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Understanding Consumers' Attitude Toward Meat Labels and Meat Consumption Pattern

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Understanding Consumers' Attitude Toward Meat Labels and Meat Consumption Pattern.

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This paper addressed consumers' attitude toward meat labels and the influence of different aspects of meat labels on beef, poultry and seafood consumption using a national survey data. Nutrition and ingredient information on meat labels were positively related with attitude toward meat labels as well as meat consumption frequency.

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Introduction

Nutrition perceptions about foods drive the choices made by many consumers. Meat labels can provide consumers with nutritional information, and provide thawing, cooking and storage guidelines, and suggest menu ideas. The Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA) require the food label to offer complete, useful and accurate nutritional information; easy-to-read formats; amount per serving of saturated fat, cholesterol, dietary fiber, and other nutrients of major health concern; and nutrient reference values, expressed as percentage of daily requirements. Although past studies have generally suggested that food labels have impact on consumers' food selection, there is a little information regarding the influence of each aspect of food labels such as the degree of information provided, and the information regarding nutrition, ingredients and production processes.

Recent passage of the Nutrition Labeling and Education Act of 1990 (NLEA) have standardized the format used to present nutritional composition of all food products, as well as safe handling recommendations on meat and meat products. The new rules requiring nutritional information of raw meat and poultry products may encourage consumers to make healthier food choices (Crutchfield et al., 2001). The information regarding the relationship between meat labels and meat consumption pattern is scant. Such information is important in light of the change in the meat consumption habit among American consumers. Americans are consuming less red meat such as beef and are consuming more poultry meat. The per capita consumption of red meat in 1999 was 117.7 lbs, a 11 percent drop since 1970 (ERS, 2001; USAD-NASS, 2001). Poultry consumption, however, was 68.3 per person, a 102 percent increase since 1970. In general, trends in consumption of animal products during the past 30 years involve more use of poultry meats, fish, lowfat milk, yogurt, and cheese and less use of red meat, whole milk, eggs, butter, and lard. Although the loss in red meat consumption has been compensated by gain in

poultry consumption to a certain degree, the overall meat consumption has been in decline. Prices, income, and taste and preferences are the key variables affecting meat consumption level (Putnam and Gerrior, 1997.) Apart from relative prices and income, many other factors played a key role in changing the demand for red meat. According to a Economic Research Service (ERS) report (Putnam and Allshouse, 2001.) consumer concern about cholesterol and saturated fat, inconsistent quality, and lack of convenience in preparation are behind the negative trend in beef demand. Consumers' selection of different types of meat may have been affected by the information in the labels. This paper addresses consumer attitude toward meat labeling and the influence of different aspects of meat labels on beef, poultry and seafood consumption. First, it evaluates whether consumers' perceive that food labels help them select food and factors associated with such perception. Secondly, it evaluates the relationship between meat consumption and socio-demographic factors along with consumers' preference for five attributes of meat labels, namely degree of information on food labels in general, and importance of information regarding nutrition, ingredients used, health claims, and production process. Improved knowledge of the relationship between consumers' food selection and socio-demographic factors and consumers' preference of a specific type of information on food labels is useful in the design and implementation of nutritional education programs. The findings of this study could be used as a guide in designing government nutrition information programs toward specific population subgroups. It might also help policy makers to revise regulations pertaining to a particular aspect of food labels. In addition, meat product marketers can tailor their products with nutrition, ingredient, and health claims toward those more likely to base their consumption decisions based on information on meat labels.

Conceptual and Empirical Frameworks

Attitude toward meat labels

A modified multi-attribute model first proposed by Fishbein (1963) was used as a basis of examining the relationship between consumers' preferences for meat label attributes and their attitude

toward meat labels. The following is the modified equation representing the stochastic multiattribute model using five attributes of meat labels:

(1) $$A_0 = \sum_{i=1}^{n} b_i X_{it} + e_t \qquad i = 1,\ldots,5; \quad t = 1,\ldots,T$$

The evaluations of attributes (β_i) and the preference about the attributes (X_i) are obtained from survey responses, and used for the calculation of the overall attitude toward a product. The X_i component, representing how strongly a consumer believes that the product possesses a particular attribute is measured using a response to "Yes" to "No." Ideally, the information on the evaluation of the attributes is also collected using a similar type of binary or scale variable. However, studies have found that respondents often have difficulties in distinguishing between the existence of the attribute and the evaluation of the attribute for low-involvement products like food (Wadel and Steenkamp, 1991; Steenkamp, 1997). The situation can be handled by treating (1) as a stochastic regression equation, and statistically measuring the evaluation of attributes (β_i). In equation (1), ε_t is the independently and identically normally distributed error term. The survey data used in this study provide information on consumers' attitudes toward meat labels and their statements for five types of attributes of labels, namely amount of information contained on meat labels, importance of nutrition information on meat labels, importance for meat labels to contain ingredient information, importance for meat labels to contain health claims, and importance for meat labels to contain information regarding production process. Respondents expressed the preference for the five attributes using a "yes" or "no" response.

A probit model is selected as the appropriate empirical model given that the attitude variable is measured as a binary variable. Respondents either agreed or disagreed that labels help in purchasing meat products. The empirical model is defined as

(2) $$Y^*_t = \beta' X_t + \epsilon_t$$

where Y^*_t is an unobserved attitude towards meat labels; X_t is a vector of five perceived preferences regarding attributes of meat labels and socio-demographic variables which is hypothesized to affect the

overall attitude toward meat labels; β is the vector of unknown parameters and ϵ_t is the independently and identically normally distributed error term. The role of socio-demographic variables in the formation of attitude towards products has been addressed in previous research (Steenkamp, 1997; Alvenslaben, 1997). While Y^*_t is unobserved, respondents actually report the attitude by agreeing or disagreeing (Y_t) that meat labels help in purchasing meat products.

Meat Consumption and Meat labels

The relationship between nutritional awareness and the demand for a product depends on consumers' knowledge of nutrition vis-à-vis the attributes of the product (Swartz and Strand, 1981). For example, if a consumer is concerned about excess fat content in diets and one of the product attributes is that the product is a rich source of fat, then the awareness is expected to shift the demand for the commodity downwards. Previous studies have shown that consumer interest in information in food labels including nutrition and ingredients have made impacts on their food selection decisions (Larsson and Lissner, 1999; L.Shine et al., 1997; Wandel M., 1997). If health and nutritional considerations are important in making food selection, meat consumers tend to consume more or less of meat products depending on how the attributes of products as stated in the labels are associated with the nutritional considerations. The conceptual model is as follows:

$$q_i = \zeta(p_i, Y, X_2, N, \varepsilon_i) \tag{3}$$

where q_i is the quantity of meat consumed, p_i is the price of meat i, Y is the income, X_1 and X_2 are the socioeconomic variables related to the consumer, N is the nutritional and other product related attributes as stated in the meat labels, and ε_i is the disturbance term.

The frequency of meat consumption is reported as integer values. It is, therefore, appropriate to analyze the consumption behavior using empirical models based on count data such as the Poisson model (Cameron and Trivedi, 1997; Greene, 1997). The log likelihood function for the single-decision Poisson regression model of lunch meat purchase can be written as:

(4) $$L(b \mid y, X) = \prod_{i=1}^{N} \frac{\exp(-m_i) m_i^{y_i}}{y_i!}$$

where $\mu = X\beta$, with X representing the vector of explanatory variables including socio-demographic and nutritional and other product related attributes, y_i=meat consumption frequency.

Selection of variables and their research hypotheses are determined based on empirical studies relating to other types of food. Socioeconomic variables influence various stages of consumers' decision making. Food selection varies across socioeconomic characteristics. Putler and Frazao (1994) reported a positive relationship between an individual's awareness of the link between dietary fat and chronic disease and household income. They also postulated a variation in food consumption pattern based on race, urbanization, and regions. Householders with different socio-demographic characteristics are likely to have different levels of consideration of dietary components when making food selections. Grossman and Kaestner (1997) reported a positive relationship between education and health. A person with more education is better able to maintain a healthy life through appropriate food selection and lifestyles than a person with less education. Better education enhances the access to nutrition information, thus increasing the likelihood of nutritional considerations while making food selections. Nayga (1997) also found a significant positive relationship between education and a main meal planner's perceived importance of nutrition in food shopping, thus selection of food. Among the other characteristics of the householders, a female householder (Nayga, 1997; Putler and Frazao, 1994) is more likely to consider nutrition while making food selections; an older household meal planner is more likely to consider nutrition while shopping for food than a younger household meal planner (Frazao and Cleveland, 1994; Ott and Maligaya, 1989). Race may be another individual characteristic associated with the variation in nutrition consideration and food selection. Nayga (1997) reported that black meal planners perceived nutrition as more important than did white meal planners.

The empirical models in this study posit that consumers' attitude toward meat labels and their meat consumption pattern are influenced by the following factors: household income, presence of young

children in the family, race, education, age, gender, general health status of respondents, respondents' perception of the adequacy and enforcement of existing food safety regulation and five attributes of meat labels. Empirical models representing consumption behavior for beef, poultry, and seafood are estimated separately.

Data and Method

A national telephone survey of 750 households was conducted in December 1999 and January 2000. Primary shoppers in the households were asked questions in five broad sections including demographics, meat safety attitudes and perceptions, and attitudes toward meat labels. The average completion time of the interview was 15 minutes. The survey questions were developed after careful review and analysis of the available literature and interaction with food, safety, and survey design professionals. Table 1 reports the explanation and descriptive statistics of variables used in the empirical models. While only about 40 percent of the households had children in the family, the average number was two. More than 70% of the respondents were female. Four in five respondents were white. The average respondent was 47 years old, had attended some college, and had a gross annual household income of slightly less than $40,000.

Results and Discussion

Approximately 70 percent of the respondents thought that labels helped in meat purchases (Table 1). While 50 percent thought that the present level of information on meat labels was about right, about 30 percent thought that it was insufficient. Similarly, 80, 81, 60, and 80 percent of the respondents thought that it was very important that meat labels contain information regarding nutrition, ingredients, health claim, and production process, respectively. Results from the probit model for consumer attitude toward meat labels and the Poisson count data model for consumption behavior for beef, poultry, and seafood are reported in Table 2,3, 4 and 5, respectively. Marginal effects are calculated for each

explanatory variable while keeping the others at their mean values. The chi-square statistics for all the models indicate that the null hypothesis that all parameters were jointly zero is rejected at 0.01 levels.

Consumers Attitude toward Meat Labels

Consumer attitudes toward meat labels were influenced by consumers' perceived importance nutrition and ingredient information on the labels, consumers' opinion regarding the adequacy and enforcement of food safety regulations, and the respondents' gender. Those respondents who thought that nutrition and ingredient information on meat labels are very important also thought that meat labels helped them select meat products. Similarly, those who considered that food safety regulations were adequate but not enforced effectively considered meat labels helpful in meat product selection. Not all attributes of meat labels affected attitudes toward meat labels. Female respondents had a positive attitude toward meat labels than the male respondents. A male respondent was 14 percent less likely to report that meat labels helped in purchasing meat products. In a separate study, Guthrie et al. (1995) reported that females were more likely to use nutritional labels than men in making food selections.

Meat Consumption, Demographics, and Meat Labels

Various socioeconomic variables were associated with each type of meat consumption. While male respondents were likely to consume poultry less frequently and beef more frequently than the females, gender was not important for seafood consumption. While a male respondent was likely to consume beef 12 times more in a year than a female respondent, a female respondent was likely to consume chicken more than 24 times in a year than a male respondent. The results, therefore, showed that female respondents preferred chicken over beef compared to the male respondents. Many studies have suggested greater health concern among women compared to men (Rimal, 2002; Rimal et. al, 2000; Frazao and Cleveland,1994.; Nayga and Capps,1994.) This result also agrees with the general findings that men are less concerned about health and food safety issues than are women. Lin (1995) noted that females were more likely to believe food safety was very important in food shopping than were males.

Guthrie et al. (1995) reported that females were more likely to use nutritional labels than men in making food selections.

A white consumer was likely to consume both seafood and poultry less frequently than a non-white consumer. A difference in attitude toward meat and red meat consumption associated with differences in ethnic background was reported by Winkleby et al. (1994) in a comparative study which tested for ethnic differences in dietary fat consumption in a community-based sample of Hispanic and white adults with low educational attainment. The study reported a high dietary fat consumption among whites with low educational attainment, an increasing fat consumption among Hispanics at higher levels of acculturation, and the need for effective dietary interventions for low educated whites and Hispanics. Although employment status was not associated with poultry consumption, a respondent who is part time or full time employed was more likely to eat beef as well seafood than those who are unemployed.

Respondents with some college or more education level are likely to consume poultry more frequently than those that have less than college education. However, education level was not associated with beef and seafood consumption. Poultry is generally known for healthier meat. The frequency of meat recall incidents associated with poultry is far fewer than the other types of meat. This result implies that educated household respondents were more likely to read about food safety and nutrition information and connect it with diet-disease relationships than less educated respondents (Putler and Frazao, 1994; Nayga and Capps, 1999.). Thus, public health and nutrition education can raise the food safety and nutritional awareness of consumers by targeting the less educated population.

Households with children were likely to be less frequent consumer of poultry and seafood. Children have a positive impact on household meal planners' consideration of vitamin and mineral content when selecting food items (Rimal, 2002). Households with children were likely to be concerned about nutritional balance in the diet. For example, zinc deficiency is known to occur in children diets that are low in sources of readily bioavailable zinc such as red meat, and high in unrefined cereals that are rich in phytate and dietary fibers (Sandstead, 1991). Although seafood is known to provide many health

benefits, this study shows that food safety concerns regarding seafood seem to prevent parents in making seafood available for their children in their diets.

Respondents who reported that they were in sound health condition were likely to consume poultry and seafood more frequently than those who reported otherwise. Healthy respondents are more concerned about health issues than those in poor health condition (Rimal et al., 2001), and their consumption behavior consistent with their health perception. This finding is consistent with the finding by Wandel that health-minded consumers put great emphasis on whether or not the food contained additives and excessive fat.

Respondents' perception of the importance of nutritional information on meat labels had varying association with different types of meat consumption. Those respondents who thought nutritional information on meat labels was very important were likely to consume beef less frequently than those who thought otherwise. It is, therefore, important for beef industry to highlight the nutritional aspect of beef to offset the well publicized association between red meat consumption and onset of diseases. The relationship between perceived amount of information on meat labels and frequency of poultry consumption was positive. Consumers who reported that the amount of information on meat labels were inadequate were likely to consume poultry more frequently than those who reported otherwise. Among the seafood consumers the information regarding production and process was very important.

Conclusion

This study examined consumers' perception of meat labels and the influence of different aspects of meat labels on beef, poultry and seafood consumption. First, it evaluated whether consumers' perceived that meat labels helped them select meat product and factors associated with such perception. Secondly, it evaluated the relationship between three types of meat consumption and socio-demographic factors along with consumers' preference for five attributes of meat labels, namely degree of information on food labels in general, and importance of information regarding nutrition, ingredients used, health claims, and production process. Regression models were estimated to identify statistically significant

socioeconomic characteristics, and attributes of meat labels influencing respondents' attitude toward meat labels, and meat consumption behaviors.

The respondents' perceived importance of nutrition and ingredients on meat labels were associated with consumers' attitude toward meat labels. Those respondents who thought that nutrition and ingredient information on meat labels were very important were likely to have positive attitude toward meat labels. Similarly, those who considered that food safety regulations were adequate but not enforced effectively considered meat labels helpful in meat product selection. Those respondents who thought nutritional information on meat labels was very important were likely to consume beef less frequently than those who thought otherwise. Female, non-white, college educated respondents preferred poultry over beef compared to males, white, and respondents with less than college education.

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Table 1: Names of the Variables and Their Descriptions.

Name	Description	Mean	Std. Dev.	Min	Max
LABEL	1=meat labels help in purchasing meat products; 0 otherwise	0.6919	0.4620	0	1
BEEF	Number of times consumed in a week	3.0473	3.0190	0	23
POULTRY	Number of times consumed in a week	2.8324	2.2959	0	22
SEAFOOD	Number of times consumed in a week	1.7405	3.4688	0	23
INFO	Amount of Information contained in meat labels: 1= not enough information; 0 otherwise	0.2986	0.4580	1	0
NUTRI	Importance for labels to contain nutrition information: 1= very important; 0 otherwise	0.7946	0.4043	1	0
INGRE	Importance for labels to contain ingredient information: 1= very important; 0 otherwise	0.8027	0.3982	1	0
CLAIM	Importance for labels to contain health claims: 1= very important; 0 otherwise	0.6000	0.4902	1	0
PROCESS	Importance for labels to contain production process information: 1= very important; 0 otherwise	0.7932	0.4053	1	0
ADEQUATE	Safety regulations are adequate but not enforced effectively	0.4635	0.4990	1	0
HEALTH	1=good health status; 0 otherwise	0.8608	0.3464	0	1
AGE	Age of the respondents in years	47.4446	16.9165	18	95
GENDER	1=male; 0 otherwise	0.2932	0.4556	0	1
WHITE	1=white; 0 otherwise	0.8027	0.3982	0	1
EDU	1=college or more educated; 0 otherwise	0.6459	0.4785	0	1
EMP	1=full-time or part-time employed; 0 otherwise	0.4338	0.4959	0	1
CHILDREN	Number of children in the household	0.8919	1.5394	0	8
PINCOME	Gross household per capita income (‘000)	21.67	17.19	1.30	113.00

Table 2: Consumer Attitude toward meat labels: Probit Model Results

Variable	Coefficient	Standard Error	Marginal Effects
Constant	-0.0353	0.3314	-0.0123
INFO	0.1762	0.1216	0.0614
NUTRI	0.4770*	0.1395	0.1662*
INGRE	0.2258*	0.1255	0.0787*
CLAIM	-0.0898	0.1173	-0.0313
PROCESS	0.1344	0.1369	0.0468
ADEQUATE	0.2171*	0.1049	0.0757*
HEALTH	0.0074	0.1592	0.0026
AGE	-0.0008	0.0035	-0.0003
GENDER	-0.4078*	0.1160	-0.1421*
WHITE	-0.0122	0.1433	-0.0043
EMP	0.0182	0.1132	0.0063
EDU	0.0007	0.1124	0.0002
KIDS	-0.0457	0.0486	-0.0159
PINCOME	-0.0010	0.0034	-0.0004
Chi-squared	54.44*		

*Statistically significant at <.10

Table 3: Beef consumption and meat labels: Poisson Model Results

Variable	Coefficient	Standard Error	Marginal Effects
Constant	1.8172*	0.1407	5.4257*
INFO	-0.0661	0.0522	-0.1974
NUTRI	-0.2663*	0.0592	-0.7950*
INGRE	0.0375	0.0632	0.1120
CLAIM	0.0323	0.0507	0.0964
PROCESS	-0.0797	0.0581	-0.2380
ADEQUATE	-0.1346*	0.0448	-0.4019*
HEALTH	-0.0583	0.0695	-0.1740
AGE	-0.0085*	0.0015	-0.0254*
GENDER	0.0885*	0.0501	0.2643*
WHITE	0.0256	0.0606	0.0763
EMP	0.0838*	0.0479	0.2501*
EDU	-0.0747	0.0479	-0.2232
KIDS	0.0110	0.0204	0.0329
PINCOME	-0.0014	0.0015	-0.0042
Chi-squared	101.52*		

*Statistically significant at <.10

Table 4: Poultry consumption and meat labels: Poisson Model Results

Variable	Coefficient	Standard Error	Marginal Effects
Constant	1.0641*	0.1487	3.0034*
INFO	0.1267*	0.0512	0.3577*
NUTRI	0.0079	0.0652	0.0223
INGRE	-0.0625	0.0667	-0.1764
CLAIM	0.0543	0.0521	0.1533
PROCESS	-0.0334	0.0621	-0.0944
ADEQUATE	-0.0202	0.0460	-0.0571
HEALTH	0.2385*	0.0772	0.6731*
AGE	-0.0018	0.0016	-0.0050
GENDER	-0.1998*	0.0541	-0.5640*
WHITE	-0.1553*	0.0596	-0.4383*
EMP	0.0355	0.0493	0.1001
EDU	0.1050*	0.0504	0.2965*
KIDS	-0.0467*	0.0220	-0.1319*
PINCOME	-0.0007	0.0015	-0.0020
Chi-squared	49.67*		

*Statistically significant at <.10

Table 5: Seafood consumption and meat labels: Poisson Model Results

Variable	Coefficient	Standard Error	Marginal Effects
Constant	-0.1039	0.1993	-0.1809
INFO	-0.0293	0.0663	-0.0511
NUTRI	-0.0501	0.0814	-0.0873
INGRE	-0.1036	0.0842	-0.1804
CLAIM	0.0048	0.0660	0.0083
PROCESS	0.3567*	0.0861	0.6212*
ADEQUATE	-0.2265*	0.0595	-0.3945*
HEALTH	0.3455*	0.0994	0.6016*
AGE	0.0121*	0.0021	0.0210*
GENDER	-0.1449*	0.0687	-0.2524*
WHITE	-0.4162*	0.0741	-0.7248*
EMP	0.2604*	0.0650	0.4535*
EDU	0.0846	0.0638	0.1473
KIDS	-0.0565*	0.0294	-0.0984*
PINCOME	-0.0025	0.0019	-0.0044
Chi-squared	120.63*		

*Statistically significant at <.10