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CONSUMER UNDERSTANDING AND USE OF THE NEW NUTRITIONAL LABEL: A PILOT STUDY

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Department of Agricultural Economics
Texas Agricultural Experiment Station
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Consumer Understanding And Use Of The New Nutritional Label: A Pilot Study

by
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The 1990's represent a turning point for nutritional labeling. The U.S. Congress has passed legislation requiring a new, more comprehensive, mandatory nutritional label and clarification of nutritional claims made by food manufacturers. After several years work developing these programs, the Food and Drug Administration has presented and is revising and extending a proposal for accomplishing these goals and expectations.

The proposed pattern of labeling is more than an update to the micronutrient-oriented nutritional label designed in the early 1970's. While the initial program has been mostly voluntary, the new one will be mandatory for most manufactured food products. The proposed label relates, for the first time, to excesses in the American diet--especially in several areas frequently related to health concerns, such as fat, cholesterol, sodium, and sugar. Elements frequently less than recommended levels in the American diet, including dietary fiber and complex carbohydrates, will be included on the proposed new label.

Although all these efforts are undertaken to increase the benefit to the consumer by supplying more information about nutrients of packaged food, research results frequently raised questions about whether nutrition information provided on food labels was understood and used by consumers (Lenahan, et. al., 1972; Jacoby, et. al., 1977; Caswell and Padberg, 1992). Consumers like the labels and often indicate that they intend to use them (Boyd, 1973; Daly, 1976). However, some studies questioned the ability of consumers to comprehend nutritional information given on the labels (French and Barksdale, 1974; Daly, 1976; Jacoby, et. al., 1974a; Jacoby, et. al., 1974b; Jacoby, et. al., 1977; McCullough and Best, 1980). Others have suggested the need for consumer education (Bymers, 1972; Lenahan, 1972; Daly, 1976; Jacoby, et. al., 1977; Hopper, 1986; McGinnis, 1986).

These studies provided some indication which format would be most usable to consumers. In addition, the most interesting finding was that even consumers who did not use the labels often liked to have them available (McCullough and Padberg, 1971; Lenahan, et. al., 1972; Daly, 1976; Padberg, 1977; McCullough and Best, 1980; Freiden, 1981). Consumers not using the labels benefit from them if others, such as manufacturers, distributors, dietitians, nutrition educators, or consumer advocates find them useful.

McElroy and Aaker (1979) found extensive levels of usage across all types of consumer six years after unit pricing. Also evidence was presented of an increase in nutritional knowledge and sensitivity associated with increased duration of the nutritional labeling program (Lenahan, et. al., 1973). If today's consumers are more knowledgeable, they also may be more confused (Goldberg, 1992). Interpretation of a myriad of figures on a food label will

be a challenge to consumers. The new label adds more information. The great quantity of data presented together with the level of technical sophistication of the effects of these nutrients make knowledgeable use of the new label both complex and unlikely (Bettman. 1975), especially for the less educated cohorts of the population. According to the results of the experiment by Russo, et. al. (1986), consumers liked more comprehensive rather than summary information regarding nutrition, even though the information does not have any effect on the purchase. However, they found immediate and powerful effects of single effort-reducing negative information (the added sugar in breakfast cereals) on the purchase. They also suggested summary rating with credibility for consumers to reduce their information processing cost to realize benefit from information.

It has become apparent that labeling issues are returning to policy significance. In an effort to bring past experience up to date and propose some policy options, a developed conceptual framework by Caswell and Padberg (1992) has been presented. The legal and nutrition science aspects of the labeling program are probably quite advanced and sophisticated while the process by which the consumer will use the information is not well understood.

A PILOT STUDY

A pilot study was undertaken to learn about the process by which the consumer perceives and uses the new nutritional label. Although the new label was not expected to be in use until 1993 at the earliest (it has now been postponed until May 1994), its design was apparent from the FDA proposal. We wanted to develop labels in this new format and test them with consumers. With so many elements (nutrients and others, such as energy, energy contributed by fat, dietary fiber, etc.) in the label, would consumers use them as nutritional professionals do? Would there emerge a few which were most important? Can we use nutritional professionals' choice to develop a weight given to a few important components?

How important is this "new" information about a food as compared with our traditional understanding of food products. Would consumers make better choices by reading the new label (without knowing what the product was) or with the product labels showing the products' names? How are professionals' choices affected when they have the name of the product? While the purpose of the pilot study was to begin a process of analysis of consumer interaction with the new label, this paper will report two findings:

1) the comparisons between consumers and professionals, and

2) the effects of the product name on choices of both consumers and professionals.

An early choice we had to make concerned what kind of products to involve in our interaction with consumers. We chose processed packaged meals. Several reasons seemed to support this choice. Traditional knowledge of nutrition is least useful for these products because they combine several food groups and contain sauces and other added nutrients.

In addition, our concept of nutrition relates to a diet rather than a product. We can only assess nutritional data in the context of a diet. These packaged meals are closer to a diet than an individual product, for example margarine. As such, we would expect the nutritional properties to begin to approach the characteristics stressed in the nutrition guidelines, whereas that is a less realistic expectation for individual products. Further, if it is possible to find a way for simplifying the way we relate relative nutritional values, a program that fits packaged meals might also be applicable to foods obtained from foodservices.

METHOD

Primary data were collected from two different populations, nutrition professionals and consumers by using a designed questionnaire (Table 1). The survey instrument(questionnaire) was designed to elicit a choice of a "healthier" product between two alternatives. Packaged meals, which were actual products in the market, were identified by the newly proposed nutritional label. The original questionnaire contained 13 comparisons of products some with product names on the label, some without.

The professionals' part of the data was obtained by a mail survey. Questionnaires were sent to local registered dietitians and 23 completed surveys were returned. After mailing the survey for professionals, errors in three of the comparisons necessitated removing them from the data set. This left a total of 253 observations (23 responses for 11 choices) of which 115 with (23 responses for 5 choices) product names on the label, 138 without names (23 responses for 6 choices). Data from consumers were collected by survey in a local shopping mall with two types of questionnaire. These two surveys were subsets of the questionnaire used to collect the data from the professionals. Each questionnaire has 3 choices with product names on the label, and 3 choices without product names on the label.

Data collection took place between May and August, 1992, during which a total of 259 questionnaires were collected. Consumers data included 1554 observations, 777 observations (259 responses for 3 choices) with and the other 777 observations without product names on the label.

Data from professionals revealed more than 95% consensus in product choice. Consumer data looked similar except less consensus in all product choices existed as compared to that from professionals. Due to the design of the questionnaire, the probability of getting the right choices was 50%. Therefore, further statistical analysis was needed to confirm the difference between professionals and consumers.

Categorical data analysis was applied to check the difference between choices made by consumers and those made by professionals. Also, the effect of presence of product name on the choice was examined. For this analysis, SAS computer package were used to examine all possible Log-Linear models. All possible partial and marginal frequency tables were constructed and analyzed (Table 2). The names of variables used in

IN A HEALTHY DIET WHICH PRODUCT IS BETTER - CHOOSE ONE

PRODUCT A ____

Serving Size	8 ounces
Calories	205
Calories from total fat	90
Total Fat	10 grams
Saturated fat	3 grams
Cholesterol	75 milligrams
Total Carbohydrate	18 grams
Complex carbohydrate	18 grams
Sugars	0 grams
Dietary Fiber	3 grams
Protein	11 grams
Sodium	520 milligrams
Percent of Daily Value	
Vitamin A	60 % RDI
Vitamin C	25 % RDI
Calcium	2 % RDI
Iron	25 % RDI

*Contains less than 2 percent of the Daily Value of this nutrient

Nutrition Profile

Food component	Percent	Daily value
Total fat	13	75 grams[1]
Saturated fat	12	25 grams[1]
Cholesterol	25	300 milligrams[1]
Total carbohydrate	6	325 grams[1]
Dietary fiber	12	25 grams[1]
Sodium	22	2400 milligrams[1]

[1] As part of a 2,350 calorie diet

PRODUCT B ____

Serving size	8 ounces
Calories	245
Calories from total fat	70
Total Fat	8 grams
Saturated fat	2.2 grams
Cholesterol	50 milligrams
Total Carbohydrate	21 grams
Complex carbohydrate	16 grams
Sugars	5 grams
Dietary Fiber	3 grams
Protein	24 grams
Sodium	540 milligrams
Percent of Daily Value	
Vitamin A	2 % RDI
Vitamin C	6% RDI
Calcium	2 % RDI
Iron	2 % RDI

*Contains less than 2 percent of the Daily Value of this nutrient

Nutrition Profile

Food component	Percent	Daily Value
Total fat	11	75 grams[1]
Saturated fat	9	25 grams[1]
Cholesterol	17	300 milligrams[1]
Total carbohydrate	6	325 grams[1]
Dietary fiber	12	25 grams[1]
Sodium	23	2400 milligrams[1]

[1] As part of a 2,350 calorie diet

IN A HEALTHY DIET WHICH PRODUCT IS BETTER - CHOOSE ONE

PRODUCT A ____

SHRIMP EGG ROLL

Serving Size	8 ounces
Calories	450
Calories from total fat	130
Total Fat	13.5 grams
Saturated fat	2.0 grams
Cholesterol	45 milligrams
Total Carbohydrate	68 grams
Complex carbohydrate	66 grams
Sugars	2 grams
Dietary Fiber	2 grams
Protein	9 grams
Sodium	1060 milligrams
Percent of Daily Value	
Vitamin A	16 % RDI
Vitamin C	*
Calcium	6 % RDI
Iron	10 % RDI

*Contains less than 2 percent of the Daily Value of this nutrient

Nutrition Profile

Food component	Percent	Daily value
Total fat	18	75 grams[1]
Saturated fat	8	25 grams[1]
Cholesterol	15	300 milligrams[1]
Total carbohydrate	21	325 grams[1]
Dietary fiber	8	25 grams[1]
Sodium	44	2400 milligrams[1]

[1] As part of a 2,350 calorie diet

PRODUCT B ____

CHICKEN NOODLES & BROCCOLI

Serving size	8 ounces
Calories	410
Calories from total fat	220
Total Fat	24.0 grams
Saturated fat	7.0 grams
Cholesterol	120 milligrams
Total Carbohydrates	28 grams
Complex carbohydrate	26 grams
Sugars	2 grams
Dietary Fiber	3 grams
Protein	21 grams
Sodium	1020 milligrams
Percent of Daily Value	
Vitamin A	8 % RDI
Vitamin C	4 % RDI
Calcium	25 % RDI
Iron	15 % RDI

*Contains less than 2 percent of the Daily Value of this nutrient

Nutrition Profile

Food component	Percent	Daily Value
Total fat	32	75 grams[1]
Saturated fat	28	25 grams[1]
Cholesterol	40	300 milligrams[1]
Total carbohydrate	9	325 grams[1]
Dietary fiber	12	25 grams[1]
Sodium	43	2400 milligrams[1]

[1] As part of a 2,350 calorie diet

Table 1 Questionnaire

Table 2. Different Partitioning of Anocat Table

SOURCE	DF	L.R.χ^2
ID	1	1041.42
NAME	1	0.29
CHOICE	1	1442.64
MUTUAL INDEPENDENCE	4	19.46
ID*NAME	1	1.80
JOINT INDEP. ID*NAME	3	17.66
ID*CHOICE	1	9.97
CONDITIONAL INDEP. NAME*CHOICE|ID	2	7.89
NAME*CHOICE	1	7.25
ID*NAME*CHOICE	1	0.44
ID*CHOICE	1	9.97
JOINT INDEP. ID*CHOICE	3	9.69
NAME*CHOICE	1	7.25
CONDITIONAL INDEP. NAME*CHOICE|ID	2	7.89
ID*NAME	1	1.80
ID*NAME*CHOICE	1	0.44
NAME*CHOICE	1	7.25
JOINT INDEP. NAME*CHOICE	3	12.21
ID*NAME	1	1.80
CONDITIONAL INDEP. ID*CHOICE|NAME	2	10.41
ID*CHOICE	1	9.97
ID*NAME*CHOICE	1	0.44
TOTAL	7	2503.81

analyses are ID for professional (1) or consumer (2), NAME for existence of product name on the label (0 for no product name, 1 for product name), and CHOICE (0 for wrong, 1 for right).

Hypotheses about main and interaction effects were tested by log of likelihood χ^2 test. Also residual plots were used to see the fit of the models, especially for three conditional independence models.

RESULT AND DISCUSSION

According to the hypotheses tested, there were no three-way interactions among ID, NAME, and CHOICE. Both conditional independence of ID and CHOICE, controlling for NAME, and NAME and CHOICE controlling for ID, were rejected (Table 2). These imply the existence of associations 1) between ID and CHOICE either with product name or without product name on the label, and 2) between NAME and CHOICE either professionals' case or consumers' case. To find out the direction of associations, frequency tables are also examined.

Table 3 shows choices made by professionals under different conditions. As confirmed by log of likelihood χ^2 test, product name on the label did not affect nutritional information processing by professionals. However, as we can see in Table 4, the product name on the label affects consumers' choice concerning the healthier product. For consumers, presence of product name on the label helped them to make better choices than without it. The effect of product name on the label on the choices consumers made was statistically significant, even at 1% significance level. This suggests that the traditional way of evaluating food products with general ideas about food, for example chicken is better than beef, is easier than comprehending information given in the new nutritional label. This reinforces the findings of Jacoby, et. al. (1977).

Conditions in the test may have been advantageous as compared to actual use of labels. The labels in the test (Table 1) were larger type and easier to read than they will be on most (smaller) food package labels. Also, data were collected with enough time for consumers to read and evaluate information on the nutritional label, since they were allowed to have as much time as they needed to answer the questionnaire. Therefore, the difference between professional and consumers is not due to the time pressure that consumers might have in a real shopping situation (Park, et. al., 1989; Caswell and Padberg, 1992). Such time pressure may bring poor choices.

This test reinforces concerns for consumers' ability to effectively use nutritional labels, whether or not it is because of information overload as suggested by Jacoby, et. al. (1974a, 1974b). Also, it indicates that without the name of the product, in a situation in which consumers deal directly and only with the label, they make the poorest choices of all.

Table 5 and Table 6 also show that professionals make better decisions than consumer under any circumstances.

Examination of frequency tables and the log of likelihood ratio χ^2 test suggested that providing the product name

Table 3. Effect of Product Name on Professionals' Choice

		Choice					
		Right		Wrong		L.R.χ^2	Prob
Product Name	Yes	112	(97.39%)	3	(2.61%)		
	No	131	(94.93%)	7	(5.07%)		
Total		243	(96.05%)	10	(3.95%)	1.039	0.308

Table 4. Effect of Product Name on Consumers' Choice

		Choice					
		Right		Wrong		L.R.χ^2	Prob
Product Name	Yes	719	(92.54%)	58	(7.46%)		
	No	689	(88.67%)	88	(11.33%)		
Total		1408	(90.60%)	146	(9.40%)	6.848	0.009

Table 5. Difference between Professionals and Consumers with Product Name on the Label

		Choice					
		Right		Wrong		L.R.χ^2	Prob
ID	Professionals	112	(97.39%)	3	(2.61%)		
	Consumers	719	(92.54%)	58	(7.46%)		
Total		831	(93.16%)	61	(6.84%)	4.629	0.031

Table 6. Difference between Professionals and Consumers with No Product Name on the Label

		Choice					
		Right		Wrong		L.R.χ^2	Prob
ID	Professionals	131	(94.93%)	7	(5.07%)		
	Consumers	689	(88.67%)	88	(11.33%)		
Total		820	(89.62%)	95	(10.38%)	5.777	0.016
Product Name	Yes	112	(97.39%)	3	(2.61%)		
	No	131	(94.93%)	7	(5.07%)		
Total		243	(96.05%)	10	(3.95%)	1.039	0.308

with the nutritional label does not always help consumers to make the right choice. It may improve consumers' decisions compared to the situation in which no nutritional information is available, which was not tested here. With only two to choose from, one would expect about 50% right answers just from guessing. Consumers were not asked to make a choice on the basis of product name alone. Therefore, we could not test for the effect of nutritional label on consumers' choices. That could have been included in the questionnaire and it would have given interesting results.

CONCLUSION

The purpose of this pilot study was to probe the consumers ability to use nutritional information provided in the label. The consumer must deal with information overload with the new complicated nutritional label format as well as arising from many other aspects of the shopping environment. Consumers value products for many reasons other than nutrition. They have many shortcuts and habits that simplify their shopping. Consumers are, on the average, more oriented to using traditional ways of evaluating our food product rather than utilizing uninterpreted nutritional data.

This indicates the need for an easier way to understand the nutritional labeling system. In addition to new updated nutritional information on the label, consumers need "claims" or other interpretive information. This will influence the direct usage of nutritional information provided to enable consumers to choose healthier diet.

The newly proposed nutritional label format has special and important uses. It can accommodate the need of people who are on specific diets. It gives a greater emphasis to nutrition as compared to other product quality attributes. But, for the normal layman without a scientific nutrition background, an interpretative claim or rating would be more easily understandable and it would get more use. Such a rating system could be used for food away from home as well. That would extend the consumers right to know about nutrition to a fast growing and important area of the food industry where the present, rather cumbersome, format is unusable.

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