To the Graduate Council:

I am submitting herewith a thesis written by Laura Emily Adams entitled "Consumers' Use of Nutrition Labels on Dairy Foods." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

Kim Jensen, Major Professor

We have read this thesis
and recommend its acceptance:

Accepted for the Council:

Associate Vice Chancellor
and Dean of The Graduate School

# Consumers' Use of Nutrition Labels on Dairy Foods

A Thesis
Presented for the
Master of Science
Degree
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Laura Emily Adams
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# DEDICATION

This thesis is dedicated to my parents
Mr. William D. Adams
and
Mrs. Fay K. Adams,
and to my sister
Dr. Karin Adams Morgan
who have given all of their love, time,
and never ending support.
Thank You.

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## ABSTRACT

This research was conducted in order to better understand and identify the demographic, socioeconomic, shopping habits, sources of nutrition information, and nutrition attitude characteristics which influence consumers' use of nutrition labels on dairy food products. The data used in this study was gathered from a mail survey of households throughout the state of Tennessee. The effects of demographic, socioeconomic, shopping habits, sources of nutrition information, and nutrition attitude characteristics on the probability of the head of a household being a nutrition label reader. The probit model was used to examine these effects statistically.

The results showed that certain characteristics do affect an individuals' probability of reading nutrition labels. Female gender had a positive effect on the probability of being a label reader. Receiving nutrition information from newspapers, books, magazines, and health professionals positively impacted the probability of label readership. An individual not working outside of the home and having children under 18 years of age present in the home were found significant and positively affected the probability of reading labels. Nutrition and flavor are very important food characteristics in food purchase decisions and positively influence the probability of label readership. Furthermore, living in an urban area has a positive impact on the probability of label readership. These results have important implications for the dairy industry, health professionals, and policy makers for the targeting of label information and nutrition advertising. Consumer segments may be identified from these results for nutrition label users and nonusers.

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# CHAPTER 1

# INTRODUCTION AND OBJECTIVES

## The 1990 NLEA

With the enactment of the 1990 Nutrition Labeling Education Act (NLEA), the FDA and USDA have made it mandatory that almost all foods will have nutrition information contained in their labels. [1] These labels will provide information on how the food fits into an overall daily diet, the amount per serving of saturated fat, cholesterol, dietary fiber, as well as other selected nutrients. Terms used to describe a food's nutrient content such as 'light' will be standardized and strictly defined. Health claims showing the relationship between a food and a disease are standardized and based on scientific evidence, and serving sizes are more standardized. Furthermore, there are strict guidelines regarding the format and placement of the nutrition panel, nutrient claims, and health claims. The 1990 NLEA was recently implemented in August 1994.

The nutrition facts panel of the new food labels gives the amounts of calories from fat, saturated fat, cholesterol, sugars, and dietary fiber in addition to the information already on labels pertaining to calories, total fat, total carbohydrates, protein, sodium, vitamins A and C, calcium, and iron. The new labels give less emphasis to information about vitamins and minerals. The new labeling act allows

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[1]Food labeling laws began with the original Federal Food and Drug Act of 1906 to prohibit any false or misleading statements on the labels of foods and drugs. This act was replaced by the Federal Food, Drug and Cosmetic Act in 1938, which allowed stricter enforcement. The act of 1938 stayed relatively unchanged for 30 years until the Food and Drug Administration (FDA) developed regulation for nutrition labeling in 1973. This regulation states labeling is mandatory if a nutrient is added to a food or a nutrient claim is made. Relatively few changes were made to the 1973 act until the Nutrition Labeling Education Act of 1990.

nutrient content and health claims on package labels. However, all nutrient claims on packages must contain consistent terminology for every product on which the claims appear. The allowable health claims refer to claims which link a food to the risk of certain diseases or health-related conditions. Standardized serving sizes are also a requirement of the 1990 Act.

Nutrient claims are strictly defined for terms such as low-fat, low-calorie, high fiber, low sodium, and light. A summary of these definitions is listed in Table 1.1. Prior to these standards for definitions, terms such as 'low-fat' could take on a variety of meanings. By providing absolute minimum or maximum values for nutrient content implied in label terms, such as low-fat, consumers should have access to more consistent information about nutriton content of foods. The FDA will only allow health claims about the relationships between calcium and osteoporosis, fat and cancer, saturated fat and cholesterol and coronary heart disease (CHD), fiber-containing grain products, fruits, and vegetables and cancer, fiber-containing grain products, fruits, and vegetables and CHD, sodium and hypertension, fruits and vegetables and cancer. These claims may only be used in certain situations strictly defined by the FDA. An example of the appearance of the nutrition facts panel, a nutrient content claim, adn a health claim is presented in Figure 1.1. The potential locations of each of these three label components is also described in Figure 1.1.

Table 1.1 Requirements for Labeling Terms

| | Labeling Term Definition |
|---|---|
| Calorie free | fewer than 5 calories per serving |
| Low calorie | 40 calories per serving or less per serving; if the serving is 30 grams or less, or 2 tablespoons or less, 40 calories per 50 grams |
| Reduced or fewer calories | at least 25 percent fewer calories per serving than the reference food |
| Fat free | less than .5 grams of fat per serving |
| Saturated-fat free | less than .5 grams per serving saturated fat, and less than .5 grams per serving trans fatty acids |
| Low fat | 3 grams or less of fat per serving; if the serving is 30 grams or less or 2 tablespoons or less, 3 grams per 50 grams of food |
| Low saturated fat | 1 gram or less per serving, and not more than 15 percent of calories from saturated fatty acids |
| Reduced or less fat | at least 25 percent less per serving than the reference food |
| Reduced or less saturated fat | at least 25 percent less per serving than the reference food |
| Cholesterol free | less than 2 milligrams of cholesterol, and 2 grams or less of saturated fat per serving |
| Low cholesterol | 20 milligrams or less of cholesterol and 2 grams or less of saturated fat per serving; if the serving is 30 grams or less, or 2 tablespoons or less, 20 milligrams per 50 grams of food |
| Reduced or less cholesterol | at least 25 percent less cholesterol and 2 grams or less saturated fat per serving than the reference food |
| Sodium free | less than 5 milligrams |
| Low sodium | 140 milligrams or less per serving; if serving is 30 grams or less, or 2 tablespoons or less, 140 milligrams per 50 grams of food |
| Very low sodium | 35 milligrams or less per serving; if serving is 30 grams or less, or 2 tablespoons or less, 35 milligrams per 50 grams of food |
| Reduced or less sodium | at least 25 percent less per serving than the reference food |
| High fiber | 5 grams or more per serving. If a food claims high fiber it must also meet the criterion for low fat, or display the fat content next to the high-fiber claim |
| Good source of fiber | 2.5 to 4.9 grams per serving |

Table 1.1 (continued)

| | Labeling Term Definition |
|---|---|
| More or added fiber | at least 2.5 grams more per serving than the reference food |
| Light | One-third fewer calories or half the fat of the reference food. If the food derives 50 percent or more of its calories from fat, the reduction must be 50 percent of the fat. |

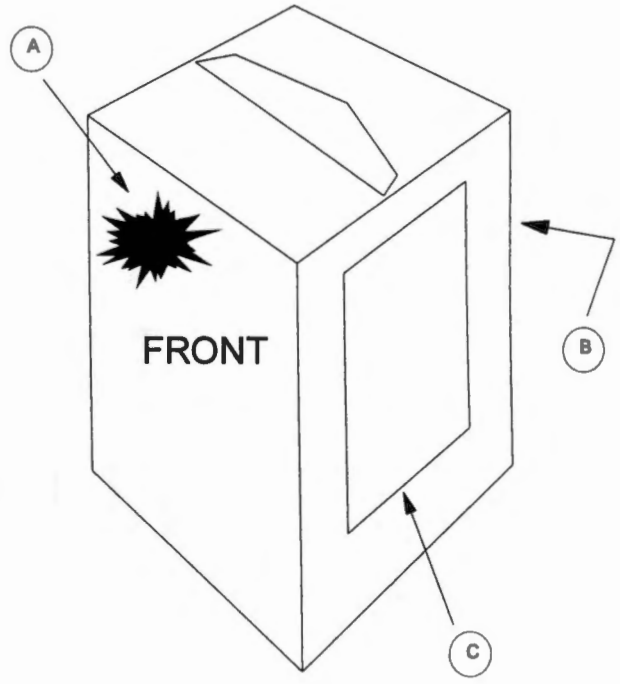
Sources: Agricultural Outlook, May 1994 and FDA Consumer, May 1993.

**SAMPLE NUTRITION LABEL COMPONENTS**

Below are examples of three components which may be a part of food labels, including those on dairy products. Please read each component carefully. The illustration shows where these label components may be located on a food package.

(A) **NUTRIENT CONTENT CLAIMS**

* Low Fat
* Cholesterol Free
* High in Calcium




(B) **HEALTH CLAIMS**

* "Development of cancer depends on many factors. A diet low in total fat may reduce some cancers."

* "While many factors affect heart disease, diets low in saturated fat and cholesterol may reduce the risk of this disease."

* "Regular exercise and a healthy diet with enough calcium helps teen and young adult white and Asian women maintain good bone health and may reduce their risk of osteoporosis later in life."

Figure 1.1. Definitions and potential locations of the three components of nutrition

labels.

(c) **NUTRITION FACTS PANEL**

## Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 3

| **Amount Per Serving** | |
|---|---|
| Calories 90 | Calories from Fat 30 |
| | **% Daily Value*** |
| **Total Fat** 3g | 5% |
| Saturated Fat 0g | 0% |
| **Cholesterol** 0mg | 0% |
| **Sodium** 300mg | 13% |
| **Total Carbohydrate** 13g | 4% |
| Dietary Fiber 0g | 0% |
| Sugars 3g | |
| **Protein** 3g | |

| | |
|---|---|
| Vitamin A 4% | Vitamin C 8% |
| Calcium 21% | Iron 4% |

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

| | Calories: | 2,000 | 2,500 |
|---|---|---|---|
| Total Fat | Less than | 65g | 80g |
| Saturated Fat | Less than | 20g | 25g |
| Cholesterol | Less than | 300mg | 300mg |
| Sodium | Less than | 2,400mg | 2,400mg |
| Total Carbohydrate | | 300g | 375g |
| Dietary Fiber | | 25g | 30g |

Calories per gram:
Fat 9 · Carbohydrate 4 · Protein 4

Figure 1.1 (continued). Definitions and potential locations of the three components of nutrition labels.

Benefits and Costs of Nutrition Labeling

The Surgeon General's *Report on Nutrition and Health* emphasizes the scientific evidence linking nutrition and long-term health. The study from the Surgeon General shows that diet can affect personal risk for coronary heart disease, stroke, atherosclerosis, diabetes, and some types of cancer (U.S. Surgeon General). Nutrition and health information, such as that contained in the *Report*, has led to an increase in consumer concerns about making nutritionally beneficial food choices. Surveys indicate that food labels are an important source of nutrition information for consumers (Russell). Consumers' reliance on food labels for nutrition information and growing evidence linking nutrition and health helped drive reforms of nutrition labeling.

Studies of the benefits and costs of labeling were conducted by FDA and USDA. The estimated benefits from labeling included those from reduced medical costs and decreased productivity losses due to diet-related diseases. Intakes of fat, saturated fat, and cholesterol were projected to decrease as a result of the labeling. Consumers are expected to use labels to modify purchase and intake habits in varying degrees. The Food and Drug Administration and USDA projected that there would be significant benefits even with limited consumer response. The costs to industry are those of costs of compliance with labeling, including designing and printing new labels, nutrient content analysis, and replacing the inventory of old labels. Nutrient content would have to be periodically verified. Benefits ($4.5 billion) were projected to outweigh costs ($1.6-$2.6 billion)

(Agricultural Outlook, May 1994).[2]

Regulatory impact analyses performed by the FDA and USDA were an expansion of the results of a shelf-labeling study conducted by the FDA and Giant Foods, Inc.. The FDA/Giant Foods study measured actual consumer response to new nutrition information on shelf labels placed near the products low in fat, saturated fat, cholesterol, and sodium. Results from the study showed that shelf labels influenced changes in market shares. These market share changes were converted into food consumption and nutrient intake figures for the United States population. An average reduction in fat intake of around 1 percent was estimated. Although the reduction in fat intake was small, the FDA and USDA projected that a 1 percent change would prevent 18,700 early deaths due to cancer or heart disease. The monetary value associated with life-years saved was projected as $5.6 billion over 20 years (Frazao, 1995).

A study by Zarkin, Dean, Mauskopf, and Williams estimated the potential health benefits of the new labeling laws. The researchers evaluated four different scenarios of potential label use by consumers. With these scenarios, they were able to estimate the potential health benefits using different levels of label usage by consumers. The usage scenarios range from total adoption and use of the daily reference values on food labels to consumers' actual responses to a nutrition shelf-labeling program by FDA in the 1980's. Zarkin et al (1993a) estimated the health benefits from reduced nutrient intake by using a

[2]The FDA's and USDA's proposed benefits of mandatory labeling are quantified in regulatory impact analyses based on research estimating the decrease in medical costs and productivity resulting from a reduction in diet-related disease. These benefits were calculated from the expected reduced intake of fat, saturated fat, and cholesterol due to improved nutrition information available to consumers. In calculating these benefits, a reduction in dietary fat was assumed to cause a decrease in cancer cases and early deaths. Also, the reduction of cholesterol and saturated fat in the diet was assumed to decrease the cases of heart disease.

computer model developed by Browner. Results of this study show that in the scenario in which all consumers read labels on all food products and are willing and able to meet all daily reference values except for meat and poultry there is a value of life-years gained of 72.4 billion dollars and a person 20 years old at the time of the nutrition label changes will gain approximately 1.5 months on their life expectancy. However, when using a scenario of nonresponse to food labels by some consumers, the estimated benefits drop to 32.6 billion dollars while gains in life expectancy stay the same. These estimates of values of life-years gained include cases of CHD (coronary heart disease) avoided and three types of cancer avoided, deaths avoided, life-years gained, and medical care costs saved for all consumers. Gains in life expectancy are small because most of the deaths avoided from cancer and CHD occur at older ages, and these figures are a population average possibly camouflaging individuals with large increases in their life years gained.

More complete nutrition labels provide consumers with the opportunity to gather nutrition information about food products and alter purchase and consumption patterns. However, consumers are faced with information about thousands of products in a supermarket to be evaluated and incorporated into purchase decisions within the time of one shopping trip. Not only is the consumer faced with a large number of products in one shopping trip, but new products, for which the consumer may have little or no prior knowledge or available information, are introduced continuously. With so many food items to be evaluated on the basis of nutrient content, the search costs for nutrition information may become prohibitively higher for consumers. Benefits accruing from the new labels will depend greatly on consumer's reading and using of the label information.

Nutrition and Dairy Products Consumption

With consumers' showing more concern for their health and the link between their diet and health, dairy products should play an important role in helping consumers to eat a more healthful diet. A great deal of scientific evidence supports the nutritional and health benefits of dairy foods used regularly in the diet. Dairy foods are thought to have a type of protective role against some cancers, hypertension, and osteoporosis (Dairy Council Digest). Dairy foods make a significant nutritional contribution to the diet of Americans. According to UDSA statistics for 1990, milk and other dairy foods (excluding butter) provided 75% of the calcium, 31% of the riboflavin, 20% of the protein, 20% of the vitamin $B_{12}$, 20% of the potassium, 19% of the zinc, 18% of the magnesium, 18% of the vitamin A, and 10% of the vitamin $B_6$ available in the U.S. food supply. Overall, U.S. dairy foods (except butter) made up only 9% of the calories, 12% of the fat and 14% of the cholesterol available in the food supply. Diets lacking in consumption of dairy foods are generally lacking in other essential nutrients. From 1980 until 1992, consumers preferences and product mix for dairy foods has changed. In 1992, the average American received 25% less fat in their diet from fluid milk than it did in 1980.

A 1990 study by Herrmann, Sterngold, and Warland examined changes in the consumption of dairy products, more specifically frozen desserts, fluid milk and several other major categories. The researchers used a nationwide sample of adult consumers to look at changes in usage patterns, characteristics of those who changed usage, and their reasons for these changes. The results indicated that there was a substantial number of

consumers who have increased the use of lower fat dairy products. As well, there were many respondents who feel that they have reduced their use of higher fat dairy products. Herrmann et al summarizes that the increased availability of lower fat products has allowed consumers to alter their fat intake relatively easily.

Frazao (1994) reports that per capita consumption of dairy products continues to increase; however, the product mix is changing. A consumer trend is toward lower fat milk and increased consumption of cheese. In the past ten years, whole milk decreased from representing 60% of all beverage milk to 40%. The consumption of lowfat and skim milk increased. School lunch programs are a very large market for whole milk. Frazao credits the increase in eating fast food away from home with the increase in cheese consumption and the opinion that consumers do not usually realize the high fat content of cheese. Approximately two-thirds of the cheese consumed is from commercially prepared foods, such as pizza and fast food sandwiches. Lower fat cheeses have entered the market, but currently these relatively new products account for around 5 percent of total cheese consumed.

Given the importance of dairy foods in Americans' diets and consumers' growing concern for their diet and health, the new food labeling regulations can be extremely helpful to consumers in planning dairy products consumption as part of their diets. Food labels can also be very important to manufacturers in developing new, more healthful products for the more health conscious consumer. Several studies of consumers' usage of nutrition labels have been conducted (Russell; Wang, Fletcher, and Carley; Reid and Hendricks; Bender and Derby; and The Roper Organization). In addition, there have

been past studies which included the effects of label usage on food purchase decisions (Russell; The Roper Organization). However, since the adoption of the new regulations, no study has examined label use and how it affects purchase patterns of dairy foods.

## Objectives

The objective of this study was to measure how the socioeconomic characteristics of shoppers, nutrition attitudes, and shopping habits affect nutrition label usage for dairy products. The effects of socioeconomic characteristics, nutrition attitudes, and shopping habits on percent of dairy products for which labels usually read was estimated using a probit model. The data were obtained through a mail survey from random sample of Tennessee residents with listings in telephone directories.

# CHAPTER 2

# LITERATURE REVIEW

Several studies have examined consumers' attitudes toward nutrition, use of nutrition labels, and effects of nutrition awareness on food purchases and consumption (Schutz, Judge, and Gentry; Jensen and Kesevan). These studies have analyzed how socioeconomic and demographic factors affect attitudes about nutrition and use of nutrition labels (Russell; Wang, Fletcher, and Carley; Reid and Hendricks; Bender and Derby; The Roper Organization). The effects of label use on purchase decisions, such as comparison shopping, have also been examined. This chapter summarizes the methods used and results for these studies.

## Importance of Nutrition

A 1986 study by Schutz, Judge, and Gentry studied the relative importance of attributes to purchase and consumption for 15 foods. The characteristics examined included were nutrition, brand, cost, and sensory attributes. The method for this research was a mail survey of six hundred Sacramento residents. The Sacramento telephone directory was used as the sampling frame. This mail survey resulted in a 58.5% response rate. The survey responses showed that importance ratings for sensory attributes are much higher than those for nutrition, price, or brand ratings. Price and nutrition were of approximately equal importance while brand was the lowest rated attribute relative to purchase and use of the 15 foods tested. Also, females rated nutrition more highly than did male respondents. The percent of family income spent on food is positively correlated with nutrition importance. This study found no

correlation between nutrition importance ratings and education and a negative correlation between nutrition importance ratings and income.

Effects of Nutrition Awareness on Purchases

Jensen and Kesavan (1993) investigated the interaction among information sources, consumers' awareness of calcium and related health attributes, and consumption of dairy products. This study used the National Dairy Board's promotion of dairy products through information on calcium to show that exposure to nutrient-related advertisements had a positive effect on awareness and attitudes related to health. They found that "stronger" positive attitudes toward nutrients led to more frequent consumption of dairy products. Project results show that advertising based on nutritional information can affect the demand for food products by changing consumers' attitudes and knowledge.

A study by Jensen, Kesevan, and Johnson (1992) looked at the effects of consumers' attitudes and health awareness on dairy food consumption. Using the same data as mentioned earlier, Jensen et al used a probit model to determine the probability of purchase of dairy foods. These results show that the attitude variable has a positive effect on the consumption of dairy products except for milk. Furthermore, age and being black had a negative effect on consumption of all dairy products and milk, while having children under five had a positive effect on consumption. Results showed those living in the Southern region were less likely to consume dairy products and milk than the West or Midwest region.

Nutrition Label Use

A study by Russell (1992) examined a household food buyers' knowledge of and attitudes toward basic nutrition and food labeling. The study done in 1990 also measures the use of nutrition labels on food during purchase decisions. This study used a door-to-door survey of Australian households. A second stage of this study was conducted in 1991 with a further door-to-door survey. Results from 1990 survey showed that 65% of respondents always read food labels before they bought a product for the first time. In the 1991 survey, subjects were asked how often they compared nutrition labels on foods before purchasing. Sixty-six percent of respondents said they compared food product labels sometimes and very often.

In both surveys, subjects were shown examples of ingredient label listings. The results suggested that a significant number of respondents, especially females, read and used nutrition information in purchasing decisions. In the 1991 survey, 95% of respondents expressed that they read nutrient claims on foods. Furthermore, 74% of respondents used nutrient claims to compare foods. The 1990 survey asked subjects to agree or disagree to the statement "it's really important that foods have ingredient labels so that you can tell what you are buying". Ninety-six percent of respondents agreed with this statement. However, nearly half of the respondents agreed that "you can't believe what manufacturers' put on their ingredient labels". The 1991 survey expanded this test of consumer confidence. Respondents were asked to indicate their degree of trust in statements about food and nutrition. Fifty-nine percent of respondents indicated that they would not trust a statement made by a food company

while 95% would trust a statement made by the National Heart Foundation. This study concluded that a large portion of household grocery buyers have a "reasonable" comprehension of the link between health and diet. These survey results strengthen the argument that consumers receive a large portion of their nutrition information from food labels.

In a 1994 study, Wang, Fletcher, and Carley examined which household socio-economic factors affect consumers' usage of food labels using data from the 1987-88 Nationwide Food Consumption Survey (NFCS). Wang et al used a logit model to determine which characteristics affect label usage. In the NFCS consumers were asked whether or not they obtained nutrition information from food labels during the last year. Responses indicated that 45% of U.S. households used food labels for nutrition information. However, the number of consumers reading food labels varies across urbanization areas and geographic regions. Survey results indicated that income positively affects food label usage.

This study found that the overall health awareness (high fat and cholesterol consumption levels) of a household positively affects the use of nutrition labels. Also, large family size households are more likely to use food labels than small size households. As the education level of the head of the household increases, the use of food nutrition labels increases. There is a significant difference in the use of food labels between racial groups. A white household head has a higher probability of receiving nutrition information from food labels than the household heads of other races. Also, residents living outside of a city are more likely to obtain nutrition information from

food labels than are residents of suburban areas. When compared to residents of the west region of the United States, northeast residents are less likely to use food labels while residents of the midwest are more likely to use food labels for nutrition information. Forty-two percent of respondents in the southern region reportedly used food labels. However, the variable representing whether or not a respondent was from a southern region was not a significant variable in the logit model indicating use levels were not significantly different from the west region.

A 1993 Canadian study by Reid and Hendricks measured consumer awareness of nutrition information on food labels, using 819 in-home interviews. The questionnaire included items which asked the importance attributed to nutrition and food labels; general understanding of labels, importance and usability of ingredient lists, claims, and nutrition panels; and self-reported label use to compare fat content between foods. Other questions addressed the respondents' knowledge and use of specific claims. In this study, regional data were weighted to represent a national sample. From 70% to 83% of Canadians value and use some part of the nutrition information found on food labels. Consumers surveyed gave all three components of nutrition labels high ratings for their importance and these consumers reported a good degree of understanding of the information presented on food labels. Respondents felt that the claims were best understood and the nutrition panel was the least understood. The ingredient list on food labels was said to be more useful than claims and nutrition panels in choosing between foods. When asked how they compare fat content between foods, 46% of the respondents look for the amount of fat, 15% use the nutrition panel

and 25% did not compare fat content. Ninety-five percent of the respondents felt that Canadians should be "very" or "somewhat" concerned about nutrition.

Bender and Derby (1992) estimated the numbers of consumers who reportedly read nutrition labels on foods using data collected by FDA in a telephone survey of 4,000 households in 1982, 1984, and 1986 and 3,200 households in 1988. Food label questions were included in one-fourth of the first three surveys and nutrition label use questions were included in one-eighth of the 1988 surveys. Respondents were asked if they pay attention to nutrition labels on foods and if they ever use ingredient information to avoid consumption of a particular ingredient. Profiles of food label users were developed using demographics (age, race, gender, education, and income), health status measures, use of special diets, and nutrition knowledge. Results show that the number of consumers who self-reportedly say that they pay attention to nutrition information on food labels has increased significantly between 1982 and 1988. Respondents who reported that they used ingredient lists to limit their intake of fats/oils and cholesterol also increased significantly between 1986 and 1988. This study used a general linear model to find significant main effects for year, age, gender, and education in the use of nutrition labels. Researchers found that consumers who read both nutrition labels and ingredient lists tended to be young, white, female, and highly educated. Consumers who read neither nutrition labels nor ingredient lists are more likely to be old, nonwhite, and male with low education.

The Roper Organization with the American Meat Institute evaluated consumers' comprehension of and attitudes toward a variety of labeling and nutrition issues and

also measured label usage. The researchers involved conducted 1,004 in-home interviews in 1991. The surveys were conducted using a multi-stage, stratified probability sample of the United States population. Almost three out of every four consumers (71%) almost always or sometimes read food nutrition labels when purchasing a product for the first time. Nearly nine out of every ten respondents who are label readers say that label information influences their food purchases. Given a choice of four factors which might enter into a food purchase decision, consumers ranked nutrition first in importance with taste a close second. Consumer groups more likely to be influenced by nutrition labels are those of older (55 years old or older), well educated (some college), and economically upscale (income of greater than $50,000). Hispanics and blacks are less likely than white consumers to be influenced by nutrition labels. Females (76%) have a higher percentage of readership of food labels than males (59%). Of those consumers reading nutrition labels, 58% use these labels to aid them in selecting products to maintain a certain diet and to help decide which products provide the most nutrition for their dollars.

# CHAPTER 3

# METHODOLOGY

## Random Utility Model

Whether or not an individual consumer reads or does not read nutrition labels on dairy foods is a binary choice variable, is represented by a 0,1 dummy variable. An individua'ls choice of reading labels or not reading labels represents a certain level of utility associated with each choice, $U^a$ =choice A to use labels, $U^b$=choice B to not use labels. These levels of utility are unobservable. However, the choice of reading or not reading is observable. Each utility (A and B) is associated with an index $Z_i$, $U^a = U^a(Z_i)$ and $U^b = U^b(Z_i)$ where there is a theoretical continuous index $Z_i$ which is determined by X, (socioeconomic, demographic, shopping habits, use of information, and food characteristic variables) where $Z_i = \beta' x_i$. The observed choice of the individual reveals which alternative provides the greater utility. The difference in utilities from each alternative can be expressed as:

(1) $$U^a(Z_i) - U^b(Z_i) = U'(Z_i) = U'(\beta' x_i).$$

The observed indicator, $Y_i$, equals 1, if $U^a > U^b$ or $U'(\beta' x_i) > 0$ (alternative A is chosen and the labels are read). The observed indicator, $Y_i$ , is zero, if $U^a \leq U^b$ or $U'(\beta' x_i) < 0$ (alternative B is chosen and the labels are not read).

## The Probit Method

If the probability of being a label reader follows a normal distribution, then a probit model should be used. Estimates of the parameters can be determined through a

maximum likelihood function. The likelihood function leads to a joint probability which is the probability of obtaining the observed data from a particular vector of $\beta$. The probability that use is observed gives the joint probability or likelihood function:

**(2)** $$Prob(Y_1=y_1,\ Y_2=y_2,\ldots,\ Y_n=y_n) = \prod_{yi=0}[1-F(\beta' x_i)] \prod_{yi=1} f(\beta' x_i)$$

where:

$F(\beta' x_i)$ = probability of being a nutrition label reader, and

$f(\beta' x_i)$ = density function.

This can be written as:

**(3)** $$L = \prod_i [F(\beta' x_i)]^{1-y_i} [1-F(\beta' x_i)]^{1-y_i}$$

In order to work more easily with the likelihood equation, we take the natural logarithm of L rather than L itself. This can be written as:

**(4)** $$\ln L = \sum_i y_i \ln F(\beta' x_i) + (1 - y_i)\ln(1 - F(\beta' x_i))$$

In order to maximize the likelihood function with respect to our parameters, we must differentiate the likelihood function with respect to each of the known parameters. The derivatives must be equated to zero, and then solved. Taking the first order conditions of the likelihood function give the density function.

**(5)** $$\frac{\partial F}{\partial z_i} = \frac{dF(z_i)}{d(z_i)} = f$$

The predicted probabilities are given by:

**(6)** $$\hat{F} = F(\beta' x_i).$$

The β vector coefficients cannot be directly interpreted to get marginal effects. The marginal effects of each independent variable at the sample means can be obtained by multiplying the density function by the independent variable coefficient.

**(7)** $$\frac{\partial F}{\partial x} = \frac{dF}{dZ} \times \frac{\partial Z}{\partial x} = f\beta$$

The likelihood ratio is used to test the null hypothesis that all the β coefficients are statistically equal to zero. The likelihood ratio statistic is calculated as:

**(8)** $$LR = -2(\ln L_0 - \ln L_1)$$

and is distributed as Chi-squared with k degrees of freedom where k is the number of explanatory variables. If calculated value is greater than critical value then the model has explanatory power. Another way to evaluate goodness of fit is a table of the hits and misses of a prediction rule which examines the frequency of "correct" predictions of label use. If the predicted probability of label use is greater than 50 percent, then the binary choice variable is predicted to have a value of one. If the predicted probability of label use is less than 50 percent, then the predicted value for the binary choice variable is assumed to be zero. Using this method, the occurrence of actual zeros and ones can be compared with the occurrence of the predicted values. The 50 percent rule is recognized as arbitrary, but considered appropriate for this study.

## Hypothesized Model

The predicted probability of readership is hypothesized to be affected by shopping habits, nutrition attitudes, use of nutrition information, and demographic and socioeconomic characteristics of the individual responsible for food shopping in the household. Variables representing these categories included in the model are:

PNEW = percent of new dairy food products purchased; 1 if greater than 10%, 0 if less than 10%;

CHILD = 1 if child under 18 present in home, 0 otherwise;

FLAVOR = respondents' rating of the importance of flavor of foods in influencing purchases;

PRICE = respondents' rating of the importance of price of foods in influencing purchases;

NUTR = respondents' rating of the importance of nutrition of foods in influencing purchases;

AREA = urbanization of location of household;

GENDER = sex of the respondent, 1 if female, 0 otherwise;

WORK = employment status; 1 if work out of the home, 0 if otherwise;

NEWS = nutritional information from newspapers, books, or magazines in the last year; and

PROF = nutritional information from a doctor, nurse, or other health professional in the last year.

Therefore, $Z_i$ = f (PNEW, CHILD, FLAVOR, PRICE, NUTR, AREA, GENDER, WORK, NEWS, PROF).

The probability of being a nutrition label reader can then be expressed as below:

Prob (LREAD=1) = f (PNEW,CHILD, FLAVOR, PRICE, NUTR, AREA, GENDER, WORK, NEWS, PROF)

where:

LREAD = 1 if read nutrition labels, 0 if do not read nutrition labels.

The percent of new dairy food products purchased is expected to have a positive influence on the probability of being a label user. This is hypothesized a priori. It is expected that consumers would have the least knowledge about nutrient content of new products and would have a greater need to read nutrition labels on these products to obtain nutrition information. However, it seems logical that a higher percentage of new products would cause an increase in the probability of being a label reader.

The presence of children in the household is hypothesized to have a positive impact on the probability of reading labels. Past research has shown that family size has a positive impact on label use (Wang, Fletcher, and Carley). Furthermore, Jensen and Kesevan found that children present in the household have a positive effect on the consumption of dairy foods.

The importance of flavor of foods and the importance of the price of foods in purchase decisions are hypothesized to have a positive impact on label usage. Russell found that 99 percent of survey respondents felt that price was an important criteria in

food purchase decisions. Furthermore, Schutz, Judge, and Gentry found that sensory attributes (flavor included) were ranked as more important than brand, price or nutrition. However, price attributes ranked higher in importance ratings than did nutrition attributes in this study.

The importance of nutrition of foods in purchase decisions is hypothesized to have a positive impact on label usage. Schutz, Judge, and Gentry and The Roper Organization with the American Meat Institute found that nutrition plays an important role in purchase decisions. Also, Russell found that a large portion of the sample used in the study have a reasonable understanding of the link between diet and health.

A household located in an urban area is hypothesized to have a positive effect on label usage. Jensen, Kesevan, and Johnson found consumers living in the central city to have a significant positive effect on consumption of dairy foods. However, Wang, Fletcher and Carley found that food labeling information is more effective in non-metro areas.

Female gender is expected to have a positive influence on the probability of label usage. Results from past studies have shown that females are more likely to read food labels (Russell; The Roper Organization). Also, findings from past studies have shown that females rated nutrition as an important attribute to consider during purchase decisions more highly than males (Schutz, Judge, and Gentry).

An individual who is not employed outside of the home or is retired is hypothesized to have a higher probability of being a label user than a person working part or full-time outside of the home. It is hypothesized that full-time homemakers and

retired persons would potentially have greater interests in nutrition because there are most likely children present in the home which might increase the concern for eating healthy. Also, those who do not work out of the home may be older, retired persons who might have more health concerns than other consumers. However, there is no past research which directly looks at the impact of employment status on label readership. Jensen, Kesevan, and Johnson found that being a full-time worker has a significant positive effect on consumers' attitudes about dairy product characteristics influencing consumption.

The sources of nutrition information were included in the model because these are factors which are likely to influence the use of nutrition labels on dairy foods. Any additional information received by a consumer is hypothesized to have a positive effect on the probability of being a nutrition label user. There is no past research to identify which sources of information might affect label readership. However, it seems logical that any nutrition information gained by a consumer can only serve to increase his or her awareness of the link between diet and health.

# CHAPTER 4

# DATA

The data used in this study are from a consumer mail survey conducted from a random sample of Tennessee residents. This survey was designed using Dillman's Total Design Method for mail surveys. The total mailout was 2417 survey questionnaires with 456 questionnaires returned as nondeliverable. Of the total that were deliverable, 254 consumers returned the questionnaire. This made a response rate of 12.9 percent. The survey questionnaire included questions about nutrition label usage, nutrition awareness, food shopping habits, and demographics. The surveys were sent on June 25, 1995. A reminder postcard was mailed on July 6, 1995.

A random sample of Tennessee residents was obtained from telephone listings for the state of Tennessee using a CD-ROM database titled "Phone Select". Therefore, this sample includes only those Tennessee residents with a telephone. The number of subjects chosen from each of 16 different zip code areas was in proportion to the total population of the area. Each individual in the population had the same probability of being chosen for the sample. The names and addresses of 2417 subjects were generated using this procedure. The survey contained questions regarding nutrition label use on dairy food products, frequency of purchase of dairy products, concerns about nutrition and product characteristics, shopping habits, and demographic and household characteristics. A copy of the survey is shown in the Appendix.

## Description of Variables

A listing and descriptions of the variables in the model is presented in Table 4.1.

Table 4.1. Variable Names and Definitions

| Variable Name | Definition |
|---|---|
| Label Usage | |
| LABELS | 1 if yes read labels, 0 if do not read labels |
| PLABELS | percent labeled products for which usually read labels |
| COMPONENTS READ | |
| NUTRIENT | 1 if usually read Nutrient Content Claim, 0 if do not usually read |
| HEALTH | 1 if usually read Health Claim Label, 0 if do not usually read |
| FACTS | 1 if usually read Nutrition Facts Panel, 0 if do not usually read |
| CPURCH | percent of purchases changed due to reading nutrition label information |
| Dairy Products Purchases | |
| FREQUENCY OF PURCHASE | 1 if purchase product once per week, 2 if less than once per week, but at least every two weeks, 3 if less often than every two weeks, 4 if never purchase |
| FLUID | fluid milk purchase |
| CHEESE | cheese purchase |
| FROZEN | frozen dairy dessert purchase |
| OTHERD | other dairy products purchase |
| PNEW | percent new dairy foods comprised of overall dairy foods purchased |
| Importance of Nutrients in Purchase Decision | |
| NUTRIENT IMPORTANCE | 1 if label information about the nutrient is very important in influencing purchase decisions, 2 if important, 3 if somewhat important, 4 if of minor importance, 5 if not important |

| | |
|---|---|
| PROTEIN | importance of protein |
| FAT | importance of total fat |

Table 4.1. (continued)

| Variable Name | Definition |
|---|---|
| CALCIUM | importance of calcium |
| CHOLEST | importance of cholesterol |
| VITD | importance of vitamin D |
| CALORIES | importance of calories |
| PLOW | percent of purchases that are low-fat, nonfat, or reduced fat |
| PRODUCT CHARACTER-ISTICS | 1 if characteristic is very important, 2 if important, 3 if somewhat important, 4 if of minor im portance, 5 if not important in influencing dairy products purchases |
| FLAVOR | importance of flavor |
| PRICE | importance of price |
| FRESH | importance of freshness |
| NUTR | importance of nutrition |
| PREP | importance of ease of preparation |
| SAFE | importance of safeness |
| Use of Other Sources of Nutrition Information | |
| INFORMATION SOURCE | 1 if have obtained nutrition informatiom from during the previous year, 0 if have not |
| NEWS | newspaper, books, magazines |
| RADTV | radio or television |
| PROF | doctor, nurse, or other health professionals |
| GOVT | government or industry publications |
| DIETEC | nutritionist, dietician, or home economists |

Shopping Habits

| | |
|---|---|
| TRIPMIN | number of minutes an average shopping trip lasts |

Table 4.1 (continued)

| Variable Name | Definition |
|---|---|
| ITEMS | number of food items usually purchased on a trip<br>1 if less than 20 items, 2 if 20-39 items, 3 if 40-59 items, 4 if 60-79 items, 5 if 80 or greater items |
| ALONE | 1 if usually shop alone, 0 if otherwise |
| FOODAWAY | percent of household food budget spent on foods eaten away from home, 1 if less than 10%, 2 if 10-19%, 3 if 40-59%, 4 if 60-79%, 5 if 80-100% |
| Household Characteristics of Food Shopper's Household | |
| INCOME | household income before taxes for 1994, 1 if under $15,000, 2 if $15,000 to $24,999, 3 if $25,000 to $34,999, 4 if $35,000 to $44,999, 5 if $45,000 to $59,999, 6 if $60,000 or more |
| AREA | 1 if household is located in a rural area, 0 if urban area |
| CHILD | 1 if children under 18 present in the household, 0 if otherwise |
| HHSIZE | number of people living in household on a full-time basis |
| Demographic Characteristics of Food Shopper | |
| EDUC | number of years of formal education |
| AGE | age of respondent in years |
| GENDER | 1 if female, 0 if male |
| RACE | 1 if White, 2 if Black, 3 if Asian/pacific islander, 4 if American Indian, 5 if otherwise |
| EMPLOY | 1 if full-time homemaker, 2 if full-time employment, 3 if part-time employed, 4 if retired, 5 if unemployed, 6 if otherwise |

A dairy product purchase question was included in the questionnaire. If a subject did not purchase some type of dairy food for at-home consumption, then they were asked to stop responding to the questionnaire and return the survey. Those individuals who reported that they did not purchase dairy foods were deleted from the data set.

Respondents were asked questions about nutrition label use. Subjects were asked if they read nutrition information contained on labels of one or more dairy products he or she considered purchasing. If they read the label, the variable LABEL was given a value of 1, if not, it was assigned a value of zero.

If respondents claimed to be label readers, they were asked to respond to a series of six label usage questions to determine how often they used labels, what components of the labels were most important, and how nutrition labels affected dairy product purchases. These label usage questions included a continuous variable for the percentage of labeled dairy food products considered for which nutrition labels were read (PLABEL). Questions about specific components of nutrition labels respondents usually read in store were also asked. These components include the nutrient content claim label (NUTRIENT), the health claim label (HEALTH), and the nutrition facts panel (FACTS). If the respondent read the component, the variable was assigned a 1, zero if it was not read. A variable for the percentage of purchases of dairy food products changed due to nutrition label information (CPURCH) was included.

The survey included a question about the frequency of purchases of dairy products. Respondents were asked to indicate how often they purchased different groups of dairy food products. The groups were fluid milk (FLUID), cheese (CHEESE), frozen

dairy desserts (FROZEN), and other dairy products such as yogurt, novelties, and sour cream (OTHERD). Respondents were given frequency of purchase choices of once per week or more often; less than once per week, but at least every two weeks; purchase, but less often than every two weeks; and never purchase.

A question about the importance of label information about certain nutrients in influencing changes in dairy foods purchases was asked. These nutrients include protein (PROTEIN), total fat (FAT), calcium (CALCIUM), cholesterol (CHOLEST), vitamin D (VITD), and calories (CALORIES). Respondents were asked to choose an importance rating for each nutrient; the ratings were 'Very Important, Important, Somewhat Important, Minor Importance, and Not Important'. Also, label usage variables included a continuous variable for the percentage of dairy products purchased which are according to their labels low-fat, non-fat, or have reduced fat (PLOW). Household nutrition variables included an importance rating on the influence of dairy product characteristics on purchase decisions. These characteristics include flavor (FLAVOR), price (PRICE), freshness (FRESH), nutrition (NUTR), ease of preparation (PREP), and safeness (SAFE).

Respondents were asked to indicate the influence of the characteristic by indicating if the nutrient was very important, important, of minor importance, or not important. Measures of nutritional information included whether the respondent had received nutritional information from newspapers, books, magazines (NEWS); radio or television (RADTV), a doctor, nurse, or other health professional (PROF), government or industry publications (GOVT), or from a nutritionist, dietician, or home economist

(DIETEC). If the subject had received information from the source, the variable was assigned a value of 1, a value of zero was assigned otherwise.

Information on respondents' shopping habits included the average length of a shopping trip (TRIPMIN), number of foods items usually purchased (ITEMS). The variable ALONE indicated whether or not the respondent shops alone. The variable was assigned a value of one if the subject usually shopped alone and zero if otherwise. The variable FOODAWAY reflected the percentage of total household food budget that is spent on foods eaten away from home. To focus on dairy food products, respondents were asked to indicate a category to measure the percentage of new dairy food products included in the total amount of dairy food products purchased (PNEW).

Demographic variables can be broken into two categories: the household characteristics of the food shopper's household and characteristics of the food shopper. Household characteristics were measured by questions involving four variables. The number of people living in the household on a full-time basis excluded roomers, boarders, or employees was determined by the variable HHSIZE. A dummy variable (CHILD) measured whether or not there are children under 18 living in the household. If a child under 18 was present, the variable was assigned a value of 1, if not, a value of zero was assigned. The variable AREA is a dummy variable for whether or not the household is located in a rural area or not (urban). If a rural household, the variable was assigned a value of 1, if not, a value of zero was assigned. The respondent was given no guidelines on the delineation of rural and urban. A measure of the respondent's income before taxes in 1994 was included. The variable INCOME presented six possible income categories

from which the respondent could choose. Characteristics of the household food shopper include the number of years of formal education (EDUC) and the age of the respondent (AGE). Respondents were asked to indicate their race (RACE) by choosing between white, black, Asian/pacific islander, American Indian, and other races. The variable GENDER was assigned a value of 1 if respondent was female and a value of zero if the respondent was male. Subjects were given 6 categories to choose from to indicate their employment status (EMPLOY). The choices were full-time homemaker, full-time employed, part-time employed, retired, unemployed, and otherwise

# CHAPTER 5

# RESULTS

## Descriptive Statistics

A summary of the means and standard deviations for continuous variables and frequencies for discrete variables is shown in the following 13 tables. Four respondents who never purchased dairy products were omitted from the sample. Of the remaining respondents, 86 percent (209 respondents) were label users.

Respondents who self-reportedly read nutrition information contained on one or more of the dairy food products considered for purchase were considered as users of food labels. Of these users, respondents read the nutrition labels on almost 75 percent of dairy food products they considered for purchase (Table 5.1). Reading these dairy food product labels caused a change in purchase pattern for 37 percent of these dairy food products. Of respondents who are users of labels, 75 percent of dairy food products purchased were according to their nutrient content claim of low-fat, non-fat or reduced fat.

Ninety-six percent of respondents who are users of food labels reported that 'YES' they usually read the Nutrition Facts Panel and 84 percent reported they had usually read the Nutrient Content Label (Table 5.2). However, slightly less than 39 percent had usually read the Health Claim and almost 25 percent had not seen the Health Claim.

Almost three out of every four respondents who are food label users purchase fluid milk once per week or more often with only 0.5 percent of the sample who never purchase fluid milk (Table 5.3). Almost 39 percent of respondents who are users purchase cheese less than once per week, but at least every two weeks. Almost 50 percent of respondents

Table 5.1. Use of Nutrition Labels on Dairy Products

| Nutrition Label Use | Mean | Standard Deviation |
|---|---|---|
| Percent of dairy food products for which read nutrition labels (N=198) | 74.03 | 27.99 |
| Percent of dairy foods products for which nutrition label information caused a change in purchase patterns (N=194) | 37.26 | 30.59 |
| Percent of dairy food products purchased that are, according to their labels, low-fat, non-fat or reduced fat (N=204) | 75.86 | 25.55 |

Table 5.2. Nutrition Label Components Read In-Store for Dairy Products

| | Percent | | |
|---|---|---|---|
| Label Components Usually Read | Yes | No | Have Not Seen |
| Nutrition facts panel (N=192) | 96.4 | 3.1 | 0.5 |
| Nutrient content label (N=187) | 84.0 | 11.2 | 4.8 |
| Health claim label (N=173) | 38.7 | 36.4 | 24.9 |

Table 5.3. Frequency of Dairy Products Purchases

| Dairy Products | Frequency of Purchase (Percent) | | | |
|---|---|---|---|---|
| | Once per week or more often | Less than once per week, but at least every two weeks | Less often than every two weeks | Never |
| Fluid milk (N=207) | 72.9 | 18.4 | 8.2 | 0.5 |
| Cheese (N=199) | 24.6 | 38.7 | 35.7 | 1.0 |
| Other dairy products (N=202) | 19.3 | 27.2 | 49.5 | 4.0 |
| Frozen dairy desserts (N=189) | 14.8 | 18.0 | 57.1 | 10.1 |

who are label users purchase other dairy products (e.g., yogurt, sour cream) less often than every two weeks with only 19.8 percent purchasing these other dairy products at least once per week. Just over 57 percent of respondents who are users of food labels purchase frozen dairy desserts less often that every two weeks, with slightly less than 15 percent purchasing once per week or more often.

Of those respondents who are label users, 84 percent felt that total fat content was 'Very Important' in influencing their purchases of dairy products (Table 5.4). Cholesterol and calories were ranked next with 59 and 52 percent, respectively, of respondents feeling these nutrients were 'Very Important' in influencing purchases of dairy food products. Thirty-two percent of respondents who are label users felt that the amount of calcium was 'Very Important' in influencing purchases. Around 30 percent of respondents who are label users felt that protein and vitamin D were only 'Somewhat Important' in influencing their purchase decisions, while only 18 and almost 15 percent, respectively, felt that these nutrients were 'Very Important'.

All respondents were asked questions regarding importance of certain food characteristics, use of nutrition information, shopping habits, and demographic and socioeconomic characteristics. For the variables representing each of these categories responses are summarized for the total sample, label users, and label nonusers.

All respondents were asked how important certain food characteristics are in influencing their purchases of dairy food products. Almost 87 percent of respondents felt that freshness of dairy foods was 'Very Important' with zero respondents feeling that freshness was 'Not Important' (Table 5.5). Safeness and flavor of dairy foods were felt to

Table 5.4. Importance of Selected Nutrients in Influencing Purchases of Dairy Products

| Nutrient | Percent | | | | |
|---|---|---|---|---|---|
| | Very Important | Important | Somewhat Important | Minor Importance | Not Important |
| Total fat (N=208) | 83.7 | 10.6 | 4.8 | 0 | 1.0 |
| Cholesterol (N=204) | 58.8 | 19.6 | 13.7 | 4.9 | 2.9 |
| Calories (N=206) | 51.9 | 26.7 | 13.6 | 5.3 | 2.4 |
| Calcium (N=198) | 31.8 | 33.8 | 22.7 | 6.6 | 5.1 |
| Protein (N=194) | 17.5 | 26.3 | 29.4 | 12.4 | 14.4 |
| Vitamin D (N=197) | 15.2 | 29.9 | 29.9 | 15.2 | 9.6 |

Table 5.5. Influence of Dairy Food Products Characteristics on Purchase Decision

| Product Characteristic | Very Important | Important | Somewhat Important | Minor Importance | Not Important |
|---|---|---|---|---|---|
| | Percent Total Sample | | | | |
| Freshness (N=240) | 86.2 | 11.7 | 1.7 | 0.4 | 0 |
| Safeness (N=236) | 70.3 | 16.9 | 8.1 | 3.4 | 1.3 |
| Flavor (N=237) | 69.2 | 26.2 | 3.8 | 0.8 | 0 |
| Nutrition (N=239) | 50.2 | 33.1 | 14.6 | 1.3 | 0.8 |
| Price (N=239) | 28.5 | 39.3 | 23.4 | 6.7 | 2.1 |
| Ease of preparation (N=237) | 25.3 | 30.8 | 29.5 | 10.1 | 4.2 |
| | Percent Label Users | | | | |
| Freshness (N=208) | 86.5 | 11.1 | 1.9 | 0.5 | 0 |
| Safeness (N=204) | 71.6 | 17.2 | 6.9 | 3.4 | 1.0 |
| Flavor (N=205) | 67.3 | 28.3 | 3.4 | 1.0 | 0 |
| Nutrition (N=207) | 54.6 | 32.9 | 12.6 | 0 | 0 |
| Price (N=207) | 28.5 | 41.5 | 22.2 | 6.3 | 1.4 |
| Ease of preparation (N=205) | 24.9 | 32.2 | 29.3 | 10.2 | 3.4 |
| | Percent Nonusers | | | | |
| Freshness (N=32) | 84.4 | 15.6 | 0 | 0 | 0 |
| Safeness (N=32) | 62.5 | 15.6 | 15.6 | 3.1 | 3.1 |
| Flavor (N=32) | 81.2 | 12.5 | 6.2 | 0 | 0 |
| Nutrition (N=32) | 21.9 | 34.4 | 28.1 | 9.4 | 6.2 |
| Price (N=32) | 28.1 | 25.0 | 31.3 | 9.4 | 6.2 |
| Ease of preparation (N=32) | 28.1 | 21.9 | 31.3 | 9.4 | 9.4 |

be 'Very Important' in purchase decisions by approximately 70 percent of the respondents. Fifty percent of respondents felt nutrition of dairy foods was 'Very Important' in influencing purchase decisions while 33 percent felt that nutrition was 'Important'. Almost 39 percent of respondents felt that price of a dairy product was 'Important' in influencing purchase decisions. Slightly over 30 percent of respondents felt that ease of preparation was 'Important' while 4 percent felt that ease of preparation was 'Not Important'. 39 percent of respondents felt that price of a dairy product was 'Important' in influencing purchase decisions.

Of those respondents which were label users, almost 87 percent felt that freshness of dairy foods was 'Very Important' in making purchase decisions with zero percent feeling that it is not important. Nearly 72 percent of label users ranked safeness of dairy food products as 'Very Important'. Almost 68 percent of label users felt that flavor was 'Very Important' in purchase decisions. Over 54 percent of label users felt nutrition was 'Very Important' in influencing purchases of dairy food products with zero percent feeling that nutrition was 'Not Important'. The majority (41 percent) of label users felt that price was 'Important' in purchase decisions. Around 30 percent of those respondents who are label users felt that ease of preparation was 'Important' or 'Somewhat Important' in purchase decisions.

Looking at only nonusers, almost 85 percent felt that freshness was 'Very Important' and 15 percent felt that freshness was 'Important'. Over 62 percent of nonusers ranked safeness as 'Very Important' in making purchases with over 6 percent ranking safeness as 'Minor Importance' and 'Not Important'. Almost 82 percent of the

nonusers felt that flavor was 'Very Important' and almost 13 percent ranked flavor as 'Important'. Almost 22 percent of nonusers felt that nutrition was 'Very Important' in influencing purchase decisions and almost 6 percent ranked nutrition as 'Not Important'. Almost one third of the nonusers felt that price was 'Very Important' in making purchase decisions with 25 percent and 31 percent ranking price as 'Important' and 'Minor Importance', respectively. Over 28 percent of nonusers ranked ease of preparation as 'Very Important , with 9.4 percent ranking it as 'Not Important'.

All survey respondents were asked about the sources from which they had received nutrition information during the past year. Eighty-eight percent of respondents indicated they had received nutrition information from newspapers, books and magazines (Table 5.6). Almost 60 percent of respondents had received nutrition information from radio or television during the past year. Slightly over 43 percent indicated that a health professional had given them nutrition information in the past year. Government or industry publications were a source on nutrition information to 19 percent of respondents. Slightly over 17 percent of respondents had received nutrition information from a nutritionist, dietician, or home economist during the past year.

Over 90 percent of the label users had received nutrition information from newspapers, books, or magazines in the past year. Fifty-nine percent of label users claimed radio or television as a source of nutrition information with 45 percent receiving information from a health professional. Over 19 percent of label users received nutrition information from government or industry publications, and nutritionists, dieticians, or home economists.

Table 5.6. Sources of Nutrition Information Used During the Past Year

| Source of Information | Source | Not a Source |
|---|---|---|
| | Percent Total Sample (N=240) | |
| Newspaper, books, magazines | 88.3 | 11.7 |
| Radio or television | 59.2 | 40.8 |
| Doctor, nurse, or other health professionals | 43.3 | 56.7 |
| Government or industry publications | 19.2 | 80.8 |
| Nutritionist, dieticians, or home economists | 17.1 | 82.9 |
| | Percent Label Users (N=209) | |
| Newspaper, books, magazines | 91.4 | 8.6 |
| Radio or television | 58.9 | 41.1 |
| Doctor, nurse, or other health professionals | 45.5 | 54.5 |
| Government or industry publications | 19.1 | 80.9 |
| Nutritionist, dieticians, or home economists | 18.7 | 81.3 |
| | Percent Nonusers (N=31) | |
| Newspaper, books, magazines | 67.7 | 32.3 |
| Radio or television | 61.3 | 38.7 |
| Doctor, nurse, or other health professionals | 29.0 | 71.0 |
| Government or industry publications | 1934 | 80.6 |
| Nutritionist, dieticians, or home economists | 6.5 | 93.5 |

Of those respondents who are label nonusers, almost 68 percent received nutrition information from newspapers, books, or magazines in the past year. Sixty-one percent of the nonusers gained information from radio or television. A health professional was a source of nutrition information for 29 percent of label nonusers. Almost 20 percent of nonusers received information from government or industry publications and almost 7 percent received information from a nutritionist, dietician, or home economist.

All survey respondents were asked questions pertaining to their grocery shopping habits. Around 45 percent of respondents of the total sample, label users, and nonusers usually purchased between 20 and 39 items on a shopping trip (Table 5.7). Around 75 percent of respondents of the total sample and those who are label users shopped for groceries alone; whereas, 88 percent of the nonusers of labels shopped alone. From all groups, around 45 percent of respondents spent less than 20 percent of their food budget on foods eaten away from home. Nonusers spent the least amount of time (in minutes) on a shopping trip. Nonusers spent a mean time of 31 minutes; whereas, the respondents in the total sample spent a mean time of almost 43 minutes and label users spent a mean time of slightly less than 45 minutes. In Table 5.8, results show that most consumers in the sample had less than 10 percent of their overall dairy food purchases comprised of new products. The results did show that while over 90 percent of label nonusers had less than 10 percent of overall dairy food purchases of new products, only about 83 percent of label users had less than 10 percent of new products. Of the respondents in the total sample, 2.0 percent purchased new dairy products comprising 30 percent or greater of their overall dairy product purchases.

Table 5.7. Shopping Habits

| Shopping Habit | Percent | | |
|---|---|---|---|
| | Total Sample | Label Users | Nonusers |
| Number foods items purchased | (N=241) | (N=209) | (N=32) |
| less than 20 | 27.0 | 24.9 | 40.6 |
| 20-39 | 45.6 | 45.0 | 50.0 |
| 40-59 | 19.1 | 21.1 | 6.2 |
| 60-79 | 5.0 | 5.3 | 3.1 |
| 80 or greater | 3.3 | 3.8 | 0 |
| Shop Alone | (N=240) | (N=208) | (N=32) |
| Yes | 77.1 | 75.5 | 87.5 |
| No | 22.9 | 24.5 | 12.5 |
| Food budget spent on foods eaten away from home | (N=240) | (N=208) | (N=32) |
| less than 20% | 47.5 | 48.1 | 43.7 |
| 20-39% | 28.3 | 29.8 | 18.8 |
| 40-59% | 17.5 | 15.4 | 31.3 |
| 60-79% | 5.1 | 5.3 | 6.2 |
| 80-100% | 1.3 | 1.4 | 0 |
| | | Mean (Std. Dev.) | |
| | (N=241) | (N=209) | (N=32) |
| Length of shopping trip in minutes | 42.9 (20.55) | 44.78 (20.79) | 30.94 (14.05) |

Table 5.8. New Dairy Products Purchases as a Percent of Overall Dairy Products Purchases

| New Dairy Food Products Purchased as a Percent of All Dairy Products Purchases | Percent | | |
|---|---|---|---|
| | Total Sample | Label Users | Nonusers |
| | (N=238) | (N=206) | (N=32) |
| Less than 10% | 84.5 | 83.5 | 90.6 |
| 10-19% | 10.5 | 11.2 | 6.2 |
| 20-29% | 2.9 | 2.9 | 3.1 |
| 30% or greater | 2.0 | 2.5 | 0 |

Questions about the household characteristic of the food shopper's household showed that around 30 percent of subjects in all three groups earned $60,000 or more in 1994 (Table 5.9). Just over seven percent of nonusers were in the $35,000 to $44,999 category while around 13 percent of the total sample and label users were in this category. Thirty-two percent of the total sample lived in rural areas. While on only 29 percent of the label users lived in rural areas, just over 47 percent of the label nonusers lived in rural areas. Of those respondents in the total sample, 25 percent had children present in the household. Over 27 percent of label users had children present in the household, but only just over 15 percent of the nonusers had children in the household. The mean number of people living in the household for the total sample is 2.30. Label users have a slightly higher mean number of people living in the household with 2.36 while nonuser households consisted of 2.0 people.

The questions about the demographic characteristics of the food shopper showed that the mean years of formal education was highest for label users, 14.78, and only slightly lower for the total sample, 14.74 (Table 5.10). The mean number of years of formal education for nonusers was 14.47 years of formal education. The mean age in years for subjects in the total sample was 52, for label users was 52.6, and for nonusers was 48.13. All respondents responded that their race was either in the white or black categories. No respondents reported themselves as Asian/pacific islander, American Indian, or other race. Ninety-six percent of respondents in the total sample, label users and the non label users were white. Almost 65 percent of the total sample was female. Almost 68 percent of the label users were female but on only about 60 percent of the

Table 5.9. Household Characteristics of Food Shopper's Household

| | Percent | | |
|---|---|---|---|
| Household Characteristics | Total Sample | Label Users | Nonusers |
| Income | (N=220) | (N=192) | (N=28) |
| Under $15,000 | 8.2 | 8.9 | 3.6 |
| $15,000-$24,999 | 11.8 | 12.0 | 10.7 |
| $25,000-$34,999 | 18.6 | 18.2 | 21.4 |
| $35,000-$44,999 | 13.2 | 14.1 | 7.1 |
| $45,000-$59,999 | 18.6 | 18.2 | 21.4 |
| $60,000 or more | 29.5 | 28.6 | 35.7 |
| Household area | (N=235) | (N=203) | (N=32) |
| Rural | 32.8 | 29.6 | 46.9 |
| Urban | 67.2 | 70.4 | 53.1 |
| Children present in household | (N=240) | (N=208) | (N=32) |
| | 25.8 | 27.4 | 15.6 |
| | | Mean (Std. Dev.) | |
| | (N=239) | (N=207) | (N=32) |
| Number of people living in household | 2.31 (1.16) | 2.36 (1.17) | 2.03 (1.09) |

Table 5.10. Demographic Characteristics of Food Shopper

| Shopper Characteristics | Mean (Std. Dev.) Total Sample (N=238) | Label Users (N=205) | Nonusers (N=32) |
|---|---|---|---|
| Years formal education | 14.74 (3.18) | 14.78 (2.93) | 14.47 (4.56) |
| Age | 52.00 (15.93) | 52.60 (15.85) | 48.13 (16.17) |
| | Percent | | |
| | Total Sample | Label Users | Nonusers |
| Race | | | |
| White | 96.6 | 96.6 | 96.9 |
| Black | 3.4 | 3.4 | 3.1 |
| Gender | | | |
| Female | 64.1 | 67.8 | 59.4 |
| Male | 35.9 | 32.2 | 40.6 |
| Employment | | | |
| Full-time homemaker | 11.3 | 12.6 | 3.1 |
| Full-time employed | 52.5 | 49.5 | 71.9 |
| Part-time employed | 9.7 | 10.7 | 3.1 |
| Retired | 23.9 | 24.8 | 18.8 |
| Unemployed | 0.4 | 0.5 | 0 |
| Other | 2.1 | 1.9 | 3.1 |

nonusers were females. Of the total sample, almost 53 percent were full-time employed with almost 24 percent retired, and 11.3 percent were full-time homemakers. Of the label users, 49 percent were full-time employed, 24 percent retired, and almost 13 percent were full-time homemakers. Of the nonusers, over 71 percent were full-time employed with almost 19 percent retired. Just over three percent of the nonusers were full-time homemakers.

## Probit Model

The estimated probit model for label use is presented in Table 5.11. When all missing values were deleted, there were 216 observations used in the estimated probit model. The log likelihood ratio test has a calculated value of 58.03618 which exceeds the Chi-square critical value (3.94, with 10 degrees of freedom, $\alpha$=.05). Therefore, the null hypothesis that all slope parameters are zero was rejected, and at least one of the variables in the model was of value in explaining the probability of label readership. The results of an in-sample evaluation of the predictive power are shown in Table 5.12. The probit model used correctly classified 86.2 percent of the individual responses. The coefficients for the variables PNEW, CHILD, FLAVOR, AREA, GENDER, WORK, NEWS, and PROF had the signs that were hypothesized. The coefficients for the variables PRICE and NUTR were both negative; however, these coefficients were hypothesized to be positive. The coefficients on GENDER, AREA, NUTR, NEWS, and PROF were significantly different from zero at $\alpha$ = .01. The coefficients for the following variables were significantly different from zero at $\alpha$ = .05 were CHILD and FLAVOR. The coefficient for the variable WORK was significantly different from zero at $\alpha$ = .10. Those which did

Table 5.11. Probit Estimates for Readership of Nutrition Labels on Dairy Foods

| Variable | Coefficient | Standard Error | t-ratio | Significance Level |
|---|---|---|---|---|
| Constant | 0.1834 | 0.6497 | 0.282 | 0.7777 |
| PNEW | 0.1087 | 0.3826 | 0.284 | 0.7762 |
| CHILD | 0.7216 | 0.3575 | 2.019 | 0.0435** |
| FLAVOR | 0.5691 | 0.2713 | 2.097 | 0.0359** |
| PRICE | 0.0166 | 0.1387 | -0.120 | 0.9044 |
| NUTR | -0.5148 | 0.1620 | -3.178 | 0.0015*** |
| AREA | -0.8623 | 0.2820 | -3.058 | 0.0022*** |
| GENDER | 0.6935 | 0.2799 | 2.477 | 0.0132*** |
| WORK | -0.5283 | 0.3128 | -1.689 | 0.0913* |
| NEWS | 1.2460 | 0.3745 | 3.327 | 0.0008*** |
| PROF | 0.6789 | 0.3011 | 2.255 | 0.0241** |
| Log Likelihood | | -61.59 | | |
| Log Likelihood-Intercept Only | | -90.61 | | |
| Chi-Square (10) | | 58.04 | | |

*** significant at $\alpha = .01$, ** significant at $\alpha = .05$, * significant at $\alpha = .10$

Table 5.12. Frequencies of Actual and Predicted Outcomes

| Actual | Predicted 0 | Predicted 1 | |
|---|---|---|---|
| 0 | 10 | 22 | 32 |
| 1 | 8 | 176 | 184 |
| | 18 | 198 | TOTAL=216 |

not have coefficients significantly different from zero were PNEW and PRICE.

Marginal effects for the variables included in the probit model were not generated because the independent variables are categorical and marginal effects are not appropriate. However, three consumer profiles were generated to illustrate the effects of use of nutrition information on label readership. Three household profiles were generated. The predicted probability of label readership was projected for each profile with and without use of nutrition information from newspapers, magazines, or books, or from health professionals. The first profile (Profile 1) was designed to represent an "average" consumer in the sample based on frequencies of PNEW, CHILD, FLAVOR, PRICE, NUTR, AREA, GENDER, and WORK. The second profile (Profile 2) was designed to produce a head of a household with a high probability of label readership based on frequencies of PNEW, CHILD, FLAVOR, PRICE, NUTR, AREA, GENDER, and WORK. The third profile (Profile 3) was designed to represent a head of a household with a low probability of label readership based of frequencies of PNEW, CHILD, FLAVOR, PRICE, NUTR, AREA, GENDER, and WORK. The results of these profiles are shown in Table 5.13.

The "average" consumer represented by Profile 1 was a female working out of the home, living in an urban area, and with no children under 18 present in the home. This household head feels that flavor is very important in purchase decisions for dairy foods with price and nutrition being important, with new dairy food products making up less than 10 percent of overall dairy food products purchased. With use of nutrition information from newspapers, magazines, and books and health professionals this

Table 5.13. Household Profile Characteristics

| Profile 1 | Profile 2 | Profile 3 |
|---|---|---|
| female | female | male |
| working out of home | not working out of home | working out of home |
| urban area | urban area | rural area |
| no children present | children present | no children present |
| nutrition very important | nutrition very important | nutrition not important |
| flavor very important | flavor not important | flavor very important |

Table 5.14. Probabilities for 3 Household Profiles

| | Percent | | |
|---|---|---|---|
| | Profile 1 | Profile 2 | Profile 3 |
| Predicted probability of using labels with nutrition information | 86 | 100 | 10 |
| Predicted probability of using labels without nutrition information | 44 | 99 | .07 |

individual has an eighty-six percent probability of reading nutrition labels on dairy foods. If this "average" consumer does not have access to these sources of nutrition information the probability of reading nutrition labels on dairy foods decreases to a forty-four percent probability.

The individual represented by Profile 2 is a female, not working out of the home, living in an urban area, and having at least one child under 18 years of age present in the home. Furthermore, this individual feels that nutrition and price are very important food characteristics in purchase decisions. Flavor is not an important food characteristic in purchase decisions to this consumer. With newspapers, books, or magazines and health professionals as sources of information this individual would have a 1.0 probability of being a label reader. If this individual represented by Profile 2 has no sources of nutrition information the probability of being a label reader decreases to .99.

Profile 3 shows an individual with the least probability of being a label reader. This individual is a male, living in a rural area, working full-time out of the home, with no children under 18 years of age living in the home. Furthermore, this individual ranks nutrition and price as not important food characteristics in purchase decisions with flavor being a very important food characteristic. With no nutritional information from newspapers, books, or magazines and health professionals this individual has a .07 percent probability of being a nutrition label reader. If sources of nutrition information are given to this individual, his probability of being a nutrition label reader increases to 10 percent.

# CHAPTER 6

# CONCLUSIONS AND IMPLICATIONS

## Conclusions

The results from this study show that most respondents read nutrition labels on dairy foods. Among label users, the majority read nutrition labels on most of the dairy foods they considered for purchase. Russell; Wang, Fletcher and Carley; and Reid and Hendricks found similar results. Reading these dairy food products labels did cause a change in purchase pattern for over one third of dairy food products respondents purchased. Of the label readers, the majority usually read the nutrition facts panel. Fewer usually read the nutrient claims. A sizable number had not seen health claim labels. The label readers viewed nutrition information regarding fat and cholesterol as very important. Calcium was also considered to be important. Less important nutrients were protein, vitamin D, and calories. The importance of nutrition information regarding fat is reflected in purchases because consumers are tended toward purchases of low-fat, non-fat or reduced fat dairy products.

The probability of label readership was influenced by gender, working outside the home, urbanization, presence of children in the home, the importance of nutrition and flavor, and use of nutrition information from newspapers, books, magazines, and health professionals. The importance of price of foods and the percent of dairy foods purchased that were new did not significantly affect the probability of label readership. Females were more likely to read nutrition labels. These results are consistent with other studies. Russell; Bender and Derby; and The Roper Organization found that

females are more likely to read nutrition labels. An individual who does not work outside of the home has a higher probability of being a label reader than one who does work outside of the home. This is similar to research findings done by Jensen, Kesevan, and Johnson. The head of households in an urban area had a higher probability of being a label reader than those in a rural area. Jensen, Kesevan and Johnson found similar results. Those individuals with no children under 18 present in the home have a lower probability of being a label reader. This is consistent with research done by Wang, Fletcher, and Carley. Probit model results show that the importance of flavor has a negative effect on the probability of label readership. The importance of price and nutrition positively affects the probability of label readership. The results for nutrition attitudes were consistent with results from Schutz, Judge, and Gentry and The Roper Organization with the American Meat Institute. However, Schutz, Judge, and Gentry found flavor attitudes in a purchase to have a positive effect on label usage. Sources of nutritional information from newspapers, books, or magazines and health professionals were found to positively affect the probability of label readership. Additional sources of information given to a consumer raises his or her probability of reading nutrition labels on dairy food products. Of the label readers, the largest number had received nutrition information from newspapers, books, or magazines.

## Implications

The identification of consumer characteristics which impact the probability of nutrition label usage has implications for the dairy industry, health professionals, and

policy makers. The results from this study can be used in identifying target markets for nutrition education programs, nutritional advertising for dairy foods and more healthful dairy food products.

The consumer segment which would contain nutrition label readers may be composed of households with the following socioeconomic characteristics: a food shopper who is female and does not work outside the household, living in an urban area, with children under 18 years of age present in the household, attitude that nutrition is a very important food characteristic in dairy products purchase decisions, with less importance stressed on product flavor, and uses newspapers, books, magazines and health professionals as sources of nutritional information. The segment of consumers with a low probability for nutrition label readership may have the following household characteristics: male head of household responsible for grocery shopping, head of household works outside the home, living in a rural area, with no children under 18 years of age present in the home, with little importance placed on nutrition in dairy product purchase decisions, with great importance placed on flavor, and has not received nutrition information from newspapers, books, magazines, and health professionals.

Identifying these consumer characteristics is important to the dairy industry as well as to policy makers. With the increased health awareness of consumers, there has been a shift towards more low-fat dairy products. Therefore, identifying characteristics of those consumers who feel nutrition is important and who are conscientious about reading nutrition labels allows dairy food processors to better market their new, lower

fat products. Consumption of dairy products is rising; however, the product mix is changing. Past research (Herrmann, Sterngold, and Warland) has shown that a substantial number of consumers have increased their use of lower fat dairy products, as well as reducing their use of higher fat dairy products. With the estimated costs of $1.6 - $2.6 billion to implement the NLEA, it would appear that policy makers would be interested to see if and to what extent these new nutrition labels are being used. Furthermore, information such as these results can also help to direct future nutrition education efforts. Nutritional information from newspapers, books, or magazines and health professionals had positive impacts on the probability of label readership. These results point out certain market segments which currently have a low probability of being nutrition label readers. These are the markets which may be in need of more intensive educational efforts.

The study results show which components of nutrition labels consumers are most frequently reading. The majority of label readers are reading the nutrient panel and the nutrient claim and current trends are toward consuming lower fat dairy products. This information can help dairy food processors to better meet the needs of their consumers. The nutrient claim on a food label is optional to the manufacturer. However, these results show that most label readers are looking at the nutrient claim. For label readers, reading the nutrition labels on dairy foods has changed their product purchases for over one-third of their total dairy products purchased. Therefore, it is likely to the benefit of the manufacturer or processor to include these nutrient claims on their products. In particular, voluntary nutrient claim labeling can be an important

aspect of advertising lower fat dairy products.

Projections from the household profiles indicate that if these individuals with a low probability of label readership obtain nutrition information from alternative sources (newspapers, books, magazines, and health professionals) their probability of label readership would dramatically increase compared with if they have not obtained nutrition information. Targeting these segments with information through newspapers, books, magazines, and health professionals about the nutrition labels could be an effective tool for increasing label readership.

This study has examined factors which influence the probability of nutrition label readership. Further research should examine the effects of these demographic and socioeconomic characteristics on the level of nutrition label usage and how information may affect purchases in specific product categories.

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# REFERENCES


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# APPENDIX

May 16, 1995

Dear Consumer:

Enclosed with this letter is a survey regarding your use of food nutrition labels. This survey is part of a research study entitled "Consumers' Use of Nutrition Labels on Dairy Foods" being conducted by The University of Tennessee. As you may be aware, the Nutritional Labelling Education Act of 1990 makes nutrition labelling on most foods mandatory. The labels must also conform to very specific requirements regarding the information they include. The purpose of this study is to examine factors which affect consumers' use of these new nutrition labels on dairy products. The study is being conducted by Dr. Kim Jensen, Associate Professor and Laura Adams, Graduate Research Assistant in the Department of Agricultural Economics.

All responses are voluntary. Your return of the survey indicates your informed consent to participate in this study. All results will be summarized so that **your individual responses will be kept confidential**. You may discontinue completing the survey without penalty at any point. Only researchers involved in the study will have access to your survey data. The survey responses will be stored in a secure area in the Department of Agricultural Economics and Rural Sociology at The University of Tennessee for a period of two years, and will then be destroyed.

Your participation in this study is extremely important. We would appreciate your taking about 10 minutes to complete the survey. There is no cost to you to return the survey. Simply refold the survey with The University of Tennessee address showing and drop it in the mail. Please note at the bottom of the survey, you may request a summary of the survey results be sent to you. **Thank you for your help with this study**. If you have any questions, please contact us at (615) 974-7231.

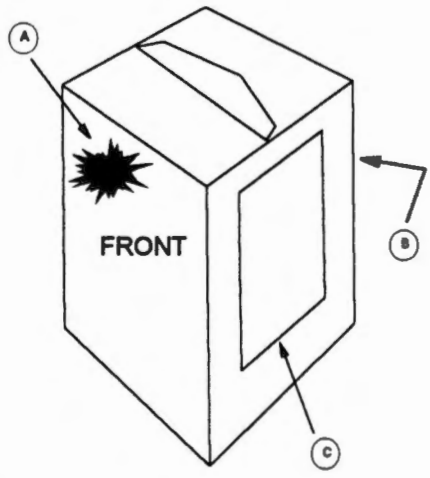
Sincerely,

Kim Jensen
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Laura Adams
Graduate Research Assistant
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## SAMPLE NUTRITION LABEL COMPONENTS

Below are examples of three components which may be a part of food labels, including those on dairy products. Please read each component carefully. The illustration shows where these label components may be located on a food package.




### (A) NUTRIENT CONTENT CLAIMS

* Low Fat
* Cholesterol Free
* High in Calcium

### (B) HEALTH CLAIMS

* "Development of cancer depends on many factors. A diet low in total fat may reduce some cancers."

* "While many factors affect heart disease, diets low in saturated fat and cholesterol may reduce the risk of this disease."

* "Regular exercise and a healthy diet with enough calcium helps teen and young adult white and Asian women maintain good bone health and may reduce their risk of osteoporosis later in life."

(c)

## NUTRITION FACTS PANEL

# Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 3

| Amount Per Serving | |
|---|---|
| Calories 90 | Calories from Fat 30 |
| | % Daily Value* |
| Total Fat 3g | 5% |
| Saturated Fat 0g | 0% |
| Cholesterol 0mg | 0% |
| Sodium 300mg | 13% |
| Total Carbohydrate 13g | 4% |
| Dietary Fiber 0g | 0% |
| Sugars 3g | |
| Protein 3g | |

| | | | |
|---|---|---|---|
| Vitamin A 4% | • | Vitamin C 8% | |
| Calcium 21% | • | Iron | 4% |

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

| | Calories: | 2,000 | 2,500 |
|---|---|---|---|
| Total Fat | Less than | 65g | 80g |
| Saturated Fat | Less than | 20g | 25g |
| Cholesterol | Less than | 300mg | 300mg |
| Sodium | Less than | 2,400mg | 2,400mg |
| Total Carbohydrate | | 300g | 375g |
| Dietary Fiber | | 25g | 30g |

Calories per gram:
Fat 9 · Carbohydrate 4 · Protein 4

Note: This sheet does not need to be returned with the survey. You may discard it or keep it for your own reference.

# Consumers' Use of Nutrition Labels on Dairy Foods



University of Tennessee, Department of Agricultural Economics

*Thank you for responding to this study of consumers' use of nutrition labels on dairy foods. We suggest that the questionnaire be answered by the primary food shopper of the household.* ***Your responses will be kept in strict confidence.*** *Your response to this survey serves as informed consent to participate in the study. You have the right to discontinue completing the survey at any point.*

Do you purchase dairy foods of some type (for example: milk, cheese, ice cream, sour cream, etc.) for at-home consumption? (Circle the answer.)

a) Yes

b) No-- **If you answered 'No', please re-fold the survey and return by mail. Thank you.**

**Section 1.** *Please answer the following questions regarding use of nutrition labels on dairy foods packaging and questions regarding dairy products purchases. Answers should be based on what you have done during recent "typical" shopping trips.*

1. Do you read nutrition information contained on labels of one or more dairy food products you consider purchasing? (Circle theanswer.)

a) Yes

b) No -- **If you answered 'No', please skip questions 2-7.**

2. For what percent of labelled dairy food products you consider purchasing do you read nutrition labels? _____ percent

3. **ON THE ENCLOSED PAGE** is an example of three components which may be part of nutrition labeling on foods (Nutrient Content Claim, Health Claim, and Nutrition Facts). Please read each of the label components. Indicate which components of nutrition labels you usually read in the store when considering a dairy food product purchase (Circle the answer).

A. NUTRIENT CONTENT CLAIM LABEL: a) Yes b) No c) Have Not Seen

B. HEALTH CLAIM LABEL: a) Yes b) No c) Have Not Seen

C. NUTRITION FACTS PANEL: a) Yes b) No c) Have Not Seen

4. Within the last year, the nutrition label information on dairy food products has caused me to change _____% of my dairy products purchases.

5. Please indicate how often you purchase the listed dairy products by circling the appropriate response.

| Dairy Products | Once per week or more often | Less than once per week, but at least every two weeks | Purchase, but less often than every two weeks | Never Purchase |
|---|---|---|---|---|
| Fluid Milk (Plain) | 1 | 2 | 3 | 4 |
| Cheese | 1 | 2 | 3 | 4 |
| Frozen Dairy Desserts (not including novelties such as ice cream bars) | 1 | 2 | 3 | 4 |
| Other Dairy Products (for example: yogurt, novelties, flavored milks, sour cream) | 1 | 2 | 3 | 4 |

6. Please indicate how important label information about the following nutrients is in influencing changes in your dairy foods purchases. (1=Very Important, 2=Important, 3=Somewhat Important, 4=Minor Importance, 5=Not Important) (Circle the answer.)

| | | | | | |
|---|---|---|---|---|---|
| Protein | 1 | 2 | 3 | 4 | 5 |
| Total Fat | 1 | 2 | 3 | 4 | 5 |
| Calcium | 1 | 2 | 3 | 4 | 5 |
| Cholesterol | 1 | 2 | 3 | 4 | 5 |
| Vitamin D | 1 | 2 | 3 | 4 | 5 |
| Calories | 1 | 2 | 3 | 4 | 5 |

7. What percent of the dairy products you purchase are, according to their labels, **low-fat, non-fat, or have reduced fat** content ?

_____ percent

**Section 2.** *Please answer the following questions about nutrition and health in your household.*

8. Please rate the following characteristics according to their influence on your purchases of dairy products. (1=Very Important, 1=Important, 3=Somewhat Important, 4=Minor Importance, 5=Not Important) (Circle the answer.)

| | | | | | |
|---|---|---|---|---|---|
| Flavor | 1 | 2 | 3 | 4 | 5 |
| Price | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| Freshness | 1 | 2 | 3 | 4 | 5 |
| Nutrition | 1 | 2 | 3 | 4 | 5 |
| Ease of Preparation | 1 | 2 | 3 | 4 | 5 |
| Safeness | 1 | 2 | 3 | 4 | 5 |

9. Please indicate other sources from which you have obtained nutrition information during the last year.

_____newspaper, books, magazines

_____doctor, nurse, or other health professionals

_____nutritionist, dieticians, or home economists

_____ radio or television

_____ government or industry publications

**Section 3.** *Please answer the following questions about your usual shopping habits.*

10. An average shopping trip lasts _____ (number of minutes).

11. The number of food items usually purchased during a shopping trip is: (Circle the answer.)

a) Less than 20 b) 20-39 c) 40-59 d) 60-79 e) 80 or greater

12. Do you usually shop alone? _____ Yes _____ No

13. On a recent shopping trip, new dairy food products (or those not tried before) comprised what percent of the dairy food items you purchased? (Circle the answer.)

a) Less than 10% c) 20-29% e) 40-49%

b) 10-19% d) 30-39% f) 50% or greater

14. Of your household's total budget for food, what percent is spent on foods eaten away from home (such as in restaurants, fast food establishments, etc.)? (Circle the answer.)

a) Less than 20% c) 40-59% e) 80-100%

b) 20-39% d) 60-79%

**Section 4.** *Please answer the following questions about yourself and your household.*

15. How many people live in your household on a full-time basis (please exclude roomers, boarders, or employees)? _____

16. Are children present in your household who are under 18 years of age?
_____ Yes _____ No

17. For 1994, what was your household income before taxes? (Include household income from all members and all sources, including wages, rent, interest, Social Security, etc.) (Circle the answer.)

a) Under $15,000 c) $25,000-$34,999 e) $45,000-$59,999

b) $15,000-$24,999 d) $35,000-$44,999 f) $60,000 or more

18. What is your gender? (Circle the answer.) a) Male b) Female

19. What is your race? (Circle the answer.)
a) White c) Asian/pacific islander e)Other

b) Black d) American Indian

20. How many years of formal education have you completed? _____

21. What is your age? _____

22. In what type of area is your household located? (Circle the answer.)
a) Rural b) Urban

23. What is your employment status? (Circle the answer.)

a) Full-time homemaker c) Part-time employment e) Unemployed

b) Full-time employment d) Retired f) Other (Please specify)_____

Again, thank you for your participation. Check here if you would like a summary of the results mailed to you _____ .

# VITA

Laura Emily Adams was born in Oak Ridge, Tennessee on March 30, 1971. She attended elementary schools in the Karns (Knox County) Area School District and graduated from Karns High School in May, 1989. The following August she entered The University of Tennessee, Knoxville and in May, 1993 received the degree of Bachelor of Science in Agriculture in Agricultural Economics and Rural Sociology. In January, 1994, she reentered The University of Tennessee, Knoxville and in December, 1995 received a Master of Science degree in Agricultural Economics.

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