly (older than 64 years of age), children under 6 years of age, or pregnant women—in terms of food-related health risks. This finding suggests the gatekeeper of a household's food intake thinks of hers and her fellow household members' health. The finding may also suggest that consumer food safety education programs have helped main meal planners recognize the importance of food safety for at-risk individuals.

No indication of perception difference was found between main meal planners who were white and who were non-white. Neither the Hispanic-origin of a main meal planner had discernible influence on the perception. It is observed that the main meal planners who reported they were employed full-time or part-time in the previous week were less likely to believe food safety was very important than others who said they did not work. This result appears to conform with Douglas's notion that full-time homemakers are more concerned about food safety. Nevertheless, readers should bear in mind that the variable (employment in a one week period) may not necessarily reflect a respondent's actual employment status. Furthermore, the responses are very similar between those who were employed (mean = 5.26) and those who were not (mean = 5.49).

It is also found that main meal planners in the Northeast and the South had a significantly stron-

⁷ The mean rating for both the 18–24 and the 25–39 subgroups is 5.19.

ger belief about the importance of food safety than others in the Midwest, who shared similar perception with main meal planners in the West. There appear to be no significant differences between how main meal planners in city, nonmetropolitan, and suburban areas thought about the importance of food safety.

Conclusions and Implications

Various population subgroups face different degrees of food-related health risk. Their food safety knowledge, attitudes, and behaviors are different. Furthermore, the demographics in the nation have been changing over recent years. It is important to obtain more information on the relationship between individual characteristics and the perceived importance of food safety. The information can help the design and implementation of more effective consumer information programs to protect the health of a diversified population and to promote safer foods to a diversified market.

This study examines how the belief of a household's main meal planner about the importance of food safety in food shopping is influenced by the person's or her household's demographic and socioeconomic characteristics. Unlike the few existing studies, the analysis uses a nationally representative sample of households' main meal planners and investigates a variety of demographic and socioeconomic factors. Very high degree of importance of food safety in food shopping was expressed by an overwhelming majority of the respondents. Results of the study suggest female, older, more educated, and non-working main meal planners generally were more likely to believe that food safety is very important. It appears that more respondents who were in the 50–64 age subgroup or who attended 12–15 years of regular school thought food safety was very important than others. Food safety was more important to main meal planners whose household members included elderly (older than 64 years of age), children under 6 years of age, or pregnant women. Northeasterners and Southerners attached more importance to food safety than Midwesterners.

With respect to food safety consumer information programs, several practical implications from the analysis are worth mentioning. First, food safety messages may receive less attention from male and working main meal planners. Since males are playing an increasingly important role in food preparation and the number of working females has increased, more public health education efforts should be targeted toward these individuals.

Second, the most educated and younger main meal planners may subject themselves to unnecessary risks from foods because food safety is viewed less important by them than by other meal planners. Their perception may be related to a belief that they are immune from the risks. Thus, it may be more difficult for consumer education to achieve behavior modification with the most educated and younger main meal planners. Third, foods with better perceived or real safety profiles may be valued more by female, older, and better educated main meal planners as well as those whose households include at-risk individuals and those who live in the Northeast and the South. Therefore, food safety can be emphasized in marketing messages and media targeted at these population segments. On the other hand, it may also be necessary to intensify communication efforts to reach other segments so the potential market for safer foods will expand. Fifth, there appears to be a satisfactory level of awareness that some individuals are more vulnerable to food-related health risks and the safety of the food they consume is very important. Consumer food safety education should continue reminding the public about the special risks faced by the elderly, children, pregnant women, and other at-risk subgroups.

Admittedly, this study is subject to data availability. It is well recognized that lifestyles have strong influences on individual perception. As lifestyles become increasingly diverse among individuals, consumer educators need to be aware of how different lifestyles affect perceived importance of food safety. This analysis did not include lifestyle variables because they were not available in the DHKS. Future research should address all of demographic, socioeconomic, and lifestyle variations. In addition, this study did not explore how the importance perception influenced main meal planners' choices of food products. This was primarily due to the lack of well-defined safety-related behavior measurements in the DHKS. Since behavior modifications is the ultimate goal of providing food safety information to consumers, appropriate data that link perceptions and behaviors should be collected and used for this purpose.

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