Toward an Understanding of Consumers' Perceptions of Food Labels

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ABSTRACT: This study examines the factors that influence consumers' perceptions or beliefs about food labels. The results indicate that health and diet related attitudes, special diet status, perceived importance of product attributes like nutrition and ease of preparation, race, gender, income, and body mass index are important factors affecting consumers' perceptions and beliefs about label use. Understanding the type of consumers who have these perceptions and beliefs as well as the factors that influence these beliefs and perceptions is crucial for designing effective marketing and nutrition education campaigns.

INTRODUCTION

The Nutritional Labeling Education Act (NLEA) has resulted in significant changes in the manner in which nutrition information is provided on food labels (Burton and Andrews, 1996). The objective of this legislation was to provide consumers with nutrition information to help consumers make informed choices that would assist them in maintaining healthy dietary practices. In part, this involved designing a consistent, understandable, and usable nutrition label. The NLEA instituted sweeping changes to replace the voluntary system of labeling established by the Food and Drug Administration (FDA) regulations in 1973. The

new food labeling legislation mandated nutrition labeling on most processed foods under the jurisdiction of the FDA, established reference Daily Values for certain nutrients, defined serving sizes, and limited health claims. It also established guidelines for voluntary labeling of raw fruits, vegetables, and seafood (Nayga, Lipinski, and Savur, 1998). Hence, the NLEA is considered one of the most important public policy initiatives related to nutritional information and food marketing.

By most accounts, the NLEA regulations have been relatively well received. Surveys indicate that as many as 80 percent of consumers are aware of these new labels on food products (Food Marketing Institute, 1995; Silvergrade, 1996). Survey results also show that about 88 percent of consumers read food labels at least some of the time (Golodner, 1993). The question, therefore, is not whether consumers are aware of the food labels but whether the presence of labels is effectively communicating useful information to consumers.

To a large extent, the effectiveness of nutritional labels depends on consumers' perceptions and beliefs about the use of these labels (Petrucelli, 1996). When faced with a purchase decision, consumers generally adopt strategies that are contingent upon their perception of the decision environment (Payne, 1982). For example, if consumers do not perceive or believe that nutrition information on food labels is useful to them, then they are less likely to use these labels. Understanding the type of consumers who have these perceptions and beliefs as well as the factors that influence these beliefs and perceptions is crucial for designing effective marketing and nutrition education campaigns (Moorthy, Ratchford, and Talukdar, 1997; Wilkie and Dickson, 1985; Schmidt and Spreng, 1996).
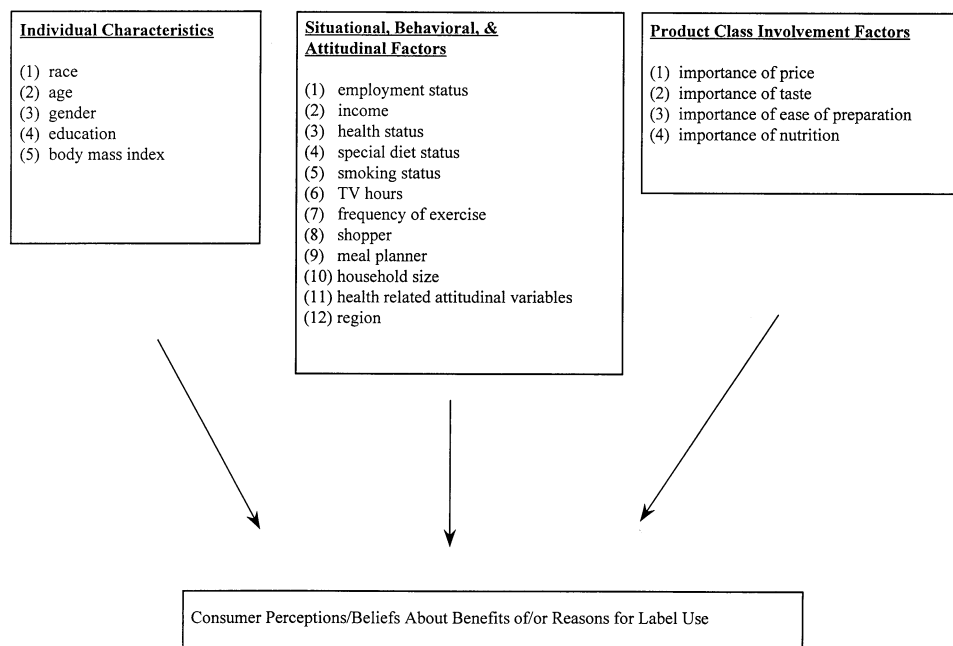
Past research by Feick, Herrmann, and Warland (1986) has identified the sources of nutrition information and the factors that affect use of this information. Three studies have also determined the factors that affect point-of-purchase use of nutrition labels as well as reasons for nonuse (Guthrie et al., 1995; Klopp and MacDonald, 1981; Nayga, 1996). Scant information, however, is available concerning the factors that influence consumer perceptions and beliefs about the benefits of food label use. This study attempts to fill this void and builds on past work related to consumer information search by examining the influence of various factors on nutritional label related perceptions and beliefs of consumers. Consumer perceptions and beliefs have long been considered to be good predictors of behavior (Shepherd and Towler, 1992; Tourila, 1987; Tourila and Pangborn, 1988). Perceptions and beliefs have also been found to be significant antecedents to intentions and behavior (Fishbein and Ajzen, 1975; Tepper, Choi, and Nayga, 1997). No known study has been conducted directly on this topic.

Individual Characteristics	Situational, Behavioral, & Attitudinal Factors	Product Class Involvement Factors
(1) race (2) age (3) gender (4) education (5) body mass index	(1) employment status (2) income (3) health status (4) special diet status (5) smoking status (6) TV hours (7) frequency of exercise (8) shopper (9) meal planner (10) household size (11) health related attitudinal variables (12) region	(1) importance of price (2) importance of taste (3) importance of ease of preparation (4) importance of nutrition

Consumer Perceptions/Beliefs About Benefits of/or Reasons for Label Use

Figure 1.   Conceptual Framework for the Analysis

CONCEPTUAL FRAMEWORK

The theory of external consumer information search is used as a framework to model consumers' perceptions and beliefs about label use. Beatty and Smith (1987) defined external search effort as the degree of attention and perception directed toward obtaining information related to the specific purchase under consideration. Reasons for and perceptions about label use are then assumed to be influenced by factors related to consumer information search (Beatty and Smith, 1987). Past research has identified a large number of factors that have been found to influence the extent of external information search (Moore and Lehmann, 1980). These factors can be grouped into the following categories: (a) individual characteristics, (b) situational, behavioral, and attitudinal variables (including time and financial constraints, attitudes, perceived risks), and (c) product class involvement factors (see Figure 1).

Based on this framework and on data available in the 1994 Diet and Health Knowledge Survey (DHKS), the model used in this study is:

$$'percept \ = \ f(income, \ black, \ other, \ age, \ male, \ employed, \ hhsize, \ educ,$$

$$bmi, \ health, \ specdiet, \ smoke, \ tvhours, \ exercise, \ fatthin, \ dietdis,$$

$$price, \ taste, \ conv, \ chol, \ northeast, \ midwest, \ west.) \tag{1}$$

The description and the means of the variables are exhibited in Table 1. In the 1994 DHKS, the respondents were asked:

"Please tell me if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement: ....."

Six statements are examined in this article (see Table 1). The respondents' degree of agreement with each of these statements related to label use is modeled separately using the specification presented above.

Individual Characteristics

It is well known that individual characteristics influence information search behavior (Ippolito and Mathios, 1990). For example, previous research suggests that the perceptions/beliefs about information search is influenced by various demographic factors such as age, gender, and education (Katona and Mueller, 1955; Schultz, 1975). Moreover, these factors have been found to have effects on use of risk-reducing strategies such as label use (Beatty and Smith, 1987; Mitchell, 1993). For instance, Phillips and Sternthal (1977) concluded that older consumers are likely to process less information than younger consumers because they are less capable of processing large amounts of information and also due to greater market experience. On the other hand, Mitchell and Boustani (1993) found that older respondents perceived risk reducing strategies to be more useful than their younger counterparts when purchasing breakfast cereals. Mitchell also suggested that those high in perceived risk seem to be particularly responsive to information they seek in comparison with information offered to them.

Bettman and Park (1980) theorized that information search depends on one's ability to search for information. A number of studies have found that higher levels of education lead to increasing levels of information search (Katona and Mueller, 1955; Schultz, 1975). Education is then hypothesized to be positively related to consumer's degree of agreement about the reasons for label use.

A recent study of nutritional label use found that males are less likely to use nutritional labels than do females (Nayga, 1996). Mitchell and Boustani (1993) also revealed that females find risk-reducing search strategies more useful than males. Consequently, a gender dummy variable is included in the model.

Situational, Behavioral, and Attitudinal Factors

There is evidence that time pressures or the opportunity cost of time affect the types of information used in decision making. In particular, time pressure has

Table 1. Description and Means of the Variables

Variable	Description	Mean
Dependent Variables[a]		
Useful	degree of agreement with the statement: "The nutrition information on food labels is useful to me"	3.22
Confident	degree of agreement with the statement: "I feel confident that I know how to use food labels to choose a healthy diet"	2.92
Important	degree of agreement with the statement: "I read food labels because good health is important to me"	3.31
Easier	degree of agreement with the statement: "Reading labels makes it easier to choose foods"	3.14
Newfoods	degree of agreement with the statement: "Sometimes I try new foods because of the information on the food label"	2.69
Better	degree of agreement with the statement: "Using food labels to choose foods is better than just relying on my own knowledge about what is in them"	3.22
Independent Variables		
Individual Characteristics		
black	1 if respondent is black; 0 otherwise	0.12
other	1 if respondent is of some other race; 0 otherwise	0.05
age	age of the respondent in years	47.87
male	1 if respondent is male; 0 otherwise	0.44
educ	respondent's highest level of education in years	12.93
bmi	body mass index	26.39
Situational, Behavioral and Attitudinal Factors		
income	household income ($ in thousand)	34.44
employed	1 if respondent is employed; 0 otherwise	0.39
hhsize	household size	2.63
health[b]	self perception of overall health	2.56
specdiet	1 if respondent is on special diet, 0 otherwise	0.20
Smoke	1 if respondent smokes; 0 otherwise	0.22
Tvhours	number of TV hours watched yesterday	2.44
Exercise[c]	frequency of exercise	3.80
fatthin[d]	degree of agreement on the statement "some people are born to be fat and some thin; there is not much you can do to change this"	2.27
dietdis[d]	degree of agreement on the statement "what you eat can make a big difference in your chance of getting a disease, like heart disease or cancer"	3.53
shopper	1 if the individual is the major food shopper of the household; 0 otherwise	0.73
planner	1 if the individual is the major meal planner of the household; 0 otherwise	0.69
northeast	1 if the individual resides in the northeast; 0 otherwise	0.19
midwest	1 if the individual resides in the midwest; 0 otherwise	0.29
west	1 if the individual resides in the west; 0 otherwise	0.19
chol[e]	perceived importance of choosing a diet low in cholesterol	3.52
Product Class Involvement Factors		
price[e]	perceived importance of price when buying food	3.30
taste[e]	perceived importance of taste when buying food	3.80
conv[e]	perceived importance of how easy the food is to prepare	3.08
nutr[e]	perceived importance of nutrition when buying food	3.64

Note: base group includes: white, female, unemployed, those from the south, not on special diet, not a smoker, not a major food shopper and meal planner of the household.
[a]Measured as 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, and 4 = strongly agree.
[b]Responses range from 1 to 5 where 1 = "poor" and 5 = "excellent".
[c]Responses range from 1 to 6 where 1 = "daily" and 6 = "rarely or never".
[d]Responses range from 1 to 4 where 1 = "strongly disagree" and 4 = "strongly agree".
[e]Responses range from 1 to 4 where 1 = "not important at all" and 4 = "very important".

been found to affect nutrition information search (Beatty and Smith, 1987; Katona and Mueller, 1955; Park, Iyer, and Smith, 1989). Employment status and income are included in the analysis to help capture these time pressure effects. The assumption here is that employed individuals and those with higher incomes have greater time pressures or higher opportunity cost of time.

The more a person feels that his/her health is likely to suffer in the future, the greater the perceived health risk. Research on consumer risk suggests that perceptions of risk motivate people to accept reasons for increased information search (Feick, Herrmann, and Warland, 1986). Consequently, variables depicting perception of overall health and special diet status are hypothesized to influence consumers' perceptions about the benefits of label use. In this study, behavioral factors such as smoking status, number of TV hours watched, and frequency of exercise are also included in the model to capture health risk related factors. It is hypothesized that smokers, those who watch television more often, and those who exercise less frequently are less likely to have a good perception about label use.

Findings from past research suggest that the behavioral factors such as desire and motivation to search can influence an individual's perception about information search (Spreng and Olshavsky, 1989). Schmidt and Spreng (1996) extended this idea by specifying that motivation to search is influenced by attitudes, enduring involvement, and shopping enthusiasm. Consumer behavior theories suggest that consumers are motivated to engage in more searching when involvement is high. Celsi and Olson (1988), for instance, found that consumers spend more time attending to information as their involvement increases. In this study, the "planner" and "shopper" variables are hypothesized to capture some of these effects. Moore and Lehman argued that consumers have a better incentive to believe the benefits of information search when the product was purchased for others to consume. Hence, a household size variable (hhsize) is also included in the model to capture some of this effect.

The variables "fatthin", "dietdis", and "chol" are included in the model as health related attitudinal factors. Individuals who believe that people are naturally born fat or thin or those who do not believe that what they eat can make a big difference in their chance of getting a disease or those who perceive a low cholesterol diet as less important are hypothesized to be less likely to believe the reasons for or benefits of label use.

Region of the respondent is also included in the analysis since this factor has been found to be an important factor influencing branded product food consumption.

Product Class Involvement Factors

The perceived importance of price, taste, ease of preparation, and nutrition variables are included in the model to test the hypothesis that these factors affect

Table 2. Distribution of Responses (Percent) to the Label Use Questions

Dependent Variables	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
Useful	3.9	9.1	47.4	39.5
Confident	7.0	18.1	50.0	24.9
Important	4.6	8.9	37.4	49.1
Easier	5.9	13.0	41.6	39.6
Newfoods	17.4	20.0	38.5	24.0
Better	5.5	9.8	41.7	43.0

consumers' perceptions about the benefits of label use. These variables represent measures of product class involvement referred to by Moorthy, Ratchford, and Talukdar (1997). Thayer (1997) and Rose (1994) both alluded to the importance of these factors in consumers' food purchase decisions. In addition, Guthrie et al. (1995) and Nayga (1996) revealed the significance of these factors in information search behaviors.

DATA AND ESTIMATION

The data set used in this study is the 1994 Diet and Health Knowledge Survey (DHKS) from the U.S. Department of Agriculture. The target individuals in this survey were randomly selected from among eligible 1994 Continuing Survey of Food Intakes by Individuals (CSFII) sample persons 20 years of age and older who had provided a complete Day 1 intake record. Data in this survey were collected by computer assisted telephone interviews (in-person interviews for those without telephones). A total of 1,879 individuals participated in the DHKS survey. With the deletion of respondents with incomplete information on the variables used in the study, the final sample used contains 1,227 observations.

Sample statistics for the variables used in the models are presented in Table 1. About 12 percent of the sample are black, five percent are of other non-white race, 44 percent are males, 39 percent are employed, 20 percent are on special diet, and about 22 percent are smokers. Average household income is roughly $34,440, average age is about 48 years while the average household size is 2.63. This sample is probably under-representative of employed individuals. The average age of individuals in the sample is also above the national average. Yet, the distribution of individuals by race, gender, and income seems representative of the U.S. population.

The distributions of responses on the three label use questions are exhibited in Table 2. About 40, 25, 49, 40, 24, and 43 percent of the respondents answered "strongly agree" to the questions, respectively.

Since the dependent variables (*percept*) are measured on a scale that is discrete and ordinal, they are modeled using an ordered logit analysis to investigate the

influence of demographic, socioeconomic, and nutrition related factors on consumers degree of belief about the reasons for label use. The ordered logit model used to estimate the model is specified as:

$$y_i^* = \beta x + \epsilon_i \tag{2}$$

where y_i^* is the unobserved perception held by individual I, x is matrix of explanatory variables, β is a vector of parameters, and ϵ is the error term. Assume that Z is a set of zero-one indicator variables with M response categories C_1, C_2, ..., C_M and R is a vector of real numbers $\lambda_0 \leq \lambda_1 \leq .. \leq \lambda_M$ with $\lambda_0 = -\propto$ and $\lambda_M = +\propto$. The relationship between the indicator Z and unobserved y_i^* can be written as follows:

$$Z_i \epsilon C_M \Leftrightarrow \lambda_{M-1} < \gamma_i^* \leq \lambda_M \tag{3}$$

where $1 \leq i \leq N$ (the sample size).

The model is based on the cumulative logistic probability function and is specified as:

$$P = F(\Phi) = F(x_i'\beta) = 1/(1 + e^{-\Phi}) = 1/(1 + e^{-(xi'\beta)}) \tag{4}$$

where Φ is a theoretical index determined by a set of explanatory variables x; $F(\Phi)$ is the cumulative logistic function; e represents the base of natural logarithms (approximately equal to 2.718); and P is the probability that an individual will make a certain choice, given the knowledge of x (Maddala, 1983). The most suitable technique of estimation when using logit is maximum likelihood. This technique requires the use of iterative algorithm and, therefore, assumes the large-sample properties of consistency and asymptotic normality of the parameter estimates so that conventional tests of significance are applicable.

EMPIRICAL RESULTS

The maximum likelihood estimates and the odd ratios of the six models are exhibited in Table 3. The chi-squared statistics for the estimated models are significant at the 0.0001 level. No degrading multicollinearity problems were detected from the data based on the collinearity diagnostic tests conducted (Belsley, Kuh, and Welsch, 1980).

Individual Characteristics

Based on the statistically significant coefficients, the results on the individual characteristics indicate that compared to whites, blacks are 1.3 and 1.5 times more likely to agree with the statements: "I feel confident that I know how to use food

Table 3. Maximum Likelihood Estimates of the Models

Variables	Useful	Confident	Important
Individual Characteristics			
black	0.033	0.288*	0.412*
	(1.033)	(1.334)	(1.510)
other	0.589*	0.118	−0.265
	(1.795)	(1.125)	(0.767)
age	−0.008*	−0.001	−0.0004
	(0.992)	(1.000)	(1.000)
male	−0.284*	0.019	−0.417*
	(0.752)	(1.019)	(0.659)
educ	−0.035	−0.004	−0.015
	(0.966)	(0.996)	(0.985)
bmi	−0.026*	−0.013	−0.045*
	(0.975)	(0.987)	(0.956)
Situational, Behavioral, and Attitudinal Factors			
income	0.007*	0.002	0.004
	(1.007)	(1.002)	(1.004)
employed	0.130	0.088	0.196
	(1.139)	(1.091)	(1.216)
hhsize	0.012	0.027	0.065
	(1.012)	(1.028)	(1.068)
health	−0.031	0.086	0.051
	(0.970)	(1.090)	(1.053)
specdiet	0.470*	0.266*	0.705*
	(1.600)	(1.305)	(2.023)
smoke	−0.135	0.091	−0.126
	(0.874)	(1.096)	(0.881)
tvhours	0.009	−0.017	−0.009
	(1.009)	(0.983)	(0.991)
exercise	0.006	−0.007	−0.058*
	(1.006)	(0.993)	(0.943)
fatthin	−0.170*	−0.073	−0.093*
	(0.843)	(0.929)	(0.911)
dietdis	0.155*	0.093	0.253*
	(1.168)	(1.097)	(1.300)
shopper	−0.360*	0.119	−0.025
	(0.697)	(1.127)	(0.975)
planner	0.177	0.088	0.127
	(1.194)	(1.092)	(1.136)
northeast	0.289*	0.171	0.422*
	(1.335)	(1.187)	(1.524)
midwest	0.101	0.119	0.109
	(1.107)	(1.127)	(1.115)
west	0.065	0.185	0.174
	(1.067)	(1.203)	(1.191)
chol	0.240*	0.199*	0.443*
	(1.271)	(1.221)	(1.557)
Product Class Involvement Factors			
price	−0.004	0.008	0.026
	(0.996)	(1.008)	(1.027)
taste	−0.182	0.031	−0.242*
	(0.834)	(1.031)	(0.785)
conv	0.116*	0.050	0.012
	(1.123)	(1.052)	(1.012)
nutr	0.742*	0.657*	0.747*
	(2.100)	(2.000)	(2.110)

(continued)

Table 3. Continued

Variables	Useful	Confident	Important
Product Class Involvement Factors (continued)			
chi-square score (26 d.f.)	145.35	87.487	223.517
p	0.0001	0.0001	0.0001
Wald Chi-Square Tests			
Individual Characteristics	18.619*	3.789	29.818*
Situational, Behav., Attitud.	57.367*	23.938	95.125*
Product Class Involvement	53.794*	41.256*	53.290*

Variables	Easier	Newfoods	Better
Individual Characteristics			
black	−0.034	0.069	−0.604*
	(0.961)	(1.072)	(0.547)
other	0.195	0.455*	0.663*
	(1.215)	(1.577)	(1.940)
age	−0.003	−0.004	−0.006
	(0.997)	(0.995)	(0.994)
male	−0.228*	−0.094	−0.142
	(0.796)	(0.910)	(0.868)
educ	−0.037*	−0.025	−0.010
	(0.963)	(0.975)	(0.990)
bmi	−0.009	−0.028*	−0.023*
	(0.991)	(0.973)	(1.000)
Situational, Behavioral, and Attitudinal Factors			
income	0.006*	0.006*	0.008*
	(1.006)	(1.006)	(1.800)
employed	0.221	−0.009	0.135
	(1.248)	(0.991)	(1.145)
hhsize	0.033	−0.043	−0.046
	(1.033)	(0.958)	(0.955)
health	−0.065	−0.060	−0.045
	(0.937)	(0.942)	(0.956)
specdiet	0.336*	0.093	0.276*
	(1.400)	(1.098)	(1.318)
smoke	−0.147	−0.347*	−0.124
	(0.863)	(0.707)	(0.883)
tvhours	0.015	−0.024	−0.029
	(0.984)	(0.976)	(0.972)
exercise	−0.013	0.031	−0.047
	(0.987)	(1.031)	(0.953)
fatthin	−0.080*	−0.066	−0.150*
	(0.929)	(0.936)	(0.861)
dietdis	0.261*	0.112*	0.281*
	(1.300)	(1.119)	(1.325)
shopper	0.040	−0.119	−0.249
	(1.041)	(0.887)	(0.779)
planner	−0.125	0.052	−0.041
	(0.883)	(1.053)	(0.959)
northeast	0.009	0.181	0.136
	(1.009)	(1.199)	(1.146)
midwest	0.097	0.178	0.129
	(1.102)	(1.195)	(1.139)
west	0.016	−0.125	−0.222
	(1.017)	(0.883)	(0.800)
chol	0.287*	0.208*	0.101
	(1.333)	(1.232)	(1.106)

(continued)

Table 3. Continued

Variables	Easier	Newfoods	Better
Product Class Involvement Factors			
price	0.023	−0.001	−0.088
	(1.024)	(0.990)	(0.916)
taste	−0.244*	−0.092	0.018
	(0.783)	(0.912)	(1.019)
conv	0.054	0.219*	0.272*
	(1.055)	(1.244)	(1.312)
nutr	0.567*	0.578*	0.362*
	(1.762)	(1.782)	(1.436)
chi-square score (26 d.f.)	112.982	105.174	117.561
p	0.0001	0.0001	0.0001
Wald Chi-Square Tests			
Individual Characteristics	7.078	12.925*	28.354*
Situational, Behav., Attitud.	55.146*	35.841*	53.250*
Product Class Involvement	35.421*	46.348*	29.819*

*Statistically significant at the 0.05 level.
Note: Odds ratios are in parentheses.

labels to choose a healthy diet"(confident) and "I read food labels because good health is important to me"(important), respectively. However, blacks are less likely to agree with the statement "better" than do whites. Individuals of other races are also (between 1.5 and 2 times) more likely to agree with the statements "useful", "newfoods", and "better" than do whites.

Age is negatively related to the statement "useful". This finding suggests that older individuals are less likely to agree that nutrition information on food labels is useful to them. This result is consistent with the findings of previous research which revealed a negative relationship between age and information search (Schaninger and Sciglimpaglia, 1981). For instance, older consumers have been found to perceive labels as more difficult to understand (Burton and Andrews, 1996) and less capable of accurately processing information (Cole and Balasubramanian, 1993). However, it is also possible that older consumers perceive that current nutritional labeling is inadequate or poorly presented.

Males are less likely to agree with the statements "useful", "important", and "easier" than do females. This finding is consistent with Nayga's (1996) result which suggested that males are less likely to use food labels and are generally less interested in nutrition and health than do females.

Interestingly, the findings suggest that higher educated individuals are less likely to agree that reading labels makes it easier to choose foods. This result is surprising considering that the basic finding from past research is that higher levels of education lead to increased search activity (Katona and Mueller, 1955; Schaninger and Sciglimpaglia, 1981). However, it is possible that highly educated consumers perceive that current nutritional labeling is inadequate or poorly presented. Hence, efforts to improve the quality of nutritional labeling may be an effective food marketing strategy for highly educated consumers.

Another interesting result relates to the significant effects of body mass index in 4 of the 6 models examined. Specifically, body mass index is negatively related to the dependent variables depicting the statements "useful", "important", "newfoods", and "better". Although some individuals with higher body mass index may not be necessarily interested in dieting or may not be health oriented, this result may have significant implications for health and nutrition education programs since it may suggest that some individuals with higher body mass may be subjecting themselves to further health risk by not having a good perception about the use of food labels.

Situational, Behavioral, and Attitudinal Factors

Except in the "confident" equation, the variable depicting diet-disease aware-ness ("dietdis") is positively related to the statements related to label use. This finding indicates that those who agree more that "what one eats can make a big difference in their chance of getting a disease, like heart disease and cancer" are more likely to agree with the statements related to label use. Moreover, those who perceive a low cholesterol diet as more important are more likely to agree with all the statements examined except the statement "better". With the exception of the "newfoods" statement, results indicate that those who are on special diet are between 1.3 to 2 times more likely to agree with the statements related to label use. This finding is consistent with prior expectation. Individuals who agree more that "some people are born to be fat or thin and that there is not much one can do to change it" are less likely to agree with the statements "useful", "important", "easier", and "better". This finding is also consistent with prior hypothesis. These results suggest the importance of these health-related attitudinal factors in influencing beliefs about label use.

Major household shoppers are less likely to agree that nutrition information on food labels is useful to them. The reason for this result is not clear. The motivation to search is thought to be influenced by shopping enthusiasm and enduring involvement (Schmidt and Spreng, 1996). However, it is possible that this variable does not really capture these intended effects. Instead, it may be consistent with the notion that greater prior purchase experience (which is assumed to be gained by being the major shopper of the household) is associated with less motivation to search (Urbany, 1986). Hence, major household shoppers may be zeroing in on what they believe to be the preferred alternative based on their prior purchase experiences. In other words, a very knowledgeable shopper may already know so much about the consideration set that there is no need to search at all. Another possible explanation could be that major household shoppers perceive that current nutritional labeling is inadequate or poorly presented.

The results also indicate that income is positively related to the likelihood that

an individual agrees with the statements: "the nutrition information on food labels is useful to me" (useful), "reading labels makes it easier to choose foods"(easier), "sometimes I try new foods because of the information on the food label"(new-foods), and "using food labels to choose foods is better than just relying on my own knowledge about what is in them"(better). This finding may be related to the results of previous studies which revealed that consumers of low socioeconomic status tend to process less information and tend to rely more on word of mouth than consumers of high socioeconomic status (Mitchell, 1993).

Smokers are less likely to agree with the statement "newfoods" than do non-smokers. Individuals who exercise more frequently are more likely to agree with the statement "important". This result is expected and may suggest that those who exercise more frequently read labels because good health is important to them. Educating consumers about the benefits of exercise and good health may be a good way of expanding the readership of food labels.

The regional variables are generally not significant with the exception of Northeasterners being 1.3 and 1.5 times more likely than Southerners to agree with the statements "useful" and "important", respectively.

Product Class Involvement Factors

Consistent with prior hypothesis, those who perceive nutrition as more important when food shopping are more likely to agree with all the statements examined. Individuals who perceive ease of preparation as more important when food shopping are more likely to agree with the statements "useful", "newfoods", and "better". Individuals who put a higher importance on taste are less likely to agree with the statement "I read food labels because good health is important to me". This finding is not surprising considering the amount of publicity regarding the presumed importance of taste in consumer food purchase decisions (Chanil, 1994; Thayer, 1997). The perceived importance of price variable is not significant in the models.

To determine the significance of group of variables based on Figure 1, Wald chi-square tests were conducted on Figure 1 groups (see bottom of Table 3). Results indicate that the variables as a group contributed significantly to the models with the exception of individual characteristics variables in "confident"and "easier" equations and the situational, behavioral, and attitudinal variables in the "confident" equation.

Summary and Concluding Remarks

The results of this study generally indicate that various factors influence consumer perceptions and beliefs about label use. No other known study on this topic has been published. The results generally suggest the following:

1. lower income, older individuals, whites compared to those of other races, males, those with higher body mass index, those from the South compared to those from the Northeast, those who are not on special diet, those who believe that people are inherently born to be fat or thin and that there is not much one can do about it, those who are less aware of the link between diet and disease, those who perceive ease of preparation and nutrition as less important when food shopping, those who perceive a low cholesterol diet as less important and major household shoppers are less likely to agree that nutrition information on food labels is useful to them;

2. whites compared to blacks, those who are not on special diet, those who perceive nutrition as less important when food shopping, and those who perceive a low cholesterol diet as less important are less likely to agree that they feel confident that they know how to use food labels to choose a healthy diet;

3. whites compared to blacks, males, those with higher body mass index, those who are not on special diet, those from the South compared to those from the Northeast, those who exercise less frequently, those who believe that people are inherently born to be fat or thin and that there is not much one can do about it, those who are less aware of the link between diet and disease, those who perceive a low cholesterol diet as less important, and those who perceive nutrition as less important but taste as more important when food shopping are less likely to agree that they read food labels because good health is important to them;

4. lower income individuals, males, higher educated individuals, those who are not on a special diet, those who believe that people are inherently born to be fat or thin and that there is not much one can do about it, those who are less aware of the link between diet and disease, those who perceive a low cholesterol diet as less important, and those who perceive nutrition as less important when food shopping are less likely to agree that reading labels makes it easier to choose foods;

5. lower income individuals, whites compared to those of other races, those with higher body mass index, smokers, those who are less aware of the link between diet and disease, those who perceive a low cholesterol diet as less important, and those who perceive ease of preparation and nutrition as less important when food shopping are less likely to agree that sometimes they try new foods because of the information on the food label; and

6. lower income individuals, blacks, those with higher body mass index, those who are not on a special diet, those who believe that people are inherently born to be fat or thin and that there is not much one can do about it, those who are less aware of the link between diet and disease, and those who perceive ease of preparation and nutrition as less important when food shopping are less likely to agree that using food labels to choose foods is better than just relying on their own knowledge about what is in them.

An objective of the NLEA is to provide consumers with information that assists them in making healthful food choices through the availability of food labels. The NLEA was a very costly undertaking and is one of the most important food policy initiatives in the 1990s. Therefore, it is important that it generates significant and lasting improvements in the dietary habits of American consumers (Petrucelli, 1996). The purpose of this research was to examine the influence of various factors on nutritional label related perceptions and beliefs of consumers. This study provides some valuable information on the profile of consumers who are less likely to agree about statements related to the reason for or benefits of label use. This information, as noted, is important not only for managerial decisions but also for nutrition education programs. The findings in this study suggest the need for additional education efforts that can be specifically designed, based on the empirical models examined in this study, to explain information on the food labels and how the labels may be used more effectively to help consumers make better and healthier food choices. For example, education messages that point to the fact that using food labels to choose foods is better than just relying on one's own knowledge about what is in them should be targeted to those consumers less likely to agree with the statement "better" used in this study (i.e., lower income, black individuals).

Interpreted broadly, the results also underline the important role of consumer education in offsetting some negative attitudinal misconceptions about health. For instance, the results pertaining to the "fatthin" and "dietdis" variables suggest the importance of educating those consumers who have a misconception that some people are born fat or thin and that there is not much one can do about it as well as those consumers who are less aware of the link between diet and disease. The finding on the diet-disease awareness variable might also underscore the importance of motivating consumers to believe the benefits of label use by pointing out the negative consequences of neglecting them.

Considering the importance of the impact of children on family food consumption, future studies should consider analyzing the impact of acceptance of the food to children as well as the impact of label use on individuals' diet quality (Kim, Nayga and Capps, 2000). The 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII) by the U.S. Department of Agriculture contains information on diet or nutrient consumption. These data will allow the determination and analysis of not only label users but also the impact of label use on diet quality. Moreover, the perceived quality issue of food labeling may have an effect on individual's perception of food labeling. Hence, future studies should investigate the quality issue of food labeling and its effect on the importance of search in food consumption.

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