THE PERCEPTION OF NUTRITION AND NUTRITIONAL LABELING IN THE BUYING DECISIONS AMONG AFFLUENT CONSUMERS

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ABSTRACT

THE PERCEPTION OF NUTRITION AND NUTRITIONAL LABELING IN THE BUYING DECISIONS AMONG AFFLUENT CONSUMERS

By

Don Arden Olson

To date only limited research has been conducted concerning what consumers want from nutritional labeling. This study was undertaken to increase understanding about the consumer's knowledge and behavior of nutrition and nutritional labeling.

Nutritional labeling is part of an effort to attain better nutritional knowledge in the United States. To accomplish the goal of greater nutrition awareness among consumers a program commensurate with the needs and wants of consumers is necessary.

This dissertation results from a study of 100 upper income consumers; consumers with family income of $15,000 and higher. Previous studies have revealed that income and knowledge about nutrition are positively correlated. If a study was done of upper income consumers, therefore, it would be expected that the findings would be even more pertinent for lower income consumers.

To demonstrate whether interviewees possess knowledge about nutrients, twelve factual statements were taken from the Food and Drug Administration's voluntary program on nutritional labeling. The results indicated that the majority of upper income consumers had a basic understanding of nutrients. Further analysis revealed, however, that the respondents were not aware of three products using nutritional labeling.

Consumers do not use nutritional labeling in meal preparation. Three major reasons why consumers currently do not use nutritional labeling in meal preparation and food purchasing include: lack of motivation; time constraints; and inability to understand how to use the listing of nutrients to assure an adequate daily nutritional intake.

When consumers were forced to select the nutrients they want listed on food labels, protein was selected most often. In addition to protein, other nutrients desired in their order of preference were: carbohydrates, vitamin C, vitamin A, iron, calcium, vitamin D, vitamin B_1, and vitamin B_2.

Respondents do not perceive of a nutritional problem unless a member of their family has a medical deficiency which needs corrective action, such as consulting a physician. But a perceived nutritional problem

in a family motivates consumers to be more concerned about nutritional intake.

The majority of consumers indicated a concern about the following nutritional factors: unbalanced diet, obesity, vitamin deficiency and heart disease. Most subjects currently had misconceptions about which nutrients were required by the body for nutritional concerns.

Findings suggest that attitudes about food selection among consumers generally do not predict behavior. Respondents seem to feel they understand what foods and food groups a well-balanced meal should include. But the results tend to indicate that these attitudes about food selection do not predict behavior about food purchasing.

The majority of consumers were not aware of nutritional labeling on food packages. But they were predisposed to more information about nutrition.

Overall, the data reveal that consumers currently are indifferent about nutritional labeling. The research does indicate, however, that if the values of the American consumers become more health oriented more consumers may use nutritional labeling.

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Don Arden Olson

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CHAPTER I

PROBLEM SETTING

Background of the Problem

This dissertation is concerned with one aspect of consumerism--nutritional labeling. It is based on an experimental study designed to determine the upper-income consumers' perception of nutrition and nutritional labeling.

During the 1960's, affluence and rising expectations of people fueled the consumerism movement which, in turn, led to the White House Conference on Food, Nutrition and Health. One of the recommendations of this conference was the desirability of labeling the nutritional value of food products.[1]

In 1970, officials of the Federal Food and Drug Administration (FDA) and the Grocery Manufacturers Association agreed upon the necessity of establishing a

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[1]Raymond C. Stokes and Rafel Haddock, Working Paper--Interim Report of the First Two Phases of the CRI/FDA Nutritional Labeling Research Program (Washington, D.C.: The Consumer Research Institute, 1972), p. 4.

voluntary nutritional labeling program.[1] The FDA undertook an extensive fact-finding effort to determine what nutritional labeling format would be both understandable and useful to the consumer.[2]

Based on the results of experimental research studies as well as the comments and recommendations from nutrition experts, consumer advocate groups and food industry representatives, the FDA proposed voluntary guidelines for nutritional labeling.[3] These guidelines were listed in the March 30, 1972 edition of the Federal Register.

The FDA received 3,140 comments to these proposals.[4] The comments were an important informational source in promulgating the voluntary guidelines issued on January 15, 1973.[5]

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[1] Ibid. [2] Ibid.

[3] The following nutrition experts, consumer advocate groups, and food industry representatives voiced their comments and recommendations to the nutrient labeling formats: Consumers Union, Consumers Federation of America, American Dietetic Association, American Home Economics Association, Mrs. Virginia Knauer of the President's Office of Consumer Affairs, Mrs. Esther Petersen, Consumers Affairs Advisor to Giant Foods, a Grocery Manufacturers of America Task Force, National Canners Association and National Association of Food Chains.

[4] U.S., Department of Health, Education and Welfare, "Report on Nutrition Labeling," Federal Register, XXXVIII, Jan. 19, 1973, 2125.

[5] Ibid.

While the proposed nutritional program is stated as being voluntary, in practice it may become mandatory since the competitive pressures of the market place may force compliance. For example, in April, 1973 Del Monte Corporation announced it would initiate a labeling program by listing nine nutrients on the labels of some of their processed food products.[1]

Since the purpose of nutritional labeling[2] is to inform and motivate consumers to assure that they are eating a nutritional diet, it seems imperative that the nutritional needs and wants of the consumer be understood as well as possible.[3] For the current apathy about nutritional labeling among consumers tends to suggest that it will require innovative measures to motivate them to use nutrient information in their buying decisions and meal preparations. In reality, some companies are placing nutrient information on the food labels without good data regarding what nutrient(s) consumers want and will find useful in making decisions and whether nutrient

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[1] "Del Monte to Start Nutrition Labeling," Advertising Age (1972), 60.

[2] Nutritional labeling is a listing of nutrients on food products by serving size.

[3] James Scala, "Nutritional Labeling as it Affects the Food Manufacturer" (speech delivered at the 32nd Annual Dairy and Food Manufacturers Conference at Kellogg Center, Michigan State University, East Lansing, Michigan, November 15, 1972).

information on food labels will motivate consumers to use that information in meaningful ways.

Scope of the Problem

This thesis draws a distinction between the nutritional needs of consumers and their wants. While the individual foods required for the proper functioning of the body should be determined by competent professional individuals, the author believes the nutritional wants or desires should be evoked from the consumer. Although there may well be a difference between what the consumer needs and what she (he) wants, both should serve as inputs concerning the future of nutritional labeling.

Historically, the food industry through its promotional techniques has attempted to persuade consumers to purchase foods on the basis of taste and habit. Consequently, the food production and food manufacturing systems were geared to satisfying food tastes and food habits. Marketing activities were not focused on the satisfaction of nutritional requirements. This does not mean, however, that marketing food products to satisfy food habits is an undesirable approach, or that freedom of consumer choice is not to be cherished. It does, however, highlight the fact that regardless of how nutritious a food may be, if it is not eaten, the food cannot satisfy the body's needs.

Since the food industry supplies the food requirements for America, it bears much of the responsibility for

the nutritional well-being of its citizens. Even though this has always been the stated goal of the food industry, or at least an implied goal, it has never been implemented. Now a procedure has been proposed which presumes to aid in achieving this goal, although the extent to which the food industry is responsible for supplying the nutritional needs of the consumer is yet to be defined. Growing pressure by society suggests, nevertheless, that the food industry must be more accountable for the nutritional impact upon the consumer of foods sold in the food system. That is precisely why nutritional labeling presently is, or should be, of utmost concern to each and every food firm.

The recent literature about nutritional labeling indicates that while some consumers can and do base some of their buying decisions on products fully labeled, they may not read the labels, or if they do, they do not seem to understand the terminology and/or its importance to the maintenance of proper health.[1] For example, one study conducted, by the Daniel Yankelovich Research Firm, indicated that consumers are becoming more conscious of nutritional labeling and using that information in their buying decisions.[2] Yet, other studies conducted by the United

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[1]A discussion of the research is in Chapter II.

[2]Daniel Yankelovich, Inc., "Applied Full Disclosure Labels to Eight Packaged Foods," Chain Store Age (1971), 68-71.

States Department of Agriculture and independent researchers indicate, however, that the dietary and nutritional menu of most Americans is declining.[1] This tends to suggest that currently many consumers may be using nutritional labeling in their buying decisions, but not in the preparation of their meals.

The FDA assumes that consumers can be made aware of proper nutrition and dietary habits.[2] It appears, however, that currently most consumers may not be motivated strongly to learn about nutritional concepts. Consider the following: school children have been taught the concept of a balanced diet; companies have nutritional labeling as well as informational materials about nutrition; and both government and consumer groups have been attempting to educate the consumer about nutritional requirements. These efforts to motivate consumers to learn about nutritional concepts may have some serious shortcomings. For example, just because students have been taught the concept of a balanced diet doesn't necessarily imply that they have learned it. Poor curricula design and/or poor instruction may have impeded learning about nutrition. Also, much of

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[1] "Nutrition: New Product Opportunity?" Grocery Manufacturing (February, 1971), 7-8.

[2] Dr. Ogden Johnson, private discussion held during meeting of 32nd Annual Dairy and Food Manufacturers Conference, East Lansing, Michigan, November 15, 1972.

the nutritional information that companies have does not get to the consumer; it exists at company headquarters. Lastly, the efforts by the government and/or consumer groups to educate consumers about nutrition may not represent an all-out effort. Thus, because the majority of Americans do not know whether they are currently receiving an adequate quantity of nutrients each day, doesn't mean they cannot learn to know and regulate the nutrient composition of the food they eat.

Why do consumers currently lack nutritional knowledge? Why isn't she (he) motivated to learn more about nutrition? Do consumers use the available information in the planning of meals? Answers to these and other questions must be known before realistic decisions can be made concerning what nutrients to place on the food label.

Statement of the Problem

The purpose of the study is to identify relevant factors about consumers' knowledge, behavior and attitudes and then determine how nutritional labeling can help consumers to achieve better dietary habits. The study investigates whether the present FDA guidelines will bring about a more nutrition-conscious and nutrition-knowledgeable populace. The study does not deal with the value question, is nutritional labeling good or bad.

Much of the controversy surrounding nutritional labeling concerns what information about nutrition the

consumer desires. Specifically, does a frustrated consumer population which has lost faith in the food industry really want, and more importantly, need additional restrictive regulation in the form of the present guidelines on voluntary nutritional labeling.

This research will be limited to the study of one segment of the total consumer population; upper income consumers, those consumers with family income of $15,000 or greater. It will investigate what upper income consumers want from nutritional labeling. Previous studies have revealed, in general, that income and knowledge about nutrition are positively correlated.[1] Thus, upper income consumers should have an elementary understanding of proper dietary habits. If a study is done of upper income consumers therefore it would be expected that the findings would be even more pertinent for lower income consumers.

The research, in studying upper income consumers will focus on four major questions:

1. What are the consumers' perceptions of the role of nutrition in the maintenance of good health?

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[1]For a discussion about the relationship of income and knowledge about nutrition, see the following studies: "Highlights from the Ten-State Nutrition Survey," Nutrition Today (July/August, 1972), 4-11; Shirley B. Jalso, Marjorie M. Burns, and Jerry M. Rivers, "Nutritional Beliefs and Practices," Journal of the American Dietetic Association, XLVI (October, 1965), 263-68; and Mary M. Hill, "Food and Nutrition Knowledge, Attitudes and Interests of Homemakers" (speech presented at a symposium on nutrition and medicine at Southern Illinois University in Carbondale, Illinois, November 3, 1972).

2. What nutrients have the greatest motivational effect on consumers in selecting food products?
3. What are consumers' level of awareness and understanding of nutritional labeling?
4. What are consumers' ability and willingness to use the information provided through nutritional labeling?

Hypotheses

The fundamental premise of this research is that to motivate people to use nutritional labeling in their food purchases and meal preparation, nutritional labeling must consider consumer wants and perceptions. Specifically, effective nutritional labeling must allow for: (1) the perceived health concerns of consumers; (2) the level of nutrient awareness and understanding of consumers; (3) the ability and willingness of consumers to use the information provided through nutritional labeling; and (4) the nutrient wants.

The specific hypotheses to be tested are:

Hypothesis 1:

Upper income consumers believe that a well-balanced diet is the best method to attain proper nutrition.

Hypothesis 2:

Upper income consumers possess little knowledge about nutrients.

Hypothesis 3:

Upper income consumers have little awareness of the concept of nutritional labeling.

Hypothesis 4:

Upper income consumers have little understanding of the concept of nutritional labeling.

Hypothesis 5:

Upper income consumers do not have strong preferences concerning the listing of eighteen specific nutrients.

Hypothesis 6:

Upper income consumers, in general, are not aware of nutritional problems in their families.

Hypothesis 7:

Where nutritional factors are of concern, heart disease and obesity are the most important.

Methodology

This dissertation is the result of an empirical investigation of the attitudes and knowledge about nutrition and nutritional labeling of upper income consumers.[1] Personal interviews were conducted with over 100 upper income food shoppers to obtain 100 usable questionnaires.

The interviews were conducted in the East Lansing-Lansing vicinity. The income characteristics of the

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[1]For purposes of this research, an upper income family is defined as a family with an income of $15,000 or greater.

families in the aforementioned area were gathered from the 1970 census tracts. This data indicated nine census tract areas in which the mean annual income for 1969 was $15,000 or higher.

To insure sample accuracy, a stratified random sample was selected from four census tracts. The number of affluent families in each census tract was represented proportionately to the total number of affluent households in the total population.

The Ingham County Health Department provided the names of members of the stratified random sample. In addition, they also provided block maps which listed the housing units that were selected in the sample. The block maps enabled interviewers to identify quickly the households in which to conduct interviews. One food shopper was interviewed for each household unit.

Each home interview was conducted by a trained interviewer. The interview was designed to last approximately 30-40 minutes. A copy of the questionnaire is in Appendix A.

Three statistical tests, the Wilcoxson matched-pairs signed-rank test, the normal approximation to the binomial and the chi-square test were then conducted on the data to affirm or reject the statistical hypotheses.

Contributions of the Study

This study was designed to make three contributions. First, it should provide a basis for establishing corporate marketing strategies which will encourage consumers to utilize nutritional labeling in their food purchasing decision framework.

Second, the research should serve to highlight whether the present FDA guidelines on nutritional labeling will bring about a more nutrition-conscious populace. In so doing, the importance of establishing objectives for nutritional labeling will be highlighted.

Third, the study should indicate whether there is a need for consumers to become more involved in the legislative process. It should indicate whether nutritional labeling, if it is to be used in the purchase decision, should be commensurate with the needs and wants of consumers.

Limitations of the Study

Any primary research in marketing contains inherent limitations. Included among the shortcomings of this research are:[1]

1. The study is not representative of the entire population of upper income consumers. It refers

[1]In this research project, numerical data were used. The dependence on statistical analysis for the numerical data imply that some limitations may be present in the research. However, scientific procedures were followed in designing the research project, which means the probability of any serious shortcoming is minimal.

only to the consumers living in the higher income suburban areas. The sample precludes pockets of upper income people living in other areas.

2. There is an inability to quantify interview errors. Despite the use of a scientific research design and trained interviewers, inaccurate reporting due to such factors as memory errors, misunderstanding of a question, reluctance of respondents to answer, and incorrect entries by the interviewer will exist.

3. Since there are many simultaneous interacting variables at time of the food purchase, including nutrition, it is difficult to focus on only one buying component; nutritional labeling. Indeed, an overemphasis on nutrition in this questionnaire may even elicit responses from the interviewees that are not a true indication of their buying behavior in a real-life purchase decision. Respondents may state that they are "for nutrition" regardless of what their actual behavior may be. They may respond more favorably to nutrition questions than what their true feelings reflect.

CHAPTER II

NUTRITIONAL LABELING IN PERSPECTIVE

Introduction

Many agencies exercise control over food in the United States. Included are: Public Health Service, United States Department of Agriculture, United States Interstate Commerce Association, Federal Trade Commission, Food and Drug Administration (FDA) and various state and non-governmental agencies.[1] This study deals principally with the FDA.

The FDA is under the jurisdiction of the Department of Health, Education and Welfare. It is invested with authority as defined by the Federal Food, Drug and Cosmetic Act of 1939. Except for meal and meat products, the FDA regulates all foods moving in interstate commerce.[2]

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[1]Gladys T. Stevenson and Cora Miller, Introduction to Foods and Nutrition (New York: John Wiley & Sons, Inc., 1960), pp. 436-40.

[2]Ibid., p. 436.

Its basic purpose is to protect the health and economy of the consuming public.[1] From a regulatory standpoint, the Food, Drug and Cosmetic Law prohibits false weights and measures, adulteration, misbranding and false advertising.[2]

To accomplish its purpose, the FDA is concerned with the safety, quality and value of food. Safety includes protecting the public from the following hazards: foodborne disease, malnutrition, environmental contaminants, naturally occurring toxins, pesticide residues and deliberate additives.[3]

In dealing with malnutrition, the FDA has two objectives: to develop guidelines for the nutritive value of important food classes; and to develop labels to communicate nutritive value to the consumer.[4] Thus, an important part of the task of FDA is to supervise and control the labeling of foods that enter into interstate

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[1]Thomas W. Christopher, Cases and Materials on Food and Drug Law (Chicago: Commerce Clearing House, Inc., 1966), p. 3.

[2]Ibid.

[3]Virgil O. Wodlicka, "FDA's Objectives in Food Today" (paper presented at the 15th Annual Education Conference of the Food and Drug Law Institute and the Food and Drug Administration, Washington, D.C., December 7, 1971), p. 1.

[4]Ibid., p. 3.

commerce. This means that the label must contain accurate statements about the product.

Since the FDA must establish priorities and make decisions to protect the general health of the public, the agency institutionalizes change concerning the health and safety of food products. Such institutionalization with one body is necessary due to the lack of scientific knowledge among scientists with which to define proper nutrition. Because of this inability of scientists to define what proper dietary intake is for each consumer, the FDA has been granted the authority by the U.S. Congress to insure that people are attaining good nutrition.

One step in helping people select nutritious food is nutritional labeling, which will give consumers a better idea of the nutritional value of about half of the food they eat.[1] According to Dr. Charles C. Edwards, Commissioner of FDA, the purpose of nutritional labeling is not to force people to eat nutritious foods. He stated: "We're not trying to tell the American public what to eat--they can eat anything they want--but those interested can now have specific information about the contents of the foods they buy."[2]

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[1]Nutritional labeling only affects processed food. The percentage intake of processed food to total food varies by age and ethnic background. Estimates range from 25% to 75%.

[2]New York Times, January 18, 1973, p. 37.

FDA, in explaining nutritional labeling, has stated that "If a product is fortified by the addition of a nutrient or a nutritional claim is made in the labeling or advertising, that product label must then have full nutritional labeling."[1] In March 1972 the FDA promulgated voluntary guidelines on nutritional labeling and revised them in January 1973. While much controversy clouds the labeling proposals, nevertheless they are being heralded as a step forward in establishing a national food policy.[2] But it is not known what success FDA has had in trying to synthesize the wants of diverse interest groups for nutritional labeling. There will be additional guidelines from FDA, however, to clarify the areas of controversy, and hopefully to appease both food and industry and consumer segments.[3]

Several important questions must still be resolved prior to the issuance of new voluntary guidelines on nutritional labeling. One is whether the food industry is promoting taste in lieu of purity and nutrition. A second concerns whether changing manufacturing patterns of the food industry such as adding water, artificial colors and

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[1] Ibid., p. 30.

[2] Ralph Selitzer, "Food Labeling Proposals," Dairy and Ice Cream Field (March, 1973), 26.

[3] Ibid.

artificial flavors to food and beverages, or substituting isolated plant substances for food (for example, soy protein added to meats), cause health damage to the consumers. A third revolves around the nutritional status of consumers. If the nutritional status has declined during the past twenty years, as has been claimed, is it the fault of the food industry or is it attributable to the changing eating patterns of the consuming public? Is the food industry abrogating its responsibility of providing nutritious foods and/or do consumers have sufficient knowledge about nutrition to select a nutritious meal. The research findings do not yet exist to fully determine the answers to such questions.

An important nutritional issue confronting the FDA centers around the need for standards of identity to control the fortification of food products with nutrients. For if there is not a need, will nutritional labeling lead to a fortified promotional race to see which manufacturer can outdo the other in terms of supplements. According to Food Chemical News,[1] "there is a need for suitable guidelines by which a food could technically and legally qualify for fortification, and such foods which qualify should be

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[1]Food Chemical News is a weekly publication which reports on regulation of food additives, colors, pesticides and allied products.

permitted and the manufacturers encouraged to make suitable claims concerning the nutritive value of the products."[1] How to achieve those guidelines is, however, not known. For example, at the follow-up Conference on Food, Health and Nutrition held in Williamsburg, Virginia, representatives from government, industry and professional groups could not agree on any standards.[2]

A related question concerns the definition of an imitation food. Imitation provisions of the Federal Food, Drug and Cosmetic Act were adopted in 1906 and 1938 to guard against "economic adulteration" in the form of "cheapened, inferior foods."[3] While many new modified products have separate, distinct identities, the FDA has prohibited their being placed on the market. Some examples include low calorie margarine, low cholesterol eggs and golden elbow macaroni.[4]

The right to market golden elbow macaroni has been challenged since it contains ingredients at variance with the federal standards of identity for macaroni.

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[1] Food Chemical News, January 12, 1970, p. 12.

[2] Frank E. McLaughlin, private interview held at East Lansing, Michigan, November 20, 1972. Mr. McLaughlin is Director for Industry Relations, Office of Consumer Affairs, Department of Health, Education and Welfare. The conference in Williamsburg was held in February 1971 and was a follow-up to the White House Conference on Food, Health and Nutrition.

[3] Food Chemical News, February 12, 1970, p. 13.

[4] Ibid.

Competitive macaroni producers have opposed General Foods in their plan to market this product.[1] Yet other items, which are also modified products need not be labeled imitation. Examples are de-caffeinated coffee, skim milk and hams with moisture added.[2]

There are a number of interesting paradoxes. For example, the American Medical Association suggests that people substitute vegetable fat for animal fat. Yet if this is done, most products using the vegetable fat substitute would have to be labeled imitations.[3] Also, there is a need to consider the new foods like baconettes which are nutritionally comparable but do not resemble traditional foods on the basis of nutrient composition and appearance.[4]

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[1]For child feeding programs, which are controlled by the USDA, elbow macaroni is used as a supplement to meat, cheese and other traditional protein sources. The USDA clears new foods to be sold for school feeding programs; the FDA controls food for marketing in food stores.

[2]The new food label proposals issued on January 17, 1973 attempt to clarify the use of the word "imitation" on food labels. The rules specify that the word only has to be used on products that are nutritionally inferior to their imitations. But this does not answer clearly the question whether imitation foods will be permitted to be marketed.

[3]Food Chemical News, February 12, 1970, p. 13.

[4]These new foods substitute plant substances, like protein, for animal ingredients.

One of the most important nutritional issues concerns how the FDA will insure that all foods will meet the nutritional standards stated on labels. The costs of monitoring a nutritional labeling program so as to guarantee compliance appear to be prohibitive yet. In past years the budget for FDA's regulatory responsibilities has not increased proportionately with growth in manufacturing. In 1961, FDA spent 11 million for its food responsibilities: safety, quality and value of food. And in 1971, in constant dollars, FDA spent 11.1 million; a growth of a mere 1%. Nevertheless, in the same decade manufacturing shipments rose 15% and manufacturing expenditures rose 43%.[1]

Included among the other problems concerning nutritional labeling which any regulatory agency must consider are:

1. What is correlation between health and diet.[2]

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[1] Food Chemical News, June 8, 1970, p. 6.

[2] There have been many studies conducted to show the relationship between foods eaten and the diseases incurred. It is difficult to prove statistically, however, that there is a cause and effect relationship. For example, in a study recently conducted by Drs. Emmual Cheraskin and W. Marshall Ringsdorf, Jr., the results showed that refined carbohydrates like sugar and syrups cause disease. They surveyed what sick people eat and what healthy people eat, and found the latter to eat much less sugary calories. The doctors concluded that diseases were related to the intake of refined carbohydrates; heart attack, stroke, cancer, diabetes and birth defects. The inability to conclusively prove these relationships is the reason for the confusion about what proper nutrition is. See Detroit Free Press, November 12, 1972, Section C, p. 1.

2. What is level of education about nutrients?
3. What segments of the population need and will benefit from nutritional labeling?
4. What nutrient information should be included on labels?
5. Is there a nutritional deficiency in the United States food supply?
6. What foods should be labeled? A manufacturer must also know how foods are used. If fortify foods and people do not eat them, the effort is wasted.
7. What are the cost-price implications of nutritional labeling?
8. To what extent do consumers read food labels when nutritional information is provided. In general, prior to the adoption of nutritional labeling, consumers' attitudes toward nutrition was to eat a well-balanced diet daily.[1]

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[1]"Daniel Yankelovich, Inc., Applied Full-Disclosure Labels to Eight Packaged Foods," Chain Store Age (January, 1971), 68-71. The consumers' attitudes toward nutrition, as stated in this publication, include:

> The end result sought by most women in the area of food purchases is to provide their families with a well-balanced diet to meet the nutritional standards of good health. Nutrition, as an objective in overall food purchasing and subsequent meal preparation, is a major priority among all housewives.
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> Interestingly, most housewives feel that they are adequately meeting this objective. They feel that they are serving their families healthy and nutritious foods. The chief support for this feeling are visible to their eyes: they see their children growing well;

9. What factors motivate a consumer to purchase one brand of a food rather than another?
10. Will nutritional labeling aid in improving the diets of these individuals most in need of such improvement?

The present state of knowledge about nutrition does not permit complete answers to these problems.

Promulgation of Rules and Regulations

The philosophy of officials of the FDA toward nutritional labeling, prior to the mid-1960's, may be explained by the following quotation: "The basic philosophy embodied in the law governing foods and drugs from its inception--indeed our basic American philosophy of government is this: decisions regulating and restricting

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they see an abundance of food being eaten; and seldom do they have any negative feedback in terms of specific nutritional deficiencies.

On an overall basis, then, they feel that they have been successful in providing nutritious food. Therefore the concern over the specific nutritive elements in any one category of food is on a very low level. They feel that they serve a wide variety of foods and that if any one food item is low in nutritive value than they might prefer, it is more than compensated for by other things that their family eats. Further, the availability of vitamin supplements, which many families are religiously taking (this applies not only to children but to adults as well), helps to obviate concern over the ingredients of any one particular food product.

Some evidence suggests that consumers are increasingly acquiring a positive attitude toward nutrition and that they are also using, to some extent at least, nutrient information in their purchasing decisions.

the citizens exercise of his freedom must deal with and be based on ascertainable facts and not on subjective opinions."[1]

To promote the general welfare of U.S. citizens, the FDA and other administrative agencies, control in part individual conduct and impose restraints on business through rules and regulations. In general, the regulatory trend in these agencies is to bring more and more of our lives under statutory regulation.[2] It is likely that administrative agencies will continue to have more control over the lives of the American people.[3] Our complex and changing social order makes it necessary for these agencies, including the FDA, to plan socially and to harmonize conflicting interests.[4]

The major tenet of the author, however, is that the FDA's voluntary labeling guidelines on nutritional labeling does not resolve conflicting interests among the

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[1]Christopher, Drug Law, p. 170.

[2]With the competing interests, desires and requirements of our complex society, a body of administrative law has developed to protect the rights of each member of society. For more discussion, see Frederick F. Blachly and Mirian E. Oatmen, Administrative Legislation and Adjudication (Washington, D.C.: The Brookings Institution, 1934), pp. 2-14.

[3]Peter Woll, American Bureaucracy (New York: W. W. Norton & Company, Inc., 1963), pp. 174-77.

[4]Ibid., p. 177.

government, food industry and consumers. Moreover, consumers have not had sufficient input in developing the labeling guidelines.

The growth of the formalized bureaucratic procedure in the FDA for promulgation of regulation and handling disputes that have risen between the FDA and business and/or other groups in society made it impossible for regular courts to adjudicate.[1] Thus there has been the creation of an administrative judicial system which has developed doctrines and criteria for deciding when they will or will not take jurisdiction over administrative acts. For instance, the doctrine of finality of administrative decisions, and the right of the administrative authorities to interpret the law have freed the courts from interpreting the law.[2] By its very nature, this highly structured procedure for conducting the affairs of the FDA has been void of consumer input.[3]

There are two methods by which consumers can participate in the promulgation of regulations. First, consumers can write directly to the commissioner of the

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[1]Frederick E. Blachly and Miriam E. Oatmen, Administrative Legislation and Adjudication (Washington, D.C.: The Brookings Institution, 1934), p. 12.

[2]Ibid., p. 5.

[3]For further discussion about the role of consumers in the future, see Peter Woll, American Bureaucracy (New York: W. W. Norton & Company, Inc., 1963), pp. 174-77.

FDA. Second, consumers can respond to proposed rules and regulations which are published in the Federal Register. But these have not been effective for input into regulations. There is a lack of interest by consumers in the affairs of the FDA. Then the legal wording of the Federal Register as well as its relatively unknown existence discourages consumer input into regulation formulation.

Despite the lack of consumer participation, the FDA makes decisions in the name of the consumer. In May, 1970, Commissioner Edwards declared:

> Our decisions must be based on scientific facts and our best judgment of what is in the consumer interest--we must continually bear in mind that we are a consumer protection agency; and our primary relationship is with the consumer. All of our decisions must be made in his interest after having considered all of the available scientific evidence. I know, of course, that our consumer-oriented decisions affect other special interests, be they medical, legal or economic.[1]

Edwards further stated: "Nutritional guidelines must meet consumer interest and principals in the food industry must be able to comply with them."[2]

1960's--A Rise of Consumer Involvement

Until the mid-1960's the policies of the FDA seemed to reflect the assumption that all consumers ate a balanced diet and that the sole purpose of the agency was

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[1] Food Chemical News, May 11, 1970, p. 6.

[2] Ibid., June 22, 1970, p. 24.

protection of the consumer against food quackery.[1] Specifically, until 1969 the FDA did not seem directly concerned with nutrition or nutritional labeling. Rather it seemed to disregard some of the evolutionary developments of the 1960's as evidenced by various changing life styles and the creation of new synthetic foods.[2] In general, the FDA was geared to the prohibition of food quackery, the truthful and informative advertising, and not to the nutritional intake of individuals.[3]

An example of this orientation occurred in 1964 when the FDA threatened legal action against certain products that bore labeling terms such as polyunsaturated and low in fats. The March 30, 1971, issue of Consumer Bulletin stated:

> The FDA simply did not know what it was talking about when it said these bits of information were not properly included on food labels, and that they were not useful for the consumer's information in respect to selecting among processed foods. FDA and the Department of Agriculture stubbornly stuck to the position that there was no need to be protected by proper food labeling against an excessive intake of fat, or fat of the less desirable kinds. The FDA failed to understand what the new

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[1]Mr. McLaughlin, private interview held at East Lansing, Michigan, November 20, 1972. Also, see Food Chemical News, July 6, 1970, p. 12.

[2]Food Chemical News, July 6, 1970, p. 12.

[3]Ibid., June 1972, p. 22.

synthetic foods and the changing life styles would have upon the daily nutritional intake of the consumers.[1]

Prior to the Conference on Health, Education and Nutrition in 1969, the FDA acted as though it was not aware that prepared, convenience foods and snack foods were the diet for many people.[2] The 1969 Conference was a reflection of the climate of the times: an era of growing consumer interest in the quality of life and greater recognition of the need of business to be more responsive to consumer needs.

Promulgation of Idea of Nutritional Labeling

An important recommendation of the 1969 White House Conference on Food, Health and Nutrition concerned the use of nutritional labeling as a means of raising the nutritional menu of Americans. After the conference, criticisms were heard about the nutritional integrity of the food industry. Two of the most vocal voices calling for action on nutritional labeling were Robert L. Choate and James S. Turner.[3]

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[1] "FDA Seems About to Abandon Its Opposition to Truthful Labeling of Factory-Made Foods," Consumer Bulletin, August, 1971, p. 27.

[2] Food Chemical News, July 6, 1970. p. 12.

[3] Robert L. Choate is Chairman for the Council on Children, Media and Merchandising. James S. Turner is a member of Ralph Nader's Center for Study of Responsive Law.

In testimony before Senate Consumer Subcommittee in July, 1970, Robert Choate said:

> Those in the food professions hesitate to compare the nutritional worth of various foods. They are curiously reluctant to arm the buyer with protective knowledge against deceptive advertising, mislabeled boxes and deceitful containers, or even to help him understand the new food technology. Most Americans are nutritional illiterates, and their lack of knowledge makes them an easy mark for segments of the food industry eager to conceal the comparative nutritive worth of their products.[1]

James S. Turner, attorney and author of the "Chemical Feast" stated:

> In the place of sustained action to advance health by helping to improve the American diet, the FDA substitutes naive faith that the way American food is produced, preserved, and distributed is exceptionally fine. It maintains this faith in the face of increasing scientific evidence that chemical additives can be extremely dangerous, that the vitamin content of the American diet is deteriorating, that saturated fat in food is probably a contributing factor to more than 70% of all American deaths, and that American food is getting filthier. As long as the FDA believes that the food industry wishes to provide to the American people, no amount of legislation, manpower or money will turn the agency into an effective food regulator.[2]

With much attention focused on nutrition, many housewives began to question whether the food industry was meeting taste (palatability, tenderness, visual presentability and convenience) at the expense of purity,

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[1] Food Chemical News, July 27, 1970, p. 40.

[2] Ibid., April 13, 1970, p. 6.

wholesomeness, safety and nutrition.[1] In general, consumers took nutritional value for granted; they assumed that food producers and retailers were watching over her diet.[2] But the fervor over nutrition raised doubts about this assumption in her (his) mind.

Nutritional labeling was thus a culmination of the FDA's belief that housewives perceived the need for better information about proper nutrition. FDA desired a program which would enable housewives to choose intelligently the proper foods for a nutritious meal.

A growing awareness by the FDA in 1969 that eating patterns greatly had changed also precipitated nutritional labeling. For instance, the growth of formulated foods meant that housewives lost control over nutritional properties of the end product. Moreover, manufacturers had no guidance in establishing nutrition specifications on products.

During World War II there was some attention by the government to nutrition, springing from fear that consumers

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[1]Commissioner Edwards of the FDA summarized the general feelings of the time when he stated: "Consumer discontent is the reality that we have today more products than quality, more promises than progress, and more concern for reaping profits than for earning them. This has created a vicious cycle of consumer discontent." See Food Chemical News, June 26, 1972, p. 22.

[2]"Consumer Attitude Study--Part II," Supermarketing, April, 1972, p. 41.

would not obtain adequate nutrition because of shortages. This led to a "numbers game": food companies were fortifying their products with vitamins and minerals.[1]

By the late 1950's, people were confused, misinformed or uninformed about the true value of a fortified food. In the 1950's also, most people were shifting their concern from "safety" to "nutrition." There was a clamor for vitamin fortification.

In 1962, the FDA illustrated its growing sensitivity for action through more restrictive regulation. Specifically, the FDA recognized the importance of nutritional intake when it proposed dietary regulations in 1962. With some revisions, the 1962 proposals became law in 1966. Part 80 of the 1966 FDA regulations listed the standards of identity for dietary supplements and vitamins and mineral fortified foods.[2] The promulgation of this regulation by the commissioner of the FDA marked the first time that the FDA publicly espoused an awareness on its part of the necessity for fortification and enrichment of foods to maintain proper nutrition for all segments of the population.

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[1] Food Chemical News, February 22, 1971, p. 4.

[2] For a complete listing of the standards for dietary foods, see Christopher, Drug Law, pp. 884-906.

There was an increasing awareness in government during the mid-1960's about the problems people suffered from lack of a nutritious diet. In 1969 this forced the FDA to consider methods by which the food consumption habits of consumers might improve. To aid consumers in selecting nutritious foods, the FDA promulgated voluntary guidelines on nutritional labeling.

But while nutritional labeling was being promoted to aid consumers, the FDA did not know what consumers wanted. If, indeed, there was diet inadequacies in the United States, would nutritional labeling assist in alleviating poor nutrition habits? Nutritional labeling, to be effective, must be used. To be used, it must not only be understandable by consumers, but there must be a desire or a need for it (or a program to stimulate a desire for it).

Level of Nutrition Knowledge

The divergent demands by consumer pressure groups and the general lack of knowledge among consumers about nutritional labeling placed the FDA in a tenuous position in 1969 to establish guidelines. Consumer pressure groups were not unified in their approach to nutritional labeling. For example, some had expressed concern over the use of additives in foods while others had stated that foods should be fortified.

Nutrition is a complex issue. Thus there are varying opinions about it. Scientists and physicians cannot agree on what is needed for the best nutritional results. While the solutions to these complex questions were not known, the FDA nevertheless felt compelled to try to attain proper nutrition for all Americans.

A major reason for the FDA promulgation of nutritional labeling was the perceived diet inadequacies among certain population segments in the United States. To help correct this situation, the White House Conference on Health, Food and Nutrition recommended better nutrient information on food.

Does malnutrition exist in the United States? According to studies conducted by the United States Department of Agriculture, there are reasons to believe that malnutrition affects all segments of our population--rich and poor, educated and not educated, black and white, etc. The 1965 survey of USDA on dietary habits showed that family diets were not as good as they were in 1955.[1] It stated that good diets dropped from 60% to 50%; those with poor diets rose from 15% to 21%; and the remainder had fair diets.[2]

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[1]"Nutrition: New Product Opportunity?" Grocery Manufacturing, February, 1971, pp. 7-8.

[2]For the purposes of this study the definition of a proper diet was described by the Food Nutrition Board/ National Research Council for seven nutrients. These

Why did the consumer's diet diminish in nutritional content? What was a reason for this trend in malnutrition? These are difficult questions to answer, but evidence indicates two principal causes for increasing malnutrition.

First, a low level of knowledge about proper eating habits and nutritional values of food exists in the United States. Studies have been conducted in various segments of the population (affluent, poor, high school students, college students, etc.) which have tested for the level of nutritional knowledge.[1] Each study conclusively states that numerous nutritional misconceptions exists among the sampled population.

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nutrients are: protein, calcium, iron, vitamin A, thiamin, riboflavin and vitamin C. If the diets provided less than two-thirds the Recommended Dietary Allowance for the individual for one or more of the seven nutrients the diet was considered poor. A level below two-thirds for any extended period of time was considered a level below which diets could be nutritionally inadequate. A level above two-thirds was considered a good diet.

[1]These research projects include:

1. A study conducted among college freshmen in 1967 by Jack Osman showed that college freshmen subscribe to many nutrition misconceptions and lack knowledge about nutrition. See Jack O. Osman, "Nutrition Misconceptions of College Freshmen" (unpublished master's dissertation, University of Maryland, 1967).
2. A research project by Jerry Rivers, Marjorie Burn and Shirley B. Jalso showed that age was directly related to nutritional opinions and practices, misinformation about nutrition was prevalent in all age groups. See Shirley B. Jalso, Marjorie M. Burns, and Jerry M. Rivers, "Nutritional Beliefs and Practices," Journal of the American Dietetic Association, XLVII (October, 1965).
3. A study by Day and Zimmerman consulting services showed people were confused what the term fortification

Second, and more important, is the low level of interest in nutritional labeling. Nutritional labeling is not a phenomenon. Food companies, such as cereal manufacturers and salt producers, have had nutritional labeling on their products since the early 1940's. In addition, many food manufacturers have issued nutritional information. But even with the availability of this nutritional data on labels, most consumers did not avail themselves of the information.

There appears to be segments of the United States population, however, in which nutritional knowledge and dietary awareness are rapidly increasing in importance. For example, with a high death rate attributable to heart disease, more Americans, both with and without heart diseases, are regulating their intake of salt, saturated fats, high cholesterol foods and other substances which may adversely affect their cardiovascular system. Also, the number of people concerned about nutrition is increasing due to the recent more affirmative effort of the food industry to enlighten people about good nutritional practices.

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means and did not understand the purpose of vitamin and mineral supplements. See "A Survey of Consumer Concepts and Expectations Concerning Vitamin and Mineral Supplements, Fortified Foods and Foods for Special Diets," Report to Food and Drug Administration, Washington, D.C., February, 1970.

Efforts have been made by physicians, dietitians, food scientists and nutritionists to determine the optimal intake of nutrients as well as the proper diet for different segments of the United States population. For example, Dr. Call, an economist from Cornell University working on nutrition, sent a questionnaire to 1,500 professional individuals who deal on a daily basis with nutrition.[1] He asked them to specify what nutrients should and should not be listed on food labels. There was no universal agreement as to what nutrients should be listed.

That considerable disagreement exists among the various professional people about what constitutes proper nutrition reflects a major problem in establishing goals for nutritional labeling. At the present time, medical science does not have the technological knowledge to define categorically what proper nutrition means for each individual in the United States. Likewise, the disagreement among the professional scientists about nutritional intake and dietary needs for different individuals makes it extremely difficult for the FDA as well as the business community to implement an effective nutritional labeling program. Many executives in the food industry were not sure that the media and the opinions of consumer advocates'

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[1]David L. Call and Miriam G. Hayes, "Reactions of Nutritionalists to Nutrient Labeling Foods," The American Journal of Clinical Nutrition (October, 1970), 1347-52.

demanding nutritional labeling accurately represented the views of most consumers.[1]

To help the manufacturer establish nutritional quality of formulated foods, the use of nutritional guidelines was adopted.[2] The first public announcement that FDA would develop nutritional guidelines was made on June 8, 1970. At that time, the FDA stated it would establish guidelines for these selected classes of foods: formulated main dishes, dairy products, fruit juices, snack foods and staple foods important to ethnic groups.[3]

In September 1970, the FDA directed the National Academy of Science/National Research Council's Food and Nutrition Board to do the following: establish nutritional guidelines for formulated main dishes, and to select three other classes of food that need minimum and maximum nutrient levels. A lack of information, however, on the

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[1]Bill Ringler, "Consumer Attitude Study--Part I," Supermarketing, March, 1972, p. 37.

[2]This developed during the White House Conference on Food, Nutrition and Health in 1969. The panel on new foods proposed that standards or guidelines of nutritional quality be developed for certain classes of food: new foods which contain ingredients that make it difficult for the consumer to identify the product. The panel proposed the following: standards or guidelines be developed which would specify a minimum and a maximum value for nutritional properties; and identification of nutritional properties which are most significant to the consumer's use of the product.

[3]Food Chemical News, June 8, 1970, p. 6.

nutritional requirements of consumers and nutritional qualities of foods slowed the establishment of guidelines on new foods.[1] Only frozen convenience dinners and main dish entrees such as meat pot pies and canned stews are covered by guidelines presently.

Proposals on Nutritional Labeling

The label information which should appear on a food label to inform consumers fully was prescribed in section 403 (j) of the Federal, Food, Drug, and Cosmetic Act issued in 1938.[2] A subsequent amendment was added in 1966 listing the standards of identity for foods of special dietary use. This amendment established the only type of nutritional labeling acceptable until the March 1972 proposals.

To develop a meaningful system for nutrients, the FDA developed six alternative forms of nutritional labeling.[3] These were then sent to nutritionists, home

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[1]Ogden C. Johnson, "Nutritional Labeling, Guidelines, and Food Fortification" (paper presented at the meeting of the Association of Food and Drug Officials of the United States, Columbus, Ohio, June 23, 1971), p. 6.

[2]Christopher, Drug Law, p. 810.

[3]The basis for developing these alternatives came from two studies: the aforementioned research conducted by David Call and a study published in Chain Store Age. In the latter research project, consumers were exposed to products with nutritional labeling while others only saw products without nutrition information. The study showed that consumers, in general, purchase products with nutrition labeling. See Chain Store Age, October, 1970.

economists, physicians, food industry executives and consumerists.[1] After analyzing the recommendations of these individuals, the FDA proposed three labeling procedures for further testing. These include:[2]

1. A chart showing percentage of National Academy of Sciences Recommended Daily Allowance per serving, ounce or calories.
2. Units or symbols to express the contribution of the food to the Recommended Daily Allowance.
3. Descriptive terms such as "good" and "very good" to describe nutritional content of product.

For each of the three labeling systems, a nutritional statement was based on Recommended Daily Allowance and nutrition information was expressed in terms of a portion. Also, each method listed the following contents: calorie, fat, protein, carbohydrate, vitamin A, vitamin C, thiamin, riboflavin, niacin, calcium, and iron.[3]

These three alternatives were evaluated by several retail chains, Consumer Research Institute and a study conducted by Drs. Call and Padberg of Cornell University.

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[1]U.S., Department of Health, Education and Welfare, "Report on Nutrition Labeling," Federal Register, XXXVIII, Jan. 19, 1973, 2125.

[2]U.S., Department of Health, Education and Welfare, "Report on Nutrition Labeling," Federal Register, XXXVII, March 30, 1972, 6494.

[3]Ibid.

Consumer Research Institute carried out its test in two phases. First, it conducted a study through Homarket, Inc., a market research organization, in 950 educated middle class households in Atlanta, Georgia and Bridgeport, Connecticut. The families shopped by catalog and compared weight, price, brand and nutrients when selecting their food products. Results of the study showed that consumer attitudes toward nutrition and knowledge of nutrition improved. In addition, there was some indication that the families used nutrient information in making their purchasing decisions.[1]

Like the first phase, the second part of the CRI/FDA studies was to determine whether consumers could understand, and therefore use nutritional labeling to meet their nutritional needs. Personal interviews were conducted with 543 low income and uneducated whites and blacks. Mail questionnaires were sent to 2,250 poor and uneducated blacks and whites and to 2,000 members of the general public.[2] The three labeling formats tested include:

1. Numerical system which lists the percentage Recommended Daily Allowance for each of seven nutrients.

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[1]"Coming--Food Labels with Nutrition Facts," Changing Times: The Kiplinger Magazine, August, 1971, p. 17.

[2]For a detailed discussion see Consumers Research Institute, Inc., Washington, D.C., "Nutrient Labeling Research Program," August, 1972 (mimeographed).

2. Verbal system which describes the products using terms like "good" or "very good" source of nutrients.
3. Pictorial system which uses symbols to indicate the quantity of a nutrient in the product.

Results of the study showed that the numerical system elicited the best consumer reaction to nutrient information. Other generalizations from the research include:

1. Consumer concern and interest about nutrition was high.
2. Consumer knowledge of nutrition improves with exposure to a nutritional labeling program.
3. Some indication that where a product or brand has a nutritional advantage over other competitors, consumers will purchase the item with the best nutritional content.

Many food chains also carried on in-store tests to study consumer reaction to nutritional labeling.

Giant Foods, Landover, Maryland was the first chain to conduct its own consumer survey of nutritional labeling.[1] On September 8, 1971, it introduced nutritional labeling on twenty-eight items in ninety-four stores

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[1]Mrs. Esther Peterson, Consumer Advisor to the President of Giant Foods along with an advisory group headed by Dr. Jean Mayer of Harvard, developed Giant's labeling program. Dr. Mayer was critical of some food industry practices, particularly the promulgation of non-nutritious snack foods.

located in the District of Columbia, Maryland and Virginia. Nutritional units listed on the label include protein, vitamin A, thiamin, riboflavin, niacin, vitamin C, calcium, iron, caloric content, gram amounts of protein, carbohydrates and fat.[1] In addition, Giant Foods sent educational materials on their nutritional labeling program to schools, grocery manufacturers and other interested parties.

Kroger Company, Cincinnati, Ohio, tested the good source method in which the food label stated whether the product was a "fair," "good," "very good," "major," or "excellent" source of certain nutrients like niacin and protein.[2] In addition, the label listed the weight of an average serving of protein, fat, carbohydrate and caloric content.

Jewell Food Stores, Melrose Park, Illinois, provided two forms of nutritional data on private brand products. For seven canned items, label information on each product included: the front of the can flagged indicating the Daily Recommended Adult Requirements of a nutrient, and the label on the back of the can listed information on protein content and vitamins in milligrams.[3]

First National Stores, Somerville, Massachusetts designated a few private-label products as "minor," "good,"

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[1]Editorial, Supermarket News, February 17, 1972, p. 4.

[2]Ibid.

[3]Ibid.

"very good," "major," or "excellent," source of nutrient. The label also listed protein, fat, carbohydrates and calories in an average serving.[1]

National Cooperatives, Albert Lea, Minnesota tested the various nutritional labeling methods proposed by the FDA. It listed ingredients by percentage; nutrients per cup in milligrams, including proteins, vitamins, minerals, fat and calories; portion of Recommended Daily Allowances of those nutrients for an adult male, rated by one to five stars, and listing of any nutrients which represent at least half the adult Recommended Daily Allowance.[2]

Other chains which provided information on nutrition included Mid-Eastern Cooperatives, Carlstadt, New Jersey; Shop-Rite, Elizabeth, New Jersey; Grand Union Company, East Paterson, New Jersey and Safeway Stores in Washington, D.C., Denver and Southern California.

A formal evaluation of the in-store tests was conducted by Dr. Call and Padberg. While the intensity of promotion and differences in numbers of product having nutritional labeling differed for each chain, the results nevertheless showed that consumers see "nutrient labeling as having some intrinsic value quite apart from the role it plays in listing of nutrients."[3]

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[1] Ibid.

[2] Ibid.

[3] D. L. Call and D. I. Padberg, "Consumer Reaction to Nutrition Information on Food Product Labels," Search Agriculture II (June, 1972).

Padberg and Call define this as non-use benefits. It means that consumers see nutritional labeling as a system that makes the food industry more accountable. In other words, nutritional labeling gives the consumers a greater feeling that the food industry is, indeed, watching over their diets.

Padberg and Call also conducted a national consumer survey. Personal interviews were conducted with 2,195 individuals in the United States. The major finding was a confirmation that the Recommended Daily Allowances was the best method of listing nutrient information on labels.

First Voluntary Guidelines for Nutritional Labeling

Based on nutritional studies of the National Academy of Science/National Research Council, studies conducted by Consumer Research Institute and experimental nutritional labeling programs by the retail food chains, FDA issued voluntary guidelines for nutritional labeling on March 30, 1972.

1. Vitamins and minerals should be expressed as a proportion of the Recommended Daily allowances (RDA) modified to provide a single RDA level for ages and sexes.
2. The labeling should indicate the caloric content and the amounts of protein, carbohydrate, and fat in the product period.
3. The nutrition content should be related to a portion or service of the food expressed in common household terms or easily identified units.
4. A complete listing of the seven important vitamins and minerals should appear on all

products unless the product contains essentially none of those vitamins or minerals.

5. A listing of protein content should appear on all products unless the product contains no protein.[1]

To this proposal, there were approximately 3,000 responses.[2] Many food industry executives, in particular, questioned the feasibility of these guidelines. They did not believe that consumers were capable of understanding the listing of nutrients and subsequently using this information in their meal preparation. Some typical comments from industry personnel include:

> Perhaps nutritional labeling should be implemented in a series of steps.[3]
>
> It has become apparent that we may be trying to digest an entire meal in one bite.[4]
>
> It is unwholly unrealistic to expect any consumer to calculate his daily nutritive intake from his food for 19 vitamin-minerals and for calories, carbohydrates, fat and protein so as to achieve RDA levels in the vitamin-minerals, and to achieve an appropriate gram intake of protein, as well as the correct gram value for carbohydrate and fat. Even when the calculations were done, they would not be meaningful unless all foods eaten away from home and all foods not labeled with voluntary nutritional labeling were somehow factored into the calculations, and unless some information were provided to inform the consumer what gram levels for carbohydrates and fat are desirable in the diet.[5]

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[1]U.S., Department of Health, Education and Welfare, "Report on Nutrition Labeling," Federal Register, XXXVII, March 30, 1972, 6493.

[2]Before promulgation of the final guidelines, 60 days were allowed for responses to the original proposal.

[3]Food Chemical News, July 24, 1972, p. 28.

[4]Ibid.

[5]Ibid., July 17, 1972, p. 34.

But the status of nutritional labeling was not in doubt. In contrast to the food executives concerns about the ability of consumers to understand nutritional labeling and the desire of consumers to have nutritional labeling, the FDA was firm in its attitude toward the concept. The importance of nutritional labeling to the FDA is exemplified by the comments of two FDA officials:

> People want to know more about the components of food--consumers will get accurate nutrient labeling.[1]

> FDA reliance or will of the marketplace for enforcement of the voluntary nutritional labeling. . . . As yesterday's public would reject a product for product taste, tomorrow's will reject a product for poor nutrition. Empty calories will be hard to sell.[2]

Final Regulations on Nutritional Labeling[3]

NUTRITIONAL LABELING: This is the umbrella regulation that labeling will be used for food products. It establishes these criteria:

1. Nutritional labeling for most foods is voluntary. However, if a product is fortified by the addition of a nutrient or a nutritional claim is made in the labeling or advertising, that product label

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[1]Dr. Ogden Johnson, "View of the Food and Drug Administration on Nutritional Labeling" (speech presented at the 32nd Annual Dairy and Food Manufacturers Conference, East Lansing, Michigan, November 15, 1972).

[2]Food Chemical News, June 26, 1972, p. 20.

[3]Ralph Selitzer, "Food Labeling Proposals," Dairy and Ice Cream Field (March, 1973), 27.

must then have full nutrition labeling. Examples of nutritional claims include any reference to protein, fat, carbohydrates, calories, vitamins, minerals, or use in dieting.

2. The following standard format and headings are established: "Nutritional Labeling"
   1. "Serving size"
   2. "Servings per container"
   3. "Caloric content"
   4. "Protein content"
   5. "Carbohydrate content"
   6. "Fat content"
   7. "Percentage of U.S. Recommended Daily Allowances of protein, vitamins, and minerals"
3. Levels of vitamins and minerals will be listed as a percentage of U.S. Recommended Daily Allowances (U.S. RDA). They replace FDA Minimum Daily Requirements (MDR) values.
4. Seven vitamins and minerals must ordinarily be included in the standard format. If a food contains less than 2% of the RDA for four or more of the seven nutrients, the manufacturer may list only those present at more than 2% of the RDA, together with a disclaimer for the nutrients not listed.

5. Protein content shall be listed on all products which contain significant amounts of protein.

6. Because there can be unavoidable variation in the nutrient quantity of natural or raw foods, FDA's regulation allows for a statistically valid sampling plan to determine compliance.

Summary

While the genesis of nutritional labeling occurred in 1962, universal interest in it was a result of the White House Conference in 1969 on Food, Nutrition, and Health. Prior to this conference, except for dietitians wanting improved labeling of food and some members of the medical profession calling for fat labeling, little effort had been placed in evaluating nutritional labeling as a means of consumer education and information on nutrition and proper diet.

With the overall growth of human social awareness and inflationary trends, consumer pressure groups, nutritionists, physicians, dietitians, and others became more vocal in their demand for nutritional labeling for food products. The FDA, USDA, food manufacturers and grocery retailers initiated several research projects relating to the feasibility as well as the specific format of nutritional labeling. In general, the research conducted to date has been concerned with the following aspects of

nutritional labeling: (1) the nutrients which should be listed on the labels; (2) the response of consumers to products carrying nutritional labeling; (3) the nutrients listed on the label which encourage the most consumer response; and (4) the format which should be employed to list the nutrients.

There are several research studies which monitor the consumers' purchasing traits of food products with nutritional labeling. However, there are no studies which specifically inquire what the consumer wants from nutritional labeling. This thesis will attempt to answer that question for affluent consumers.

CHAPTER III

RESEARCH METHODOLOGY

The purpose of this chapter is to describe the research instrument, sample, and the method of data collection.

Selection of the Research Area

The East Lansing-Lansing area was selected for the research. The area contains nine census tract areas with an average household income above $15,000.[1] To insure interviewing the highest proportion of households meeting the criteria of $15,000, the four census tracts with the highest average household income were chosen.

By framing the population to be studied geographically, the concentration of interviews permitted substantial cost saving. Since the interviews were conducted in the cities of East Lansing and Lansing, it was possible for the research director to control and monitor the interviewers carefully.

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[1]Census tracts divide the city into smaller parts, each smaller part being composed of a group of blocks.

The specific area in which the research was conducted included census tracts 17, 38.01, 39.01, and 40. Tracts 38.01, 39.01, and 40 are in the city of East Lansing; tract 17 is in Lansing.

Table 1 shows the average household income of each of these census tracts. An enumeration of the average household income for all census tracts in East Lansing and Lansing is shown in Appendix B. The specific areas in which the research was conducted are shown in Figures 1 through 3.

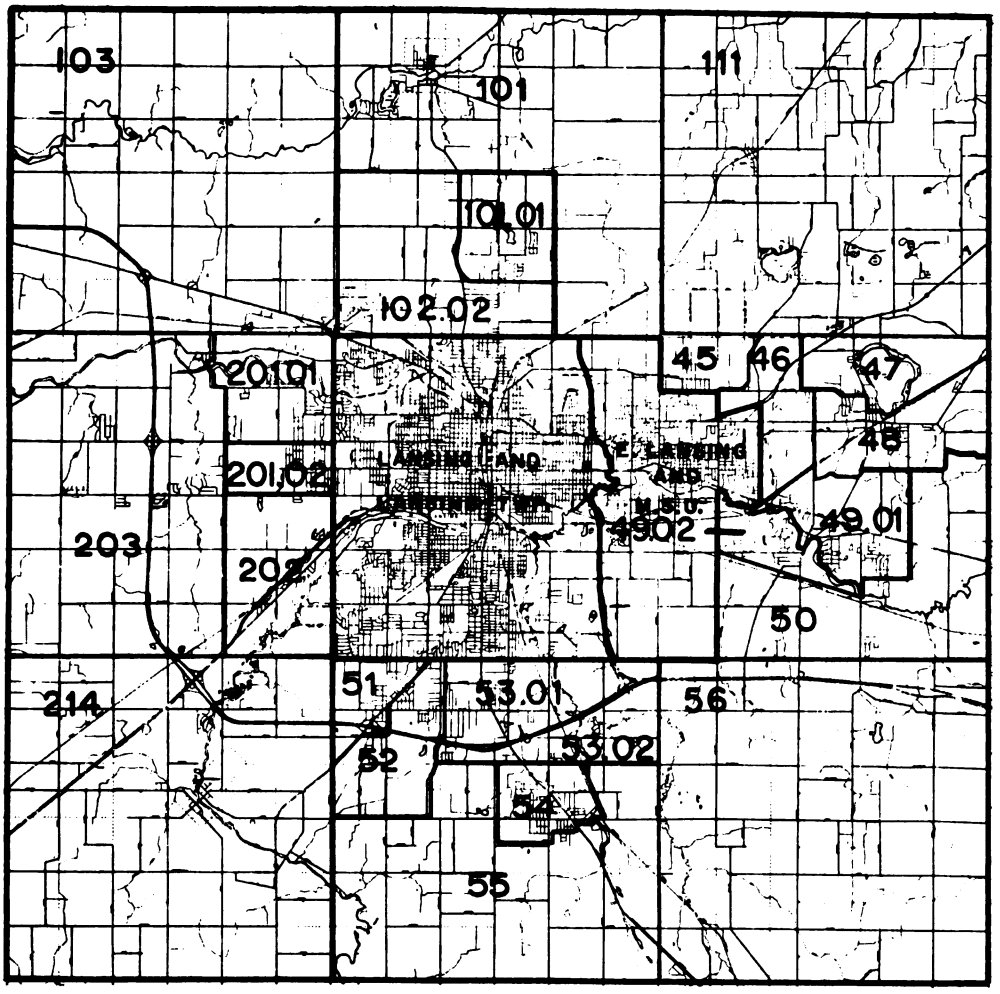
TABLE 1

Average Household Income of Census Tracts

Census Tracts	Number of Households	Mean Income
17	1,148	$20,173
38.01	615	20,856
39.01	247	37,550
40	967	20,270

Source: This data is taken from the 1970 census information; "Income Characteristics of the Population: 1970," Lansing, Michigan, SMSS, pp. 31-40.

Visual observation of the households and information from the interviews confirmed that heterogeneous conditions were prevalent in four sections. Variability in family units included the following: housing types, income levels, occupation of household heads, educational



PLANNING FOR PEOPLE
TRI-COUNTY REGIONAL PLANNING COMMISSION FOR CLINTON, EATON AND INGHAM COUNTIES

NINE TOWNSHIP AREA

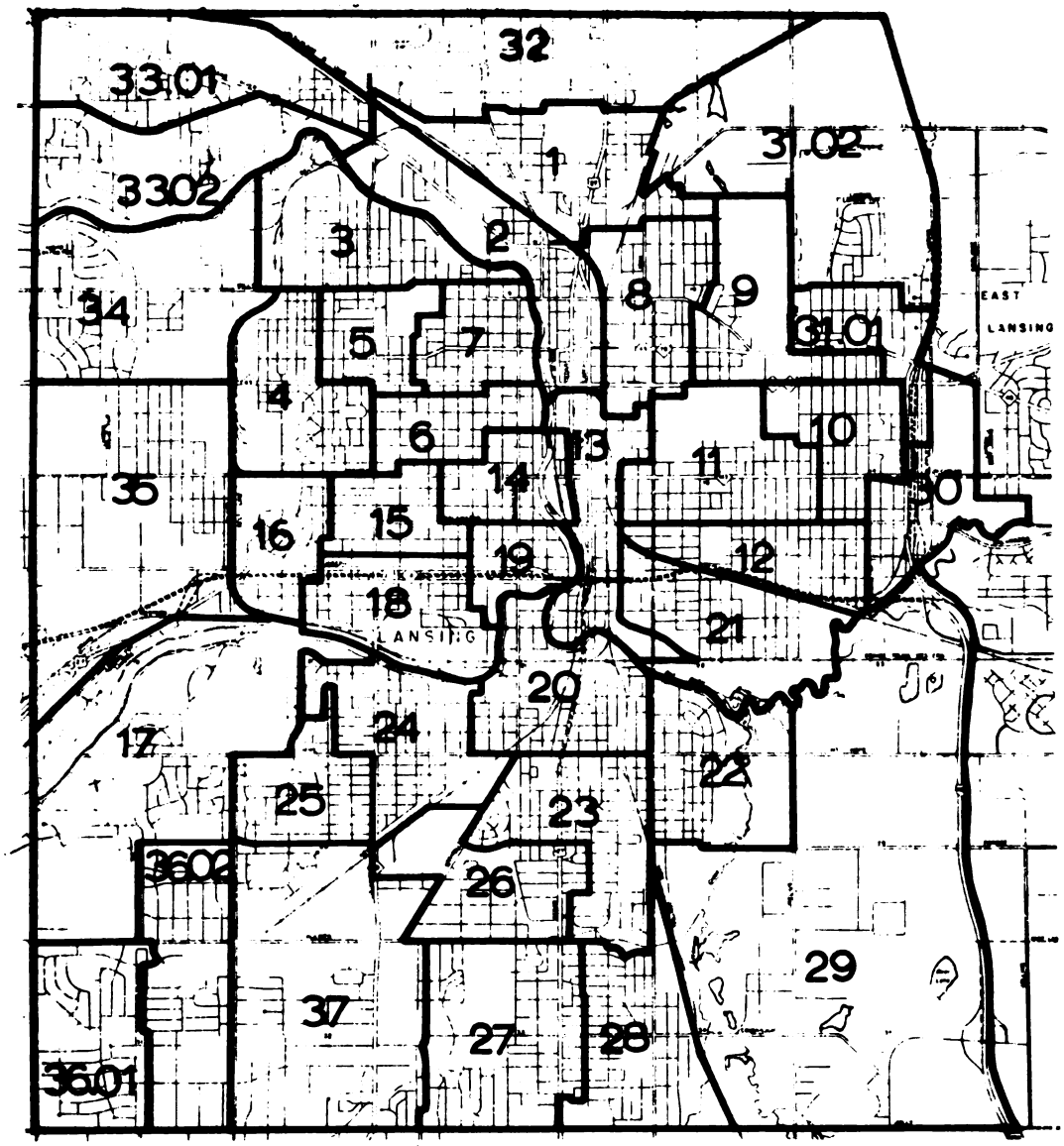
1970 CENSUS TRACTS

—— CENSUS TRACT BOUNDARIES

40 CENSUS TRACT NUMBERS

FIGURE 1

Map of Nine Township Area



PLANNING FOR PEOPLE

TRI-COUNTY REGIONAL PLANNING COMMISSION FOR CLINTON, EATON AND INGHAM COUNTIES

LANSING AREA

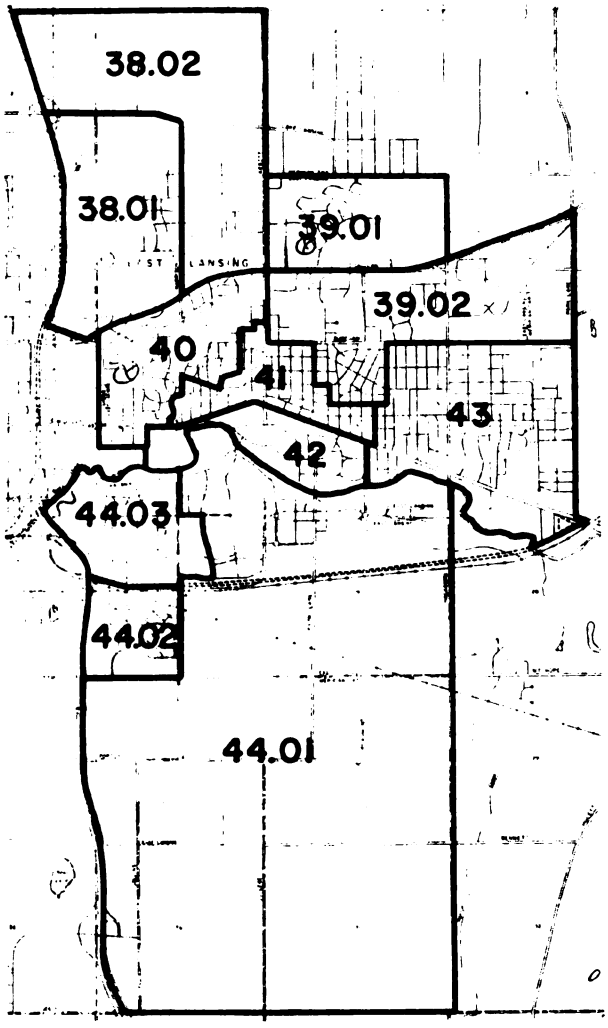
1970 CENSUS TRACTS

—— CENSUS TRACT BOUNDARIES

15 CENSUS TRACT NUMBERS

FIGURE 2

Map of Lansing Area



PLANNING FOR PEOPLE
TRI-COUNTY REGIONAL PLANNING COMMISSION FOR CLINTON, EATON AND INGHAM COUNTIES

CITY of EAST LANSING

1970 CENSUS TRACTS

—— CENSUS TRACT BOUNDARIES

42 CENSUS TRACT NUMBERS

FIGURE 3

Map of East Lansing

levels of respondents, social classes, life cycles, and number of children. While it cannot be stated unequivocally these four census tracts are representative of all high income areas in the United States, the aforementioned diversity in family units does indicate that they are a good cross-section.

Sample Unit

Food shopping is generally done for the household or family. Households were therefore chosen as being the most representative unit to work with in evaluating knowledge of nutrition and nutrients. The person interviewed in each household was the individual who usually purchases and prepares the food. The universe to be sampled was designated as consisting of all upper income households in the research area.

Design of the Sample

Selection of Household Units

To permit inferences about the population of upper income households in the United States from the sample data, random selection procedures were used in selecting the sample. Two statistical steps were required when designing the probability sample: enumeration of all household units and random selection of the units.

An enumeration of each household unit in the four census tract areas was made. A household unit was defined

as "the entire group of persons who live in one housing unit."[1] Then a random procedure was used to select the actual housing units to be included in the sample. A housing unit is defined as "a group of rooms or a single room which is occupied as separate living quarters and where the occupants do not live and eat with any persons in the structure.[2]

The Ingham County Health Department provided a complete enumeration of all the housing units. In this research, all housing units which were selected by a random procedure consisted of either apartments or single family homes.[3]

An extensive appraisal of all household units by block for the East Lansing-Lansing area is conducted bi-annually by the Ingham County Health Department.[4] Thus, this agency has on file a complete listing of all housing units, by block, in the cities of East Lansing and Lansing. On their block maps, all physical structures

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[1]See "Environmental Block Appraisal," Ingham County Health Department, Lansing, Michigan, p. 8. (Mimeographed.)

[2]Ibid., p. 6.

[3]Mobile homes, trailer homes, boarding houses, rooming houses and the like are not located in upper income areas usually.

[4]The most recent appraisal of households was conducted in August, 1972.

are listed in sequence starting at the northwestern corner and proceeding clockwise around the block.[1] For structures containing one or more units, the number of housing units is recorded in parenthesis ( ) to the right of the structure number. For example, a listing of 7 (2) means that the seventh structure on the block contains two housing units. Separate structures containing only one housing unit are listed with an unqualified number like 1,2,14, etc. An example of the environmental block maps used in this survey is contained in Appendix C.

All structures selected randomly in the four census tracts were residential. A residential structure was defined as "one which is designed or intended solely for human occupancy, either as temporary or a permanent residence."[2]

Interviews were conducted in 87 single family homes and 13 apartments. All interviews in single family homes were with the traditional husband-wife-children household. In the apartments, nine interviews were with

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[1]In addition, block maps contain the following information: county number, civil division number, census tract number, section number and block number. All structures are evaluated and color coded as either well-maintained, deteriorating, or dilapidated.

[2]Non-residential structures such as business establishments, churches, and government buildings did not appear in the sample. See "Environmental Block Appraisal," p. 4.

families and four contacts were with two members of the same sex sharing an apartment.

With the environmental block appraisals serving as a starting point for selecting a sample, a probability sample was drawn from each census tract area. A proportionate systematic random sample was used to select blocks and then units within blocks. The size of the sample for each tract was determined by the percentage of households with an average income above $15,000 to the total number of households in the block.[1]

Determination of Sample Size

A sample size of 100 was selected for this research. The estimate of the true percentage of upper income consumers that have knowledge about nutrition is therefore within ± .1 in 95 samples out of 100.[2]

But this sample estimate has variability because of biases. Two major sources of this bias can be attributed to the following: (1) inaccurate selection and/or distribution of the sample; and (2) inaccurate questionnaire techniques. As aforementioned, the precision

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[1]See Appendix D for housing units selected.

[2]Confidence at a 95 percent level means that 95 samples out of 100 will have a sample percentage within ± .1 of the true population percentage of upper income consumers that have knowledge about nutrition.

of this sample estimate is ± .1 from the sample proportion(p).[1] An increase in sample size which would yield greater accuracy was not feasible for this study. The mathematical derivation of the sample size is contained in Appendix F.

To insure that interviews were completed with at least 100 households, an equally proportional sample of 170 was selected. The number of families chosen in each census tract is shown in Table 2. Drawing a sample of size, 170 prohibits the necessity of selecting a second sample and thus incurring the expenses associated with administration and computer time. To expedite the interviewing process, an equally proportional sample of 120 was chosen from the original sample of 170. By using a table of random numbers, 120 households were chosen. The households interviewed are listed in Appendix E by census tract and by block. Table 3 shows the number of households by census tract which need to be interviewed.

Research Instrument

A copy of the questionnaire used is included in Appendix A. It was designed to secure the following data from the upper income consumers: (1) the role of

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[1]The precision of a sample estimate depends on the sample size and the variability of the phenomenon to be measured in the research. For more discussion about precision see Appendix E.

TABLE 2

Sample Quota by Census Tract

Census Tract	Number of Families	Number of Families With Income $15,000 and Greater	% to All Families	Size of Sample	% to Total
17	1,148	718	62.7	66	40.4
38.01	615	367	39.9	35	17.0
39.01	247	206	83.4	14	11.6
40	967	553	57.1	55	31.0
Totals	2,977	1,844		170	

TABLE 3

Sample Quota by Census Tract

Census Tracts	Size of Sample		
	170 Selected	120 Selected	Total Needed
17	66	47	39
38.01	35	25	21
39.01	14	10	8
40	55	39	32
Totals	170	120	100

nutrition in health among upper income consumers; (2) consumer knowledge about nutrients and nutrition; (3) consumer awareness and understanding of nutritional labeling; and (4) consumer motivation to use nutritional labeling. The questionnaire was divided into five parts.

The first part of the questionnaire was structured to determine consumers' knowledge about nutrition in relation to health. Two scaling questions and one open-ended question tested consumers' understanding about a well-balanced diet.

The second segment of the questionnaire measured the knowledge of consumers about nutrients. Construction of these questions included nutrients contained in the FDA's voluntary guidelines on nutritional labeling issued on January 19, 1973.[1] Nutrients in the guidelines provided the basis for the twelve scaling questions.

The third section of the questionnaire inquired about the nutritional problems and concerns of the upper income consumers. The respondents were instructed to do the following: list the nutritional problems of their family, and rank the four most important nutritional concerns for their family from a list of ten concerns. No definition of the terms nutritional problem and nutritional concern were given. In addition,

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[1]Vitamin C, which does appear in the FDA's voluntary guidelines, was not included in these questions.

respondents were asked what family member each nutritional problem and concern were most closely associated with.

The fourth part of the questionnaire obtained a measure of the upper income consumers' awareness and use of nutritional labeling. First, respondents were asked to name three products which currently use nutritional labeling. Then for each of the three products, they were asked to name three nutrients listed on the label. These open-ended questions were designed to evaluate the consumers' use of nutritional labeling.

In the last part of the questionnaire, respondents were instructed to express which nutrients they wanted listed on the food labels and to suggest what could be done to help them better understand nutritional labeling. This not only permitted the respondents to display some creativity, but it provided insights into how much information about nutrients is actually used in purchasing food products. In this section, all the questions were open-ended.

Pre-tests

The final form of the questionnaire was a culmination of two pre-tests. First, a sample survey was administered by the researcher and his wife. It was conducted on a non-random basis to residents of East Lansing. The objectives of this pre-test included:

1. To determine the willingness and ability of consumers to furnish desired information.
2. To insure that the questions were worded properly.
3. To uncover any difficulties in the administration of the questionnaire.
4. To test the hypotheses for their acceptability.

Second, a pre-test was conducted among fourteen professional nutritionists and food scientists.[1] The purpose of this pre-test was two-fold: to insure the questions were technically correct, and to determine if they measured knowledge about nutrition and nutrients.

The pre-tests indicated that consumers were willing, but not always able, to answer questions about nutrition and nutritional labeling.

Two principal refinements were made in the questionnaire as a result of pre-test findings. First, the questions on knowledge of nutrients were restructured. Second, more open-ended questions relating to the consumer's expectations of nutritional labeling were added.[2]

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[1]Professor Olaf Mickelsen sent questionnaires to the following individuals: Drs. Leveille, Yang, Schemmel, Rosmas, Cederquist, Chenoweth, Mook, Morris, Miss Wenberg, and Mrs. Gartung.

[2]The pre-tests confirmed the feasibility of administering the questionnaire to upper income consumers. As shown in Chapter I, income and education are correlated highly. Therefore, the consumers with the highest average annual income usually have the most formal education.

Interviewers and Data Collection

The attitudinal and exploratory questions about nutritional labeling necessitated the use of personal interviews. The survey research was completed by seven professional interviewers: six ladies from Michigan Interviews, Inc., and one lady working independently.[1] In addition, the research director completed four interviews.

After the interviews were selected, three training sessions were held. Training of interviews covered the following topics:

1. Overview of research projects
2. Importance of the interview to the research
3. Sample methodology
4. Household contact procedures
5. Possible problems to be encountered
6. Thorough briefing of each question in the questionnaire

In these sessions major emphasis was given to the purpose of the research, the importance of obtaining adequate information from the interview, and the necessity that each interviewer follow uniform procedures. Each interviewer received these following instructions:

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[1]Michigan Interviewers is headed by Mrs. Nan Darling, 1711 Greencrest Avenue, East Lansing, Michigan. Major clients include W. R. Simmons and Associates, Hough Associates, Gallup and Market Opinion Research.

1. To follow exactly the procedure specified.
2. To ask all questions in order subscribed.
3. To become completely familiar with questionnaire and all procedures to be followed.
4. To interview the person that does the majority of food buying and meal preparation.
5. To use the exact wording, and not lead the questions. Do not explain the meaning of words.

Prior to conducting the research, each interviewer conducted three sample interviews: one in the training session and two outside the training session. In the sample interviews, special attention was given to the importance of probing for needed information and the practicing of structuring the interview situation so that the respondent feels willing to talk freely.

While some interviewers were more effective than others in the training session, it was evident their experience enabled them to use the survey instrument effectively. A problem with one interviewer did develop, however. After she had completed four interviews, it was decided her work did not meet the aforementioned standards. A follow-up telephone conversation with the four individuals supplied the additional information required on each of the four survey instruments.

Each interviewer reported to the supervisor daily, and on numerous occasions to the research director daily. The supervisor and research director were in contact daily.

In general, the interviewers were interested in the success of this study. The close liaison between the research director, supervisor and interviewers as well as the topic of the research attributed to the enthusiasm of the interviewers. Evidence of this enthusiasm is the high completion rate (87-1/2%) and the resourceful information obtained on the questionnaire.

Contact of the Household Unit

Each housing unit drawn in the sample was contacted by interviewers personally. To facilitate entry, each interviewer carried a letter of introduction. As shown in Appendix G, the letter was written on Michigan State letterhead stationery. It provided the following: (1) to introduce the interviewer, (2) to explain the project, and (3) to authenticate the project. In general, most respondents did not read the letter; rather they only looked at the Michigan State letterhead on the stationery.

At the start, each interviewer was assigned ten housing units in a specific geographic area. Upon completion of those ten, two interviewers were not given additional assignments. The other interviewers completed

the interviewing. The interviewing started on March 26, and was completed on April 14, 1973. Table 4 shows the interviews completed by each interviewer.

Interviewers were provided with a block map for each interview. A red arrow on the map designated the housing unit to be interviewed. For example, the map would indicate that the interviewer had to go to the third housing unit in structure nineteen. In most situations, the interviewer could identify this structure by going to the proper street and then visually looking at the structures in reference to the block map and determine the proper housing unit to be interviewed.

No deviation from the designated housing unit was permitted unless there was a new structure built after August, 1972.[1] In that case the interviewer was instructed to start at the northwest corner of the block and proceed in a clockwise direction around the block counting the number of housing units until she came to the designated unit.

Before a housing unit could be considered to be a non-respondent, it was contacted five times. Interviewers conducted the first call during a weekday; this resulted in sixty-two completed interviews. The second attempt was made on either a weekday evening or a weekend. If

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[1]All environmental block maps used in this research were updated August, 1972.

TABLE 4

Questionnaires Completed by Interviewer

Interviewer	Census Tracts			
	17	38.01	39.01	40
A	5	4	1	
B		18		6
C	21			
D				17
E		3	7	9
F	7			
G	4			
H	2	1		
Totals	39	26	8	32

needed, the third call-back was made on a different time schedule than the first two attempts. If after three attempts there was no contact with the housing unit, the interviewers then telephoned the housing unit to set up a time for the interview. The telephone number of the designated unit was obtained from a neighbor. Table 5 shows the contact point when interviews were completed.

TABLE 5

Contact When Interviews Were Completed

Contact	Completion	Refusal	Not at Home
1st Call	67	6	47
2nd Call	26	4	17
3rd Call	11	2	4
4th Call	1	1	2
5th Call	0	0	2

Of the 15 questionnaires out of 120 not completed, 2 were not at home and 13 refused to be interviewed. The reasons for refusing are shown in Table 6.

Methods of Data Analysis

Information received from the questionnaire was edited, tabulated, and recorded. The data were recorded

and prepared for analysis by the research. After the information on the questionnaires was tabulated, analyses on the data were performed.

TABLE 6

Interviews Not Completed

Reasons	Number
Not at home	2
Refusals	10
Did not allow people in home	1
Did not have time	1

Instruments Which are Used to Analyze the Data

Nonparametric statistical tests were used for inferential purposes. The characteristics of the data which necessitated the use of nonparametric tests include:

1. A nominal level of measurement.
2. The variance of the population is not known.
3. The inability to determine if the observations are drawn from a normally distributed population.

Content analysis was used for the open-ended questions.

Hypotheses and Tests

Seven hypotheses relate to the research problem. Hypotheses were tested using the .05 level of significance.[1] The primary statistical techniques used in this research include the Wilcoxson matched-pairs signed-rank test, chi-square test, normal approximation to the binomial and confidence interval estimation. A discussion of hypotheses employing the most statistical analyses follows.

Consumer Preference of Nutrients

The research is designed to determine if there is a preference on the part of the consumer for nutrients listed on food labels. The relevant hypothesis is:

H_0: Upper income consumers do not have strong preferences concerning the listing of specific nutrients.

H_1: Upper income consumers do have strong preferences concerning the listing of specific nutrients.

The top seven nutrients were selected and the Wilcoxson matched-pairs signed-rank test was performed

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[1]This means that for a sample of 100, the probability of a value of the statistic equal to or greater than a particular critical value purely by chance is .05 or less. For more discussion, see Sidney Siegel, Non-Parametric Statistics for the Behavioral Sciences (New York: McGraw-Hill Book Co., Inc., 1956), pp. 30-31). The critical value is obtained from statistical tables in any introductory statistics textbook.

on these seven.[1] To use this statistical procedure, however, it was necessary to determine the average value for the nutrients not included in the ranking from one to seven. Appendix H shows how this test is conducted.

Knowledge of Nutrients

To determine if consumers have knowledge about nutrients, the following analysis was used: construction of bar charts for questions six through seventeen and confidence interval estimation.

First, a bar chart showing the percentage of the respondents answering the question correctly is given for each question. Then three hypotheses about the percentage of the population having knowledge of nutrients are tested. The three hypotheses included are:

1. Π = 33-1/3%
2. Π = 50%
3. Π = 83-1/3%

Thirty-three and one-third is the minimum under pure guessing. In other words, this designates the probability that the respondents were guessing. Fifty percent was selected because that is the minimum which can be expected if a majority of the population have knowledge about nutrients.

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[1]For more discussion of this test, see Siegel, Non-Parametric Statistics, pp. 75-83.

To obtain a figure that would represent knowledge the twelve questions were administered to fifty-five students in a graduate class in nutrition. Their average score was ten right answers. Thus, this figure was chosen as connoting high knowledge about nutrients in the population.

Open-ended Questions

The open-ended questions permitted assessments on the part of respondents. They required recall of knowledge and enabled the respondents to express in their own words what they believed to be important. The criteria for evaluating each open-ended question is discussed in the next chapter under the appropriate hypothesis.

For the scaling questions two other statistical tests, the normal approximation to the binomial and the chi-square, were used to analyze whether the responses to the questions under investigation differed in frequency. A full discussion of these statistical methods are included under the hypothesis in which they were used.[1]

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[1]Appendices I and J show how these tests are calculated.

CHAPTER IV

RESULTS OF THE STUDY

The results of this study are based on personal interviews with 100 consumers in the East Lansing-Lansing area. The 100 completed questionnaires were obtained from 120 interviews conducted during March and April, 1973. The two major reasons for the success of the personal interviews are the use of professional interviewers and the interest of the respondents in the topic of the research.[1]

The purpose of this chapter is to present the study's findings. Specific results are discussed for each hypothesis under investigation. The data and the conclusions drawn are presented in seven sections according to each of the hypotheses. The sections follow

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[1]The difference between the two values (20 questionnaires) represent 15 interviewees who did not respond and 5 questionnaires that were discarded from one census tract. The 5 questionnaires containing the least information from census tract 38.01 were not included in the analysis of results. To obtain an equally proportional random sample, it was necessary to disregard these five survey instruments.

the order in which the hypotheses were presented in Chapter I.

Hypothesis 1

Hypothesis 1

The upper income consumers believe that a well-balanced diet is the best method to attain proper nutrition.

This hypothesis was formulated to obtain knowledge about the nutritional intake of consumers. One statement using the semantic differential was structured to test the hypothesis statistically. It read:

> A well-balanced diet is the best method to attain proper nutrition.

The results are summarized in Table 7.

Appendix K shows that the calculated Z value is 10. Since the observed value of Z is significant beyond the -1.645 level, and since p is greater than .05 (α), it can be concluded that upper income consumers believe the best method to attain proper nutrition is a well balanced meal.

While the aforementioned analysis indicates that consumers agree with the statement about a well-balanced meal, it does not however indicate whether they actually attain proper nutrition.[1] To obtain some indication

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[1]Housewives will claim that they serve nutritious meals; very few, if any, will admit to serving non-nutritious meals.

TABLE 7

Summary of the Responses to Question About How Consumers Attain Proper Nutrition

Responses	Percent
Strongly Agree	50
Agree	47
Neither Agree nor Disagree	2
Disagree	0
Strongly Disagree	0
No Answer	1

whether consumers eat nutritious foods, respondents were asked to name the four basic food groups which should be eaten daily. The results are shown in Table 8.

To obtain some relative measure of the upper income consumers' ability to list the basic food groups, confidence limits were constructed. For example, the proportion of the population of upper income consumers who can name all four food groups is estimated to be between $p = .21$ and $p = .39$ with a level of confidence of 95%.[1] Likewise, confidence levels are shown for the other categories.

The four basic food groups include the following: bread-cereals, dairy products, meat and fruits-vegetables. For fruits-vegetables to be recorded a correct answer, a respondent must have listed both a vegetable and a fruit. Where an individual named some commodity within any food group, she (he) was credited with a right answer for that specific food group. Examples include eggs for meat, flour for bread, cheese for dairy and the like. Appendix M contains a complete listing of the responses.

The number of respondents who did not list specific food groups is shown in Table 9.

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[1]See Appendix L for the calculation of a confidence interval.

TABLE 8

Summary of Listing of Food Groups*

Food Groups Listed	Percent of Respondents	Confidence Interval	Percent of Respondents With No Errors
All Four Basic Food Groups	30	(.21-.39)	76
Three of Four Basic Food Groups	35	(.26-.44)	66
Two of Four Basic Food Groups	23	(.15-.31)	61
One of Four Basic Food Groups	10	(.4- .16)	50
None	2	(0- .15)	50

*Dr. Olaf Mickelsen, a member of the dissertation committee and Professor of Food Science, Biochemistry and Human Nutrition, evaluated the listings for their correctness.

TABLE 9

Respondents Not Listing Specific Food Groups

Food Group	Percent
Meat	17
Dairy	24
Bread	49
Fruit and Vegetable	29

It cannot be stated that the 70% (see Table 8) unable to name the four basic food groups are ignorant about proper eating habits. For example, 49% did not know bread was a food group. This does not imply, however, that they do not eat bread daily. A similar statement can be made about the 17% who did not list meat.

To determine accurately whether consumers purchase food to achieve well-balanced meals, it would be necessary to monitor actual food purchases and meal preparations. Although this was not done, the aforementioned information does strongly indicate that eating patterns of upper income consumers are not likely to include the necessary daily nutrients. If a housewife cannot list the groups, there is a good chance that she may not be aware of what constitutes a well-balanced meal. This, in turn, increases the probability that her family may not be receiving proper nutrition daily. Thus, for the purpose of this research,

it is assumed that consumers who can name the basic four food groups are more likely to eat well-balanced meals each day than those who cannot. Similarly, if a consumer is able to name the four food groups, it is taken as an indication that she has some elementary comprehension of proper nutrition.

A knowledge of the four basic food groups is one of the elementary concepts in understanding nutrition. If a consumer is not able to name the four food groups, it suggests she (he) will have difficulty understanding the listing of nutrients on food labels.

Given the above assumption, it would seem that the majority of upper income consumers use criteria other than food groups to plan their meals.

To gain insight into how people select foods, two statements were constructed. The first read:

> In general, would you please indicate which one of the following statements most accurately describes your food purchasing habits.

The second read:

> In general, appetite is a good guide to proper food habits.

Results of replies to the first statement are shown in Table 10.

A chi-square test was performed on the response data. The calculated value of χ^2 was fifteen. The observed value was significant beyond the .001 level.[1] Since this

[1]See Appendix N for calculations.

TABLE 10

Summary of Results About Food Purchasing

	Response	Percent
1.	In general, I select the foods which provide the highest proportion of minerals and vitamins.	37
2.	In general, I select foods which are the most convenient to prepare.	10
3.	In general, I select foods according to taste.	28
4.	In general, I select foods which provide the best unit value per dollar expended.	25

is less than .05, it can be concluded that there is preference of opinion among these four responses. Specifically, the χ^2 test indicates that upper income consumers have a preference for purchasing according to the highest proportion of minerals and vitamins. It does not mean that there is no opinion about the other three answers. In fact some people had an opinion about each choice. The most preferred alternative among the upper income consumers is selection of foods by minerals and vitamins.

Of the 37% who stated they select foods for the highest proportion of minerals and vitamins, however, 25 or 68%, did not know what food groups comprised a well-balanced meal. In addition, 28 (76%) were not able to name three products which have nutritional labeling. Thus, it appears that if consumers are selecting foods by minerals and vitamins, they may not be consuming the right kinds of foods to insure an adequate intake of nutrients daily.

The results of responses to the second statement concerning appetite as a good guide to proper food habits are shown in Table 11.

The normal approximation to the binomial was used to test the above question. Appendix O shows that the calculated Z value is -1.3. The observed value of Z is significant beyond the 1.645 level. Based on this assumption (p greater than .05) it can be concluded that upper income consumers believe that appetite is a good guide to proper food habits.

TABLE 11

Summary of Responses About Appetite Being A Good Guide to Proper Food Habits

Response	Percent
Strongly Agree	7
Agree	30
Neither Agree nor Disagree	13
Disagree	41
Strongly Disagree	8

Interpretation of Data

Examination of the data indicates that consumers believe a well-balanced diet is the best method to attain proper nutrition. But for some consumers a discrepancy existed between responses to open-ended questions and reactions to semantic differential statements. For example, thirty-seven consumers stated they purchased foods on the basis of vitamin and mineral content but then could not name products with nutritional labeling and nutrients on the product. This suggests that, indeed, they may not purchase foods for vitamin and mineral content; or, if they do, they look for products with the most vitamins and minerals listed on the label. It seems reasonable to conclude therefore that the majority of upper income consumers do not buy their foods on the basis of achieving a well-balanced meal. Rather they tend to buy for appetite.

Hypothesis 2

Hypothesis 2

Upper income consumers possess little knowledge about nutrients.

The major purpose of nutritional labeling is to improve the eating habits of Americans. To accomplish this objective, Americans must understand information about nutrients. Also, they must be motivated or encouraged to purchase food on the basis of nutrient

composition. While the latter will be discussed in Chapter V, the findings presented here highlight the degree to which upper income consumers have knowledge about nutrients and nutrition.

Nutrients, as components of food, include vitamins, minerals, water and the like. Their major functions are to supply energy, renew and rebuild body tissue, and regulate body processes. An individual's intake of nutrients determines his mental and physical health. Thus, to be sound in both body and mind, each individual should insure that he is obtaining the nutrients in the right quantities daily. But, in general, most individuals do not know the nutrients and what amounts of them they should consume daily.[1]

Historically, there was an overt awareness among professional nutritionists and food scientists that individuals neither had the knowledge nor the desire to learn about the components of food. This resulted in the promulgation of the idea of eating a variety of foods from the four, and/or seven, basic food groups. The fact that good nutrition could be obtained by eating a well-balanced diet was promoted.

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[1]The required nutrient intake for each individual is contingent upon such factors as age, physical activity, health status and sex. The national Academy of Sciences' National Research Council-Food Nutrition Board has published a recommended daily allowance for various age groups.

Questions of whether people were actually eating a well-balanced diet received prominence during the 1960's. Given affluence and rising health problems such as heart disease, arteriosclerosis and the like, pressures existed from the government for better eating habits. Many segments of society, particularly the federal government became influential in promoting more knowledge about eating habits. Nutritional labeling was seen as one method to achieve that goal.[1]

Nutritional labeling lists the percentage of nutrient composition of food in one serving. A basic knowledge about nutrients therefore will enable consumers to use nutritional labeling better.

Twelve statements were presented about nutrients to determine whether the upper income consumers possess knowledge to know the importance of proper eating habits. They were factual statements about nutrients taken from the FDA's voluntary program on nutritional labeling.[2]

In this research it was assumed that once people have knowledge about the functions and purposes of nutrients, they will be more inclined to use nutritional

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[1]How to achieve better eating habits is a major problem. While nutritional labeling is one step in that direction, it is not a panacea.

[2]FDA's voluntary guidelines on nutritional labeling were used to structure these questions.

labeling. It then follows from the assumption that, once individuals know the importance of nutrients to maintain good health, they will be more interested in using nutritional labeling to insure an adequate intake of nutrients. Therefore, a hypothesis was formulated to obtain some measure of the number of upper income consumers who possess knowledge about nutrients.

Table 12 shows the percentage of upper income consumers that answered each question correctly. The following three sub-hypotheses were tested under the general hypothesis. These were:

1. H_{01}: At least one-third of the upper income consumers have knowledge about nutrients.

   H_{11}: Less than one-third of upper income consumers have knowledge about nutrients.

   (If a respondent was selecting answers randomly, she (he) would get four correct. A minimum percentage of correct answers, if guessing would be 33-1/3%. Thus, four correct answers for one individual is taken to imply guessing.)

2. H_{02}: At least 50% or more of upper income consumers have knowledge about nutrients.

   H_{12}: Less than 50% of upper income consumers have knowledge about nutrients.

   (Fifty percent is the minimum percentage that would be expected if more people in the population knew the answers than didn't know them. In other words, to have knowledge about nutrients and nutrition, the individuals must get more than six answers right.)

TABLE 12

Summary of Responses to Questions About Nutrients

	Question*	Percentage Responding Correctly
1.	The daily iron intake should be the same for both men and women.	75
2.	People who do not eat meat are found to be in poor health.	70
3.	To maintain health, an adult requires one hundred percent (100%) of the recommended dietary allowance for vitamin A and riboflavin daily.	21
4.	A thirty-five (35) year old average woman needs about five thousand (5,000) calories per day.	84
5.	To reduce the caloric intake of the average American, it would be more effective to eliminate potatoes, rice, fruits, and vegetables from the diet rather than ice cream, butter mayonnaise, and fatty meats.	94
6.	An active individual does not require more calories than an inactive person.	86
7.	A calorie is a unit of measurement and not a nutrient like fats, carbohydrates, protein, etc.	88
8.	Carbohydrates provide man with most of the energy to carry on his bodily activities.	45
9.	Meeting one hundred percent (100%) of the recommended dietary allowance for calcium is more important for children than for adults.	68
10.	An important reason for having some fat in the diet is that fats usually carry certain vitamins with them.	39
11.	For equal weights, butter contains the same number of calories as an apple.	72
12.	Taking vitamin pills is the best way to receive your necessary daily vitamin requirements.	81

*These questions correspond to numbers 6-17 on the questionnaire.

3. H_{03}: 83-1/3% or more of upper income consumers have knowledge about nutrients.

   H_{13}: Less than 83-1/3% of upper income consumers have knowledge about nutrients.

   (A control group of fifty-five graduate students, majoring in human nutrition, were given these twelve questions. For this research, their average number of answers correct, then 83% represented expert knowledge about nutrients and nutrition.)

For each sub-hypothesis, a 95% confidence interval was constructed. The boundaries of these intervals for the three percentages are shown in dashed red lines on Table 11. Computation of the confidence intervals appears in Appendix P. Visual observation of this table indicates that the interval from 25-1/3% to 41-1/3% may be construed to represent lack of knowledge or pure guessing.

Thus, according to the study criterion if nine or more statements as represented by bar charts appear in the area, H_{01} would be rejected. This indicates the percent of the population who have knowledge about nutrition and nutrients is deemed to be less than 33-1/3%. Since only one bar chart is in the interval, however, H_0 is accepted, which means that more than 33-1/3% of the population is believed to have some knowledge about nutrition and nutrients.

Hypothesis H_{02} is accepted if at least six statements (bar charts) are greater than 40%. Figure 4 reveals that in reality the responses to nine statements are higher

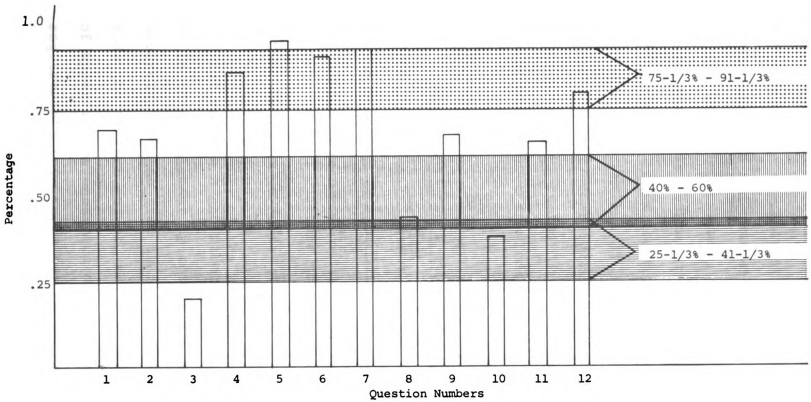

FIGURE 4

Percentage of Sampled Population Attaining Correct
Answers on Twelve Questions About Nutrients

1. If 9 or more bar charts are in the area 25-1/3% - 41-1/3%, it indicates the percent of the population who have knowledge about nutrients to be less than 33-1/3%.
2. At least 50% or more of upper income consumers have knowledge about nutrients if at least six statements are greater than 40%.
3. The appearance of 10 bar charts in area of 75-1/3% - 91-1/3% means expert knowledge about nutrients.

than the figure 40%. Therefore, H_{02} is accepted: more than 50% of the population is believed to have knowledge about nutrition and nutrients.

For this research, expert knowledge about nutrition and nutrients is defined by H_{03}. This hypothesis implies that responses to at least ten statements must appear in the interval from 75-1/3% - 91-1/3%. Since this criteria is not met (only four questions appear within the confidence interval), it indicates that most of the respondents do not have expert knowledge.

Interpretation of Data

Using the FDA's voluntary guidelines on nutritional labeling, the findings indicate that more than 50% of the population of upper income consumers have an understanding about nutrients. For one question, however, the results tend to indicate that some respondents may hold misconceptions. The question was:

> To maintain health, an adult requires one hundred percent (100%) of the recommended dietary allowance for vitamin A and riboflavin daily.

While this statement by itself may appear insignificant, nevertheless, the fact that 29% of the consumers did not know the correct answer, may also suggest that the majority of upper income consumers erroneously believe that nutrient requirements have to be met on a daily basis. For an overdose of certain nutrients, particularly vitamins A and D, can cause illness.

Hypothesis 3

Hypothesis 3

Upper income consumers have little awareness of the concept nutritional labeling.

Nutritional labeling was promulgated for the benefit of consumers. One measure of its effectiveness is whether consumers will use it in purchasing food and food products. But to use the information, consumers need to be aware of it. If they are not, then they won't likely use nutritional labeling. Therefore, this hypothesis was constructed to determine if food shippers are aware of nutritional labeling.[1]

To test this hypothesis, consumers were asked to name three products which they had purchased that use nutritional labeling. Of the 59% listing three products, 29% correctly named products that have nutritional labeling[2] (see Table 13).

Bread, milk and cereals were the products listed the most frequently. Fifty-five respondents listed cereal; thirty-four identified bread; and thirty-six stated milk. While all cereals and most bread products use nutritional

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[1]A definition of nutritional labeling was not given to the respondents.

[2]A product was judged to have nutritional labeling if the label included nutrient analysis of serving size. A definition of nutritional labeling was not given to the respondents.

TABLE 13

Summary of Responses Identifying Products That Use Nutritional Labeling

Number of Products Named by Respondents That Use Nutritional Labeling	Percent of Respondents	Percent of Respondents Identifying Products Using Nutritional Labeling Correctly
0	13	-
1	14	57
2	14	36
3	59	29

labeling, milk does not.[1] Four products, listed by four respondents, were purchased at health food stores. Also, four consumers identified dog food as using nutritional labeling, which hardly qualifies in this study.

Interpretation of Data

Findings about consumer awareness of nutritional labeling indicate 17% of the upper income consumers studied can name three products which use nutritional labeling correctly; 22% can identify two products; and 30% can name at least one product.[2]

Twenty-seven percent could not name any products that use nutritional labeling. This suggests there has not been effective communication about nutritional labeling to consumers. At present, the food industry and FDA have not made the majority of upper income consumers aware of nutritional labeling.

Hypothesis 4

Hypothesis 4

Upper income consumers have little understanding of the concept nutritional labeling.

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[1]The researcher verified which nutrients appeared on each product. See Appendix Q for a complete listing of all products identified as using nutritional labeling.

[2]Since a random sample of upper income consumers was selected for this research, it is believed the results tend to represent all upper income consumers in the United States.

Like the aforementioned hypotheses, this hypothesis relates to consumer's use of nutritional labeling. A related factor to consumer's use of existing nutrient information listed on labels is their understanding of nutritional labeling. While understanding is not tantamount to use, nevertheless, consumers who do possess knowledge about nutritional labeling, represent a segment of the population which has the ability to use it effectively in shopping for food. Thus, H_{04} was developed to test the understanding about the listing of nutrients on the label of food products. Table 14 presents the findings related to the hypothesis.

In the survey instrument, one question using the semantic differential and two open-ended questions were constructed to measure use of nutritional labeling. The semantic differential obtained the consumer's attitude about food purchasing habits. The open-ended questions forced consumers to recall the names of three nutrients on each of three products.

For operational purposes, in these three questions the assumption was made that if consumers can recall nutrients on products which use nutritional labeling, they had some contact with nutritional labeling.

Table 14 shows the number of nutrients listed by products named using nutritional labeling. For example, thirteen respondents (13%) could not mention any nutrients

TABLE 14

Number of Respondents Who Identified Nutrients on Labels of Food Products *

Number of Products Named Which Use Nutritional Labeling	Percent of Respondents by Number of Nutrients Listed Per Product				Percent of Respondents
	At least				
	0	1	2	3	
0					13
1	28(4)	28(4)	22(3)	22(3)	14
2	21(3)	0(0)	14(2)	65(9)	14
3	10(6)	7(4)	15(9)	68(40)	59
Totals	(13)	(8)	(14)	(52)	100

*The researcher identified each product listed for its correctness. Appendix R shows the following: (1) Products which the consumers listed as using nutritional labeling; (2) Nutrients which the consumers listed on products named using nutritional labeling. The listed numbers represent only those who fulfill the criteria listed at the head of the column. This means the numbers are not cumulative figures.

that appeared on product labels. Forty respondents (40%) listed correctly at least three nutrients on three products.[1] Therefore, the results seem to suggest that the majority of upper income consumers can correctly identify at least three nutrients on food products.[2]

In this research, it was assumed, however, for upper income consumers to have some knowledge of the meaning of nutritional labeling, they must be able to identify nutrients on products which use nutritional labeling. Table 15 reveals the results.

Table 14 indicates that 59% of upper income consumers listed three products which use nutritional labeling. Table 15 reveals 7% can correctly identify three products that use nutritional labeling and three nutrients on each of the three products. This suggests the majority of upper income consumers presently associate nutritional labeling with products listing nutrients on the label. It tends to indicate, therefore, the majority of upper income consumers may know they are attaining certain nutrients, but do not regulate nutrient intake by using nutritional labeling.

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[1]In Appendix R nutrients which consumers listed as appearing on products, but do not, are designated with the term "no" in parentheses.

[2]The food products do not have to use nutritional labeling.

TABLE 15

Percentage of Upper Income Consumers Correctly Identifying Nutrients of Food Labels

Number of Products Correctly Named Which Use Nutritional Labeling	Percent of Respondents by Number of Nutrients Correctly Listed Per Product			Percent of Respondents
	At least			
	1	2	3	
1	7	-	-	12
2	2	-	-	5
3	1	2	7	17

One statement using the semantic differential reads as follows:

> In general, which one of the following statements best describes your habits concerning food purchasing.[1]

The results of this statement are summarized in Table 16.

The question was analyzed for all respondents that answered 1, 2 or 3. Two respondents who answered number 1 (always use nutritional labeling) named three products which have nutritional labeling. While they were not able to name three nutrients on each product, nevertheless they did identify nutrients not listed on the labels.

Interestingly enough, however, five respondents who stated they always use nutritional labeling were not even able to name one product on which nutritional labeling appears. In addition, three of the five could not name any nutrients appearing on food labels. Therefore, the results tend to indicate that upper income consumer's attitude toward using nutritional labeling is not commensurate with their actual purchase behavior.

For two questions, respondents were given the definition of nutritional labeling.[2] Upon knowing the meaning of nutritional labeling, fifty-two consumers (52%)

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[1]In this research, it is assumed that if consumers actually read food labels for nutrient information, they will be able to recall the nutrients.

[2]Nutritional labeling is a listing of nutrients on food products by serving size.

TABLE 16

Summary of Responses About
Food Purchasing Habits

Answers	Percent of Respondents
1. I always read the food labels for nutrient information.	10
2. I frequently read the food labels for nutrient information.	29
3. I occasionally read the food labels for nutrient information.	20
4. I seldom read the food labels for nutrient information.	22
5. I never read the food labels for nutrient information.	19

stated they used it either on the orders of a physician or under their own volition. When asked what specifically they look for on a label, eight individuals related that they look for the brand name only. Also, eight individuals related that they look for a list of preservatives or additives and that they try not to purchase refined food. Seventeen mentioned some health concern such as salt-free food, low fat content, skim milk, corn oil margarine, and calories. While fourteen individuals listed vitamins and/or minerals, no specific vitamin, mineral or other nutrients were listed more than three times.

It is interesting that 63% of the respondents who said they used nutritional labeling in food purchasing and/or meal planning indicated they do not specifically look for nutrients on the food labels. While this does not conclusively imply they do not look for information about nutrients, it does suggest that they do not associate nutritional labeling with a listing of nutrients by serving size.

Hypothesis 5

Hypothesis 5

Upper income consumers do not have strong preferences concerning the listing of specific nutrients.

This hypothesis was included to determine if consumers have preferences about nutrients. If specific

nutrients are preferred more than others, this may provide the basis for implementing a strategy to motivate consumers to use nutritional labeling.

Three questions were included in the survey instrument to test this hypothesis. For one question, eighteen nutrients were listed on a card and the respondents were asked to rank the top seven nutrients in the order of their importance for the maintenance of proper nutrition.[1] Table 17 shows the percentage of respondents including each nutrient in the top seven rankings.

The Wilcoxson Matched-Pairs Signed-Rank Test was used to determine the most preferred nutrients. Appendix S shows the results of this analysis. The test showed the following: (1) nutrients most frequently listed as essential for proper nutrition include iron, vitamin C, protein and vitamin A; (2) the second most preferred group of nutrients included calcium, vitamin B_1, vitamin B_2, and vitamin D. These results were statistically significant at the .05 level.

In contrast to the aforementioned statement which forced individuals to select an answer, two open-ended statements were structured to elicit responses about nutrients. The first was:

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[1]While all nutrients are important, this question indicates what nutrients consumers perceive as being most important. The nutrients were taken from a table on a breakfast cereal carton.

TABLE 17

Summary of Respondents' Ranking of Nutrients[a]

Nutrients	Percentage of Respondents Ranking Nutrients From One to Seven	Rank[b]
1. Vitamin A	54	1
2. Thiamin (Vitamin B_1)	51	2
3. Riboflavin (Vitamin B_2)	48	2
4. Niacin (a B Vitamin)	33	3
5. Vitamin C	64	1
6. Vitamin D	50	2
7. Vitamin E	33	3
8. Iron	67	1
9. Phosphorus	11	3
10. Calcium	53	2
11. Magnesium	7	3
12. Vitamin B_6	8	3
13. Vitamin B_{12}	20	3
14. Pantothenic Acid	2	3
15. Protein	60	1
16. Fat	19	3
17. Carbohydrates	37	3
18. Calories	17	3

[a]Seven respondents did not answer this question; eight others did not rank seven, but some number less than seven.

[b]Based on the Wilcoxson Matched-Pairs Signed-Rank Test, the following rankings appeared:

1. Most Preferred
2. Second Most Preferred
3. Least Preferred

> Can you please give me the names of the nutrients which the body needs to function properly.

The purpose of this statement was to find what nutrients the consumers believe were important to the proper functioning of the body. It was assumed that the nutrients which the consumer listed might have a greater influence on food purchase and meal preparation than those not perceived as being important to the body.

Appendix T shows the responses to this question. Table 18 reveals the most frequently listed terms.

While many respondents listed only the terms vitamins and minerals, other consumers listed specific vitamins and minerals. The most frequently listed vitamins and minerals included the following: Vitamins A, C, D and the B Complex. There was, however, no consistent pattern in listing the B vitamins. For example, Table 19 shows 34% included one of the B vitamins such as B_1, B_2 and the like.

The second open-ended statement concerning nutrients listed on food labels read as follows:

> Are there any nutrients that you feel should be included on all food labels.

While thirty-four consumers (34%) answered the question affirmatively, sixty-six (66%) did not respond.

The research findings shown in Appendix U reveals a variety of responses to this question. Forty-four percent of the individuals that answered yes to the

TABLE 18

Most Frequently Listed Nutrients
By Percentage of Sample

Nutrients	Percentage of Sample
1. Protein	67
2. Carbohydrates	52
3. Minerals	46
4. Vitamins	42
5. Fats	24

TABLE 19

Summary of Listing of Minerals and Vitamins

Vitamins	Percent of Respondents	Minerals	Percent of Respondents
A	27	Calcium	20
B_1	11	Magnesium	6
B_2	9	Phosphorus	4
B_{12}	7	Iron	20
B_3	7	Iodine	3
C	30		
D	20		
E	16		
K	4		

aforementioned statement revealed that vitamins should appear on all food labels. Nine percent indicated specific vitamins. Six percent listed vitamin C and 3 percent recorded vitamin D. No consumer listed any of the B vitamins. The second and third most frequently identified nutrients were protein (41%) and fat (38%). Fifteen percent stated they were interested in the cholesterol content of food particularly.

Other nutrients listed included carbohydrates and minerals. Calories were included by nine individuals.

Interpretation of Data

It is assumed in this research that consumers who can name specific vitamins and minerals are more likely to look for those nutrients when purchasing food. Given this criteria, the results suggest that upper income consumers do not purchase food on the basis of specific vitamins and/or minerals. Thus, it is believed in the short run upper income consumers want some indication whether products are a good source of all vitamins and/or minerals rather than specific ones.

Hypothesis 6

Hypothesis 6

Upper income consumers are generally not aware of any nutritional problems in their families.

Since most food advertising is entertaining rather than informational, most consumers have not been aroused to read food labels. To use nutritional labeling individuals must read the labels. It is assumed in this research that individuals with a perceived health problem are more likely to read a food label. For example, individuals required to watch their intake of certain items such as calories, saturated fats and the like are more likely to purchase on the basis of nutrient composition per serving than individuals who do not have to do so. Consequently, this hypothesis was structured to test whether upper income consumers perceive of any nutritional problems in their families.

One statement read:

> Are there any nutritional problems concerning members of your family?

Twenty-one percent stated they had a nutritional problem in their families. Seventy-nine percent indicated they did not. Appendix V illustrates the following statistical information: that the 95% confidence interval for the proportion of all upper income consumers with nutritional problems is 13% to 29% and that when the normal approximation to the binomial is conducted on the data, the hypothesis is accepted.

Of the 21% who stated their family had a nutritional problem, 80% were under the care of a physician, while 20% were not. Appendix W shows the nutritional

problems. The major perceived problem was control of fat intake. Seven respondents listed overweight and/or cholesterol as a nutritional problem in their families. Other nutritional problems included high blood pressure, diabetes, anemia, and low iron in blood.

Interpretation of Data

In this research, it was assumed that consumers would be more likely to use nutritional labeling in food purchasing and meal preparation if they perceived of a nutritional problem in their family. Based on this standard, about 20% of upper income consumers are potential users of nutritional labeling.

Hypothesis 7

Hypothesis 7

Where nutritional factors are of concern, heart disease and obesity are the most important.

In addition to a question on nutritional problems, respondents were asked to rank their four most important nutritional concerns. Table 20 indicates that the most important nutritional concerns were the following: unbalanced diet, obesity, vitamin deficiency, and heart disease.

For each nutritional concern, the respondent was asked what nutrients were required by the body. Research findings presented in Appendix X display the wide

TABLE 20

Summary of Responses About Nutritional Concerns

	Nutritional Concern	Percent
1.	Anemia	19
2.	Heart Disease	31
3.	Mineral Deficiency	10
4.	Nutritional Ignorance	21
5.	Obesity	47
6.	Poor Quality Protein	18
7.	Unbalanced Diet	56
8.	Vitamin Deficiency	37
9.	No Nutritional Concerns	17
10.	Other	10

variation in responses. While many respondents gave answers that were not germane to the question, nevertheless, an analysis of the responses does give some indication of the knowledge about the nutritional concern.[1]

Sixty-five percent of the individuals listing heart disease believed they should reduce their intake of cholesterol and fat content. Twenty-three percent specified that high saturated fats should be avoided.

Fifty-five percent listing obesity as a nutritional concern held misconceptions about what nutrients were needed by the body for obesity. Twenty-nine percent believed that an obese person should eat more protein, while 21% related that intake of carbohydrates should be reduced. Since protein and carbohydrates have no effect upon obesity, there is ignorance about the nutritional concern. Thirty-six percent did suggest that intake of fats should be reduced.

Answers for individuals who stated that their nutritional concern was an unbalanced diet are relative to the individual concern. Therefore, the correctness of the answers cannot be judged. Thirty-five percent listed protein, however, as the nutrient required to correct an unbalanced diet. Several vitamins were listed; but no specific vitamins were stated by more than four individuals.

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[1]Dr. Olaf Mickelsen evaluated the responses for their correctness.

Again, it is impossible to judge the correctness of the answers for 37% who listed vitamin deficiency as a nutritional concern. Vitamins C and A were the most frequently listed nutrients, however.

Interpretation of Data

In this research it is assumed consumers having an awareness of a nutritional concern in their family will be more likely to use nutritional labeling. Given this criteria, the results indicate for each nutritional concern the percentage of upper income consumers representing a potential market for information on nutrients about that concern. It is believed this information could be obtained through nutritional labeling. For example, 47% are a potential market for information on obesity. The findings indicate, however, 71% of upper income consumers presently have misconceptions about nutrients required by the body for the nutritional concern. This suggests that nutritional labeling should be accompanied by an educational program about the nutrients required to correct nutritional concerns.

Vitamin and Mineral Supplements

Eighty-nine respondents or 89% stated they or another member of their family had used them at some time. As is shown in Appendix Y, 83% to 95% of all upper income

families have used vitamin and mineral supplements. Reasons for using supplements are listed in Table 21.

TABLE 21

Summary of Responses About Using Vitamin and Mineral Supplements

Reasons	Percent
1. Prescribed by a physician	23
2. Insurance against illness	22
3. Supplement or balance diet	33
4. No specific reason	11

The results suggest 89% of upper income consumers are aware of vitamin and mineral supplements. While awareness is not tantamount to understanding, it is believed, nevertheless, if consumers use the supplements they will be more likely to use nutritional labeling.

Food Groups Which Should Use Nutritional Labeling

Responses reveal a wide variation in answers to the following statement:

> List any groups of food on which you would most like nutritional labeling.

Twenty-nine consumers indicated that they had no interest in the subject. Some typical comments from this group include:

1. "I think it's all silly; if you eat balanced foods, you don't need all this labeling."
2. "Products give an adequate supply of vitamins and minerals."
3. "not nutrition, but poison."
4. "don't trust labeling--even under government supervision."
5. "People can go by common sense."
6. "nutritional labeling--not at my age."
7. "Products give an adequate supply of vitamins and minerals."

Twelve respondents had constructive comments about which food groups should use nutritional labeling. In Table 22 these comments are grouped into five categories.

Interestingly, five respondents stated: "You've set me thinking about nutritional labeling, I'll start looking at labels."

The food groups listed most frequently for which consumers wanted nutritional labeling included frozen TV dinners and processed meats, like hot dogs and luncheon meat.

Some Comments About Nutritional Labeling

To obtain some general ideas about nutritional labeling, respondents were asked what could be done to help them understand it better. Thirty-one percent remarked that there was nothing that should be done. Most of these replied that if people were really interested,

TABLE 22

Some Comments About Food Groups
Using Nutritional Labeling

Comments	Percent
1. Information on water content of all products for diet	17
2. Information on nutrients for snack foods like pop, popcorn and potato chips	33
3. Information on nutrients for meat	26
4. Information on whether nutrients have been artificially added to any product	17
5. Information on how to balance meals nutritionally with other products	8

there were sufficient data available to understand nutritional labeling. Comments from the 31% are classified in Table 23.

Fifty-three percent of upper income consumers stated they wanted more information about nutritional labeling. Table 24 categorizes statements from these individuals.

The 53% wanted some brochure or informational piece which would inform them about the total nutrient composition of foods. For example, 20% of the respondents indicated they wanted complete meal planning to insure fulfilling the nutrients the body needs. Other suggestions on what the brochure should contain included:

1. Listing of all nutrients discussing the best food sources for each nutrient.
2. Showing what a deficiency of each nutrient will cause.
3. Illustrating how much nutrient content in food is lost via cooking and storage.
4. Giving RDA of nutrients for all age groups.

A major concern of 10% is what to believe about nutrition. Specifically, they remarked that much food advertising on TV is misleading and confusing. Two examples which they gave included Geritol and breakfast cereals. Their belief was that the advertising for these

TABLE 23

Some Comments About Why Consumers Are Not Presently Interested in Understanding Nutritional Labeling

	Response	Percent
1.	Do not care about it	60
2.	Do not need it, other people do	20
3.	Do not believe education can change behavior	8
4.	Do not believe they can understand it	6
5.	Do not read beyond top of labels	6

TABLE 24

Summary of the Type of Additional Information Desired About Nutritional Labeling on Food Labels

Response	Percent
1. Information should be simplified by listing all nutrients on a common basis, like per one calorie.	14
2. Information on how to understand use of nutrients in maintaining health.	68
3. The number of nutrients listed on the label should be reduced from 7 to 3.	9
4. Information on a balanced diet.	9

products purported something not true. While they understand this to be the general situation in advertising, nevertheless, they said this discredits most food advertising about nutrition. In addition, 3% related that "doctors give too much information about food when they really don't know." These individuals wanted "factual information about nutrition put in a pleasing manner."

CHAPTER V

SUMMARY AND CONCLUSIONS

There are four purposes of this chapter: (1) to summarize the study; (2) to evaluate the hypotheses and relevant findings; (3) to indicate implications of the research; and (4) to suggest topics for future research.

Problem Area

During the 1960's, a growing awareness of malnutrition arose among all segments of society. The increasing incidence of such health concerns as obesity, heart attacks, arteriosclerosis and the like caused Congress to demand a full scale investigation about the dietary habits of consumers. In 1969, President Nixon called for a Conference on Food, Nutrition and Health to study nutritional problems.

One recommendation of this conference was to gather more information about the nutritional value of foods and to implement nutritional labeling. The purpose of nutritional information was to help consumers select and consume a nutritionally sound diet. Specifically,

the FDA was charged with the responsibility of developing guidelines for nutritional information on food labels which could be effectively communicated to the consumer.

To develop these guidelines, the FDA worked with physicians, nutritionists, consumerists, home economists and food industry executives. The group originally developed six alternative formats for nutritional labeling. These six formats were tested concurrently for consumer acceptance by retail food chains, the Consumer Research Institute (CRI) and Cornell University. The studies conducted by retail chains, CRI and Cornell University provided sufficient data to enable the FDA to promulgate the first voluntary guidelines on nutritional labeling in March, 1972. These guidelines were later revised in January, 1973.

The aforementioned studies attempted to measure consumer attitudes toward nutritional labeling and/or use of it. The research results indicated that consumers wanted and used nutritional labeling in their purchasing of food products. Specifically, the FDA found that at all income levels consumers said they would use nutritional labeling if it were made available in food products.[1] But nutritional labeling use was not defined, which may affect the interpretation of results. While these studies

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[1]Jacque Boyd, "Food Labeling and the Marketing of Nutrition," Journal of Home Economics (May, 1973), 21.

revealed that consumers may purchase products containing a listing of nutrients, they did not indicate that consumers were able to comprehend the information for meal preparation and food purchasing.

Only one study gave evidence that consumers may not use nutritional labeling in their meal preparation and food purchasing. A research project conducted by Drs. Call and Padberg, indicated nutritional labeling is not used, yet has results that may reflect merit on the industry without improving consumer diets.

It was explained:

> Consumers seem to perceive nutritional labeling (along with open code-dating and unit pricing) as systems that make this depersonalized food industry more accountable.[1]

The purpose of this project is to identify relevant factors in order to determine how nutritional labeling can help consumers achieve better dietary habits. The study focused on four major questions:

1. What is the consumers' perception of the role of nutrition in the maintenance of good health?
2. What nutrients have the greatest motivational effect on the consumers in selecting a food product?
3. What is the consumers' level of awareness and understanding of nutritional labeling?

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[1]D. L. Call, D. I. Padberg and others, "Consumer Reaction to Nutrition Information on Food Product Labels," Search Agriculture, II (1972), 216.

4. What is the consumers' ability and willingness to use the information provided through nutritional labeling?

The research was conducted in the East Lansing-Lansing area. Four census tracts with the highest average household income were chosen. A random sample of 100 personal interviews were drawn. Interviews were held with the individual in the household units selected who did the major part of food purchasing and meal preparation.

In general, the findings of this study support the Padberg and Call assertions that although upper income consumers may want more information, they do not seem to use that information in food purchasing and meal preparation. The research results reveal that consumers believe nutritional labeling is a worthy goal (at this juncture who can be against more nutritional knowledge). The findings also indicate, however, that consumers do not, count-up nutrients to make sure they are getting an adequate nutrient intake daily. Among the reasons for this are: lack of motivation; lack of time; and inability to understand how to use the listing of nutrients to assure an adequate nutritional intake.

The results highlight the fact that most people are not able to comprehend information about nutrients on food labels. First, consumers are not willing to take the

time to tabulate nutrient intake to make sure they receive the 100% of each nutrient daily. Second, they are most confused about the listing of proteins, minerals, vitamins, carbohydrates, fat and calories. For example, they raised such questions as: How do I compare nutrition of different brands? How much of each nutrient should I be eating? What is the difference between international units, grams, milligrams and the like? In general, they have no base line reference upon which to make their decisions.

The research findings suggest that consumers want nutrient information in the simplest possible form to insure that they are feeding their families properly. Nutritional labeling does not now provide this. Currently nutritional labeling is not the most effective strategy to accomplish better dietary eating habits.

Evaluation of Hypotheses and Summary of Findings

This section reviews each hypothesis and the relevant findings indicating whether the hypothesis is accepted or rejected. Table 25 shows whether the hypothesis was accepted or rejected. Each hypothesis was stated as a null hypothesis. The acceptance of a null hypothesis means the findings support the hypothesis as stated. The rejection of a null hypothesis means the alternate hypothesis is accepted.

TABLE 25

Results of Hypothesis Testing

Null Hypothesis	Research Result
Upper income consumers believe that a well-balanced diet is the best method to attain proper nutrition.	Accept
Upper income consumers possess little knowledge about nutrients.	Reject
Upper income consumers have little awareness of the concept nutritional labeling.	Accept
Upper income consumers have little understanding of the concept nutritional labeling	Accept
Upper income consumers do not have strong preferences concerning the listing of specific nutrients.	Reject
Upper income consumers are generally not aware of any nutritional problems in their families.	Accept
Where nutritional factors are of concern, heart disease and obesity are the most important.	Reject

Well-Balanced Diet Hypothesis

Upper income consumers believe that a well-balanced diet is the best method to attain proper nutrition.

Statistically, the hypothesis is accepted. Appendix I reveals that the majority of upper income consumers believe that a well-balanced diet is the best method to attain proper nutrition. The data presented in Table 9 indicated that consumers cannot name the four basic food groups. But this does not mean that consumers who cannot list these groups do not eat foods from these groups. It does suggest, however, that individuals who cannot name all four food groups may have a low level of knowledge about what foods to eat daily. It may mean they do not think of these food groups as being important sources of information, or that consumers are so accustomed to eating foods from these food groups that they do not think in terms of food groups. Nevertheless, it does raise the question that if upper income consumers cannot understand food groups, can they understand nutritional labeling?

Knowledge About Nutrients Hypothesis

Upper income consumers possess little knowledge about nutrients.

Three sub-hypotheses were tested for this hypothesis. These were:[1]

Ho_1: At least one-third of the upper income consumers have knowledge about nutrients.

H_{11}: Less than one-third of upper income consumers have knowledge about nutrients.

Ho_2: At least 50% or more of upper income consumers have knowledge about nutrients.

H_{12}: Less than 50% of upper income consumers have knowledge about nutrients.

Ho_3: 83-1/3% or more of upper income consumers have knowledge about nutrients.

H_{13}: Less than 83-1/3% of upper income consumers have knowledge about nutrients.

On the basis of the data presented in Appendix N, sub-hypotheses Ho_1, and Ho_2, are accepted; Ho_3 is rejected. Thus, the findings indicate that the majority of upper income consumers do have some knowledge about nutrients. On the basis of the aforementioned data, the general hypothesis is rejected.

Awareness Hypothesis

Upper income consumers have little awareness of the concept nutritional labeling.

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[1] Ho_1, Ho_2 and Ho_3 are stated as null hypotheses. H_{11}, H_{12} and H_{13} are alternative hypotheses. If a null hypothesis is rejected, then the alternative hypothesis is accepted.

The data in Table 12 tend to support the acceptance of this hypothesis. Of the thirty respondents who identified at least one product correctly which uses nutritional labeling, seventeen listed three items. The facts are that products like breakfast cereals and iodized salt have used nutritional labeling for over twenty years, yet the majority of consumers cannot identify at least one product using nutritional labeling correctly. This suggests that nutritional labeling has not been communicated successfully to the consumer.

Understanding Hypothesis

> Upper income consumers have little understanding of the concept of nutritional labeling.

Forty percent of upper income consumers listed three products using nutritional labeling and three nutrients on each product. Of this 40%, however, only 7% correctly identified three products that used nutritional labeling and three nutrients on each of the three products. The results tend to indicate, therefore, the majority of upper income consumers do not understand that nutritional labeling means a listing of nutrients by serving size. The findings reveal that the majority of consumers identified nutritional labeling with any products which list nutrients.

Listing of Nutrients Hypothesis

> Upper income consumers do not have strong preferences concerning the listing of eighteen specific nutrients.

The data in Tables 14, 15, and 16 indicate that this hypothesis is rejected. When consumers were asked to select the seven most important nutrients from the list of eighteen, the findings reveal that the most preferred nutrient to be listed on the food label was protein. Other nutrients which upper income consumers expressed interest in included the following: iron, carbohydrates, calcium, fats, and vitamins A, B_1, B_2, C and D. Also, the results tend to indicate that most upper income consumers do not think in terms of specific vitamins and minerals.

Nutritional Problem Hypothesis

> Upper income consumers are generally not aware of any nutritional problems in their families.

The results reveal that twenty-one respondents (21%) stated some member of their family had a nutritional problem. Of these, only four were not under the care of a physician. Many upper income consumers stated at least one family member had one or more of the following: heart trouble, high cholesterol, obesity, and the like. However, they did not believe the aforementioned were

nutritional problems. Thus, based on the findings, this hypothesis is accepted. Unless a member of their family is under the care of a physician, consumers do not seem to think in terms of the existence of nutritional problems.

Hypothesis About Nutritional Concerns

Where nutritional factors are of concern, heart disease and obesity are the most important.

The results of the research as revealed in Table 20 suggest that the four most important nutritional concerns were: unbalanced diet, obesity, vitamin deficiency, and heart disease. Since heart disease and obesity were not found to be the most important, this particular hypothesis is rejected.

Other Findings

1. Upper income consumers use vitamin and mineral supplements. The reasons given for their use include: (1) insurance against illness, (2) a physician's orders, and (3) to supplement a diet.

2. Upper income consumers believe the following food groups should use nutritional labeling: frozen foods, meat, canned vegetables, and canned fruit.

3. Brochures distributed at the checkout counter of supermarkets are the best medium to communicate information about nutritional labeling.

Conclusions

In General, Upper Income Consumers Do Not Use Nutritional Labeling in Their Meal Preparation and Food Purchasing

When discussing use of nutritional labeling, the results of the research indicate two distinct groups of upper income consumers: those who definitely will not use nutritional labeling and those who presently do not, but may be persuaded to do so. Approximately one-third of the population of upper income consumers categorically state they will not use nutritional labeling in their meal preparation and food purchasing. About one-half revealed some interest in the concept, but didn't specifically state they would use it in their meal preparation and food selection. Most of these, however, were not able to comprehend the basic information on the food label to use nutritional labeling.

This research reveals three major reasons which mitigate against the use of nutritional labeling in meal preparation and food purchasing; namely: lack of understanding, lack of motivation, and time constraints. The following paragraphs contain a discussion of each of these points.

Lack of understanding.--Upper income consumers do not seem to understand how to use nutritional labeling in meal preparation and food purchasing. They tend to perceive of nutrient information as being printed in a complex form. The majority of consumers desired more information about how to use nutritional labeling in evaluating different brands of food products.

Consumers identified the following concerns with nutritional labeling:

1. They now were neither willing or able to tabulate the nutrient content of all food products eaten daily to insure obtaining the RDA of each nutrient.

2. They now were not able to interpret the relationship between grams, milligrams, U.S.P. and international units.

3. They now were not able to evaluate the overall nutrient content of one brand compared to another. This is especially true where the nutrients present in largest amount differ for the various brands. For example, to maximize the nutrient intake of breakfast, should the housewife offer her family one serving of Kellogg's Special K or one serving of oatmeal.[1]

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[1]The nutrients supplied in one serving of each are:

4. They now do not understand how to determine the trade-off decisions about which product is the most nutritious. The thousands of product choices the consumer is confronted with in the food store make it difficult for him (her) to evaluate the most nutritious brands based on the nutrient information which will appear on the label.[1] The consumers' perceived inability to be able to make such decisions engenders frustration about nutritional labeling.

The study does indicate, however, that while some consumers do not understand the purpose of nutritional labeling they may adopt the overall concept by purchasing food products that they perceive to contain the highest

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	Special K (% of MDA)	Oatmeal (% of MDA)
Vitamin A	33%	
Vitamin B	33%	
Vitamin C	33%	
Niacin	33%	
Thiamin (B_1)	33%	15%
Riboflavin (B_2)	33%	
Iron		10%
Phosphorus	6%	15%
Calcium	1%	
Sodium		.85gm
Protein	5.7gm.	4.10gm.
Fat	.3gm.	1.70gm.
Carbohydrates	20.8gm.	18.80gm.
Calories	109	107

[1]For example, in a one-ounce serving of oatmeal an individual receives .85 gm of sodium and 15% of daily requirements of phosphorus, whereas in a one ounce serving of Special K, the individual receives 6% of daily requirements of phosphorus, no sodium, but receive more protein as well as more vitamins.

nutrient content. But adoption without understanding does not insure an adequate intake of nutrients daily. For example, purchasing food products containing the most nutrients doesn't imply that consumers are aware of their overall intake of nutrients daily. They may be obtaining an overdose of certain nutrients and an insufficient amount of others. To help them select food products which have the highest nutrient content, many respondents suggested a standard reference which is common to vitamins, minerals, proteins, fats, carbohydrates, and calories. Many respondents suggested that each nutrient contained in the food should be listed in terms of a one calorie serving of the item.

Motivation.--Many upper income consumers do not use nutritional labeling in food purchasing and meal preparation because they are not motivated to read food labels for nutrient information. However, most individuals of the FDA and some industry representatives believe that consumers may be stimulated to read food labels for nutrient information as a result of educational programs. Dr. Ogden Johnson (Director, Division of Nutrition, FDA), Dr. Robert Smith, (Assistant Director of Research and Development-Nutrition, The Quaker Oats Company), and Mr. William Smithburg (Marketing Director, The Quaker Oats Company) tended to believe that greater awareness and more education about nutritional labeling will result in more consumers

using it in their meal preparation and food selection. But each voiced reservations about getting the majority of consumers to use nutritional labeling in food purchasing and meal preparation.[1]

The data tend to suggest that upper income consumers at present do not use nutritional labeling in meal preparation and food selection because they do not seem to be concerned about their eating habits. Currently, the majority of upper income consumers are not motivated to correct abnormalities in their dietary habits. Given this situation, one problem is to make people more concerned about their eating practices and its relationship to overall health. Presently the culture of the United States is not health oriented. It may, therefore, be difficult to accomplish this goal.

This does not mean, however, that the current consumer indifference about nutritional labeling cannot be changed. The present attitudes about nutrition and nutritional labeling may not be a valid insight into future behavior given a changed environment. For example, new and creative educational programs (by business, government and schools) may encourage better nutrition and promote nutritional labeling. It may be possible to change

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[1]Interestingly, each gentleman believed that even if consumers did not use nutritional labeling, still they were entitled to more information about nutrients.

the values of American consumers so they become more health oriented. The findings of this thesis, however, do not categorically furnish answers about how to make consumers more concerned about their eating practices and its relationship to overall health. Some suggestions will be made in section three, pages 144-47.

One-third of the upper income consumers should be classified as not now being interested in nutritional labeling and nutrition. For this segment, it does not seem likely that education or persuasive advertising tactics, in the short run, will influence them to use nutritional labeling. These persons are likely to eat the foods which they enjoy.

Because of the intensity of feelings of one-third of the upper income consumers about lack of concern for eating habits, one wonders whether education or persuasive advertising tactics are the mechanisms by which to implement better nutrition habits for this segment. The findings suggest that a personal crisis situation, like a heart attack, cancer scare, or such, may be the only factors at present which will precipitate a change in eating habits for these consumers.

Time.--Upper income consumers do not believe that they have the time to read food labels for nutritional information. Also, many related that shopping for food

was a burdensome task and they were not willing to take the time to read food labels in the grocery store.[1] It is of interest that many upper income consumers do not look at the food labels for nutritional information before preparing the food for a meal. The data do not conclusively reveal, however, that consumers do not read food labels at home.

A Perceived Nutritional Problem in a Family Motivates Consumers to be More Concerned About Nutritional Intake

Each of the consumers who stated that there was a nutritional problem in their family displayed knowledge about the listing of nutrients on food labels. Specifically, these individuals revealed they purchased food on the basis of nutritional information. In addition, they were able to list nutrients and their importance to the specific nutritional problem. The 95% confidence interval estimate of the number of upper income consumers that have nutritional problems is in a range between 13% and 29%.

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[1] A typical comment was: "I'm not going to fight the traffic in the food store to read food labels. My goal in food purchasing is to get into the store and out as fast as possible."

In General, Upper Income Consumers Do Not Perceive of Any Nutritional Problems in Their Families

Upper income consumers do not perceive of nutritional problems unless a member of their family has a medical deficiency which needs corrective action, such as consulting a physician. In general, they believe their families are healthy and have no nutritional problems. The findings also tend to suggest that upper income consumers list most medical deficiencies associated with a member of their family as nutritional concerns. In general, medical deficiencies associated with members of families which do not require treatment by physicians are listed as nutritional concerns, and not nutritional problems.

There was some indication that the fear of finding something wrong medically was the reason upper income consumers did not visit a physician for ailments like obesity, etc. Since upper income consumers do not seem to believe that such ailments as obesity require a physician's consultation, they do not perceive of these ailments as being nutritional problems.

Upper income consumers tend to rationalize nutritional deficiencies of members of their family. They rationalize that it is not serious. Therefore, they do not list it as a nutritional problem. This was particularly noticeable in the responses of obese individuals.

The interviewers observed several respondents, who although they were overweight, did not list obesity as a problem. In some cases obese respondents did not even identify it as a nutritional concern.

In General, Attitudes About Food Selection Among Upper Income Consumers Do Not Predict Behavior

In general, upper income consumers seem to believe they follow a rational behavior pattern in food selection and meal preparation. They seem to feel that they understand what foods and food groups a well-balanced meal should include. But the results tend to indicate that these attitudes about food selection do not predict behavior about food purchasing.

Housewives are not likely to admit readily that they do not prepare nutritious meals. They are aware of the importance of eating well-balanced meals. When upper income consumers are asked questions about food selection, they may encode these questions based on their internalized attitudes about the necessity of eating nutritious foods.

The response of housewives concerning food selection contrasts with how they actually purchase food in the market-place. The majority of upper income consumers do not purchase food by nutritional content. Instead, food selection and meal preparation are oriented to the tastes of those consuming the food.

Knowledge About Well-Balanced Meals and Nutrients Does Not Insure Proper Eating Habits

Upper income consumers are generally aware of the importance of eating well-balanced meals. Also, they have some knowledge about nutrients listed on food labels as required by the FDA. But the findings tend to indicate that this informational base is not tantamount to good dietary habits.

Approximately Fifty Percent of the Population of Upper Income Consumers Expressed Some Interest in Using Nutritional Labeling in Purchasing Food and Preparing Meals

While it cannot be concluded that each consumer included in this 50% segment will eventually use nutritional labeling in their food selection and/or meal preparation, it can be concluded that they are predisposed to more information about nutrition. They desire information about nutrition which will help them ensure that their family is eating nutritious foods. Presently, however, most consumers in this 50% segment are confused about the proliferation of information about nutrition.

There is also some evidence to suggest a backlash effect about nutrition information. The findings tend to indicate that upper income consumers do not know what messages and what sources of communication to believe about such subjects as nutrition, nutrients, eating practices and the like. The results seem to suggest that many consumers

may be blocking information about nutrition and nutrients from their minds when selecting food or preparing meals.

Other Conclusions

1. Upper income consumers do not seem to be aware of nutritional labeling on food packages. They cannot recall products which use nutritional labeling.

2. When upper income consumers were forced to select the nutrients they want listed on food labels, protein was selected most often. The order of reference for other nutrients include: carbohydrates, Vitamin C, Vitamin A, iron, calcium, Vitamin D, Vitamin B_1, and Vitamin B_2.

3. Some of the most important nutritional concerns among upper income consumers include: unbalanced diet, obesity, vitamin deficiency, and heart disease.

4. Upper income consumers use vitamin and mineral supplements for the following reasons: (1) to supplement their diet; (2) to ensure against illness; and (3) to comply with the orders of a physician.

5. Upper income consumers expressed the belief the following food groups should use nutritional

labeling: frozen foods, meat, canned vegetables and canned fruits.

Implications of the Research

Implications for the FDA About Policy Decisions on Nutritional Labeling

There are four stated purposes of nutritional labeling: (1) to bring about healthier eating habits; (2) to permit the consumer to purchase the most nutritious foods at the lowest cost; (3) to inform the consumer what is in the food she (he) purchases ("the right to know"); and (4) to increase the food processor's concern about the nutrient content of his product. In general, the purpose of nutritional labeling is to make people more aware of the nutritional values of the food they eat.

To evaluate the potential success of nutritional labeling, it is necessary to obtain some measure of how well nutritional labeling is meeting its goal. Such an evaluation is related to the consumer's willingness and ability to read food labels. This research indicates consumers at present do not read food labels when purchasing or eating food.

A principal reason offered for not reading food labels is the lack of time. But it is likely that the unwillingness to take the time to read food labels is attributable to the unfavorable task of food shopping.

The majority of upper income consumers seem desirous of expediting food shopping. Thus, upper income consumers are not motivated to read food labels and are unwilling to take the time to do so.

Future trends seem to suggest that consumers will be even less willing to take the time to read food labels for nutrition information. For example:

> Products that increase the efficient use of time will find more favorable markets. People will become less patient with routine instrumental activities that require great time relative to the gratification generated.[1]

These aforementioned results tend to indicate that nutritional labeling may not be the best method to accomplish better nutritional intake among the population. If this is the case, then how can consumers be motivated to be more concerned about the consequences of their eating habits.

The findings of this research suggest that the FDA might consider adopting a new approach to encourage more consumers to be concerned about their dietary intake. The author believes that the overall approach should be

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[1]Dr. William Lazer, et al., CELS-80, A Report on Consumer Environments and Life Styles of the Seventies, Report to Whirlpool (Benton Harbor, Michigan, August 31, 1971). If consumers learn about nutritional values of products, they would not have to spend much time in shopping. The majority of upper income consumers at present are not motivated to learn about nutritional values. Also, the author believes that neither an advertising campaign nor an educational program will change food purchasing in the short run since food buying habits do not change rapidly.

two-pronged: (1) an emphasis on persuasive communication about nutrition for the post-secondary school segment of the population; and (2) an educational program for the elementary and secondary schools.

Since eating habits and preconceived attitudes about eating practices are difficult to change, an extensive campaign should be directed at the post-secondary school market. This campaign should include the following points:

1. An emphasis on the fact that health and eating habits are highly correlated.
2. An emphasis on the fact that taste and appetite are not necessarily the best guides to proper nutrition.
3. An emphasis on the importance of food groups. It should be stressed that this is the best method to obtain the necessary nutrients daily.

It is believed that the aforementioned orientation will tend to achieve the following: (1) influence the consumers to eat a variety of foods; and (2) motivate them to select foods based on nutritional value, without the confusion generated by nutritional labeling. To accomplish this, the FDA, should actively seek the co-operation of such members of the business communities: media, food trade associations and public relations departments of food manufacturers and food retailers.

Since the creative minds of individuals working in these institutions can sell food on the basis of taste and appetite, there appears to be no reason why these same individuals cannot design innovative strategies to market nutrition.

To do this, however, the FDA must recognize that food-related companies are in business to sell their products. Certainly, manufacturers of food products that do not have high nutritional value, such as snack items, are not going to welcome a competitive arena highlighting nutritional quality. But if the FDA judiciously creates an awareness about the relationship of dietary habits to overall health among consumers, it is likely that some food companies will begin to use the nutrition theme as a marketing tactic. Thus, in the process of meeting their sales goals, these companies will be engendering greater nutritional awareness of eating habits among consumers. While this is not realistic for some companies, snack food manufacturers particularly, it is believed many organizations will undertake this marketing approach.

The second part of the approach is an educational program for the elementary and secondary schools. Children should be taught to think about the relationship between nutrition and good health.

The FDA should establish educational objectives for teaching nutrition. Their strategies to be based on

what motivates children to learn about nutrition should be carefully planned and conducted. It is most important to adopt standard teaching materials for the teaching of nutrition. Since many teachers are not trained in nutrition, a coordinated planning guide should be developed which informs teachers how to convey the subject material to the students.

The findings suggest that the educational orientation concerning nutrition should be the attainment of a balanced diet by using the four food groups. For example, school children should be taught such basic concepts about nutrition as: (1) vitamins A and C come from fresh vegetables and fruits; (2) riboflavin, thiamin, and niacin come from cereal groups; (3) calcium and protein are obtained from the dairy group; and (4) iron and protein come from the meat group.

By stressing nutrition education in the elementary and secondary schools, it is likely that more adults, parents particularly, will begin to seek additional information about proper nutrition. Current nutritional educational programs should be revised by the FDA to meet the growing receptivity about nutrition information.

Implications for the Adoption of Nutritional Labeling

The findings indicate that consumers do not use nutritional labeling as a means of insuring the RDA of

each nutrient. Why? First, as was discussed, reading nutrients on food labels is not compatible with the consumption act because upper income consumers do not have the time, motivation, or understanding to read food labels for information about nutrients. Second, upper income consumers do not appear to see any advantage to using nutritional labeling in meal preparation and food selection. They are not now willing to use nutritional labeling in meal preparation and food selection as a method to correct their dietary habits.

Third, it is difficult to communicate effectively about nutritional labeling. The results of this research suggest that product information on packages has had little impact in persuading consumers to adopt nutritional labeling in their meal preparation and food selection. If nutritional labeling, as proposed by the FDA, is to be used in meal preparation and food selection, the findings suggest that person to person contact is the most effective medium to communicate information about nutritional labeling.

Dr. Ogden Johnson, Director, Division of Nutrition, FDA, emphasized that consumers are entitled to more information about the nutrient content of the food they purchase ("the right to know").[1] Also, he stated that as

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[1]Dr. Ogden Johnson, private discussion on November 15, 1972.

the merits of nutritional labeling were told, more consumers would begin using it to insure the RDA of each nutrient. Yet discussions with two representatives from the food industry revealed different opinions about the use of nutritional labeling. It was stated that their research indicates some consumers are interested in calories only, and not in the listing of nutrients.[1] It seems that some consumers have learned that caloric intake determines body weight. The executives did express optimism, however, that maybe after most food products have adopted nutritional labeling, consumers would then begin to use nutritional labeling in purchasing foods.

Implications for Market Research and Consumer Behavior

In the food industry, consumer panels and consumer surveys are used extensively to obtain demographic information as well as data about attitudes towards products, food purchasing, store size, etc. Numerous studies have been conducted which show the relationship between some demographic input (income, education, and the like) and some other variable such as store patronage, product purchase, and so on.

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[1]The author believes more people are becoming interested in controlling their weight because of the health hazards associated with being obese. It is believed that consumers learn to become more weight conscious from two principal sources: (1) physicians; and (2) articles about obesity in newspapers and magazines.

Marketing researchers realize that such data are not an indicator of market behavior. They do not explain the "why" of behavior. They do not answer such questions as: Why people buy specific products? Why people shop at a certain store? Why one brand sells better than another?

To answer such questions, it is necessary to uncover the determinants of behavior. While it is not known how to predict behavior, much research in the food industry has centered on attitudes. Several approaches to operationalize measurement of attitudes include: (1) Osgood's Semantic Differential; (2) Thurstone Scales; and (3) Likert Scales.

The results of this research indicate that the measurement of attitudes may have no direct relationship to behavior in the market place. For example, consumers are unwilling to express opinions which indicate they are poor housewives or that they do not provide nutritious meals for their families. Moreover, respondents often do not know the reasons for their own purchase behavior. They are unaware of why they do what they do. In such instances, respondents may give inaccurate information about the consumption act. Consumers are often unable to verbalize their reasons for purchasing some products. Thus, the design of questions alone will not uncover the consumer's behavioral actions. This suggests that an

attitude survey would need to be complemented by actual monitoring of consumer's food purchases to determine how consumers buy food items in the market place.

Implications for Advertising Strategy of Food Manufacturers

The real paradox of nutritional labeling is that it does not seem to meet the perceived needs of most consumers, yet most manufacturers will probably adopt it.

The study indicates that as consumers become more aware of the relationship of eating habits to health, some of them become interested in the total quantity of nutrients they consume. However, they are not yet interested in the individual nutrients. This suggests a promotional format might stress the following:

1. The role of food in maintaining good health.
2. The importance of eating the four food groups daily.
3. The necessity of selecting foods which meet the daily nutrient requirements of one or more of the food groups.

The results also tend to indicate that food manufacturers may not be successful if they attempt to persuade consumers via advertising to adopt nutritional labeling as guides in making food purchases or in meal preparation.

The research results suggest that an educational program about nutritional labeling may not be too effective. It seems unlikely that information about nutritional labeling in a short period of time will become an important part in the consumer's decision process. Rather, the findings suggest that advertising containing emotional appeals about the need for proper nutrition will have greater impact upon influencing consumers to establish good dietary habits.

It is suggested that advertising campaigns might highlight:

1. Importance of food products to the attainment of proper nutrition.
2. How food products meet the nutritional needs daily.
3. Creative ideas about nutritious menu planning.
4. Central nutritional theme common to all products in all sources (newspapers, magazines, television and radio).

Increasingly, nutrition will become a topic in vogue. As this happens, more consumers will be exposed to articles about nutrition in magazines and newspapers which will better enable them to begin to monitor their dietary intake of nutrients. If food manufacturers recognize this increasing awareness about nutrition among

consumers, and convey a simple and emotional message about the role of his product in meeting nutritional requirements, new demand for products will be generated. For example, it is suggested that manufacturers emphasize the importance of eating their products to obtain proper nutrition daily. Also, it is suggested that this information be distributed in brochures at the checkout counter in food stores.

Implications for Marketing

As government assumes more control over segments of society, particularly business, the rules and regulations that result from that control are not necessarily commensurate with the needs and wants of consumers. This research suggests that if a society is not responsive to the needs of the populace, there is an erosion on the part of consumers to abide by the rules established by government; and this results in more governmental control. For example, even though nutritional labeling may not generally be used by consumers in food selection and meal preparation, some food manufacturers may try to market products on the basis of quantity of nutrients.

Also, there is strong sentiment particularly among consumer-oriented groups for more regulation of nutritional claims. The greater involvement of government

in the marketing of foods will make it even more difficult for marketers to create a unique image of their product among consumers. It is likely that the trend in selling food products will be away from the creation of brand image to that of a commodity product where price is the major selling factor. This will tend to reduce the frills (free gifts, promotional games and fantasy) from product offerings.

Suggestions for Future Research

The following suggestions are made for future research:

1. Since this research was conducted among affluent consumers in East Lansing and Lansing, a natural extension of the study would be to other segments of the population like low income, ethnic and other geographic areas.

2. Consumers are continually faced with selecting food from among competing alternatives. It would be desirable to test further how to quantify the multiple and interrelated factors (price, convenience, nutrition and the like) affecting food purchasing. Detailed studies segregating the individual importance of these food purchasing inputs would permit a more rational approach to

the achievement of better dietary habits among the populace. For example, if for one segment of the population nutrition is the most important input in purchasing food then marketing strategies highlighting nutrition could be developed. If for another segment of the population, nutrition constitutes only 20% of the buying decision, then marketing strategies could be developed to increase the importance of nutrition in the purchase decision.

3. A third fruitful area of future research is that of determining how the relative importance of the inputs to food purchasing change over time. It is suggested that studies should be oriented to the effect of education about nutrition upon the change in food purchase behavior. It would also be desirable to determining which is the best media to use in transmitting information about nutrition.

4. Fourth, future research might be designed to determine what impact education about nutrition has upon the purchase of food products. The study should seek to determine specifically the relationship between a consumer's verbal report of attitude about nutritional education and actual behavior concerning nutritional labeling.

APPENDICES

APPENDIX A

RESEARCH INSTRUMENT

Questionnaire Number_____

Interviewer_____

INTERVIEW DATA

Address and description of location (include apt. no.)

_____

_____

_____

_____

Telephone No._____

Scheduled Appointment_____

Best Time to Visit_____

Signature_____

Interview Completed

_____

Mo. Day Yr.

Not Completed (ck. one)

Household refusal_____

Vacant_____

Extended Absence_____

Not home_____

No such DU_____

Summer Home_____

Other (specify)_____

Record of calls to complete interview

	Date	Time
1.		
2.		
3.		
4.		
5.		

Good (morning, afternoon, evening)! My name is_____

I am an interviewer with the Michigan State University Marketing Department which is conducting a study on food shopping habits. By way of introduction, here is my official letter.

Show respondent letter. If she asks how she was chosen, explain that she was picked as a member of a random sample of homes in various neighborhoods in the Lansing-East Lansing area.

It is very kind of you to help us gather the information we need. Before we start, let me emphasize that we are interested in your own opinion. Your individual answers are coded and will be held strictly confidential. We will prepare a report on what we find but no individual answers will be disclosed.

To start, I am going to read a statement. Please tell me how you feel about this statement using this card for your answer. Hand Card 1.

1. In general would you please indicate which one of the following statements most accurately describes your food purchasing habits.

   (1-1) (1-2) (1-3) (1-4) Ans._____.

Now for the next two questions, please use this card for your answer. Hand Card 2.

2. In general, appetite is a good guide to proper food habits.

   (2-1) (2-2) (2-3) (2-4) (2-5) Ans._____

3. A well-balanced diet is the best method to attain proper nutrition.

   (3-1) (3-2) (3-3) (3-4) (3-5) Ans._____

4. A well-balanced diet should include what basic food groups daily?

   Ans._____

   _____

   _____

Now we would like to ask you some questions about nutrients. As you know, nutrients supply energy, renew and rebuild body tissue, and regulate body processes.

5. Can you please give me the names of the nutrients which the body needs to function properly?

   Ans._____

   _____

   _____

   _____

   _____

   _____

   Anything Else?_____

   _____

   _____

For questions 6-17 I would like to know how you feel about the statements read. Please use this card for your answer. Hand Card 3

6. The daily iron intake should be the same for both men and women.

   (6-1) (6-2) (6-3) Ans._____

7. People who do not eat meat are found to be in poor health.

   (7-1) (7-2) (7-3) Ans._____

8. To maintain health, an adult requires one hundred percent (100%) of the recommended dietary allowance for vitamin A and riboflavin daily.

   (8-1) (8-2) (8-3) Ans._____

9. A thirty-five (35) year old average woman needs about five thousand (5000) calories per day.

   (9-1) (9-2) (9-3) Ans._____

10. To reduce the caloric intake of the average American, it would be more effective to eliminate potatoes, rice, fruits, and vegetables from the diet rather than ice cream, butter, mayonnaise, and fatty meats.

    (10-1) (10-2) (10-3) Ans._____

11. An active individual does not require more calories than an inactive person.

    (11-1) (11-2) (11-3) Ans._____

12. A calorie is a unit of measurement and not a nutrient like fats, carbohydrates, protein, etc.

    (12-1) (12-2) (12-3) Ans._____

13. Carbohydrates provide man with most of the energy to carry on his bodily activities.

    (13-1) (13-2) (13-3) Ans._____

14. Meeting one hundred percent (100%) of the recommended dietary allowance for calcium is more important for children than for adults.

    (14-1) (14-2) (14-3) Ans._____

15. An important reason for having some fat in the diet is that fats usually carry certain vitamins with them.

    (15-1) (15-2) (15-3) Ans._____

16. For equal weights, butter contains the same number of calories as an apple.

    (16-1) (16-2) (16-3) Ans._____

17. Taking vitamin pills is the best way to receive your necessary daily vitamin requirements.

    (17-1) (17-2) (17-3) Ans._____

Now we would like to ask you some questions about the role of nutrition in the diet of your family.

18. In general, which one of these statements best describes your habits concerning food purchasing. Hand Card 4

    (18-1) (18-2) (18-3) (18-4) (18-5) Ans._____

Ask question 19 if the answer to above was 4 or 5; otherwise go to question 20.

19. Please tell me the major reasons why you seldom (never) read the food labels for nutrition.

Ans._____

_____

_____

Anything else?_____

_____

_____

_____

What about malnutrition?_____

_____

_____

_____

For the next statement, please answer yes or no.

20. Are there any nutritional problems concerning members of your family?

yes (20-1) no (20-2) Ans._____

Ask question 21 if answer to above was yes; otherwise go to question 22.

21. Please list the nutritional problem(s) of your family.

Ans._____

_____

_____

_____

_____

Anything else?_____

_____

_____

_____

22. From this list, would you please rank the four most important nutritional concerns in your family. Hand Card 5

(22-1)_____ (22-4)_____ (22-7)_____

(22-2)_____ (22-5)_____ (22-8)_____

(22-3)_____ (22-6)_____ (22-9)_____

(22-10)_____ explain _____

_____

23. Then for each nutritional concern, please specify what nutrient(s) is (are) required by the body.

Rank 1_____

_____

_____

Rank 2_____

_____

_____

Rank 3_____

_____

_____

Rank 4_____

_____

_____

Now we would like to ask you some questions about vitamin and mineral supplements. Hand Card 3

24. In your opinion, does a diet of the right foods supply you and your family with the vitamins, minerals, carbohydrates, fats, and proteins you and your family need for normal health?

(24-1) (24-2) (24-3) Ans._____

For the next question, please answer yes or no.

25. Have you or any other member of the household ever used vitamin and mineral supplements?

yes no
(25-1) (25-2) Ans._____

If answer is yes to above question, ask question 26; otherwise go to question 27.

26. In general, would you please indicate which one of the following statements most accurately describes the reason the vitamins or mineral supplements were (are) used. Hand Card 6

(26-1) (26-2) (26-3) (26-4) (26-5) Ans._____

Now we would like to ask you some questions about nutritional labeling.

27. Please name three products which you purchase that use nutritional labeling.

Ans._____

_____

_____

_____

28. For each of the aforementioned products you named, please specify three nutrients which are listed on each label.

Product 1_____

_____

_____

Product 2_____

_____

_____

Product 3_____

_____

_____

Nutrient labeling will require the listing of nutrients in a single serving.

For questions 29 and 30 please answer yes or no.

29. Do you or any member of your family use special dietary foods on the orders of a physician?

yes (29-1) no (29-2) Ans._____

30. Do you or any member of your family use any foods that have nutrient labeling other than on the orders of a physician?

yes (30-1) no (30-2) Ans._____

If answer is yes to either question 29 or 30, ask question 31; otherwise go to question 32.

31. When you use any of these products, what information on the label do you particularly look for, other than the brand name?

Ans._____

_____

_____

_____

_____

Anything else?_____

_____

_____

_____

Recently, the federal government has issued guidelines on nutritional labeling. Because of the pressures of the market place it is probable that most processed and frozen food will have nutritional labeling within the next 3-4 years. The next questions inquire as to what you want from nutritional labeling.

32. List any groups of food which you would most like nutrient labeling on.

Ans._____

_____

_____

_____

Anything else?_____

_____

_____

_____

For the next question, please answer yes or no.

33. Are there any nutrients that you feel should be included on all food labels?

yes (33-1) no (33-2) Ans._____

If yes, which nutrients?_____

_____

_____

_____

_____

34. Here is a list of nutrients that might appear on a breakfast food label. Would you please rank the top seven (7) nutrients in the order of their importance concerning the maintenance of proper nutrition. Show Card 7

(34-1)_____	(34-7)_____	(34-13)_____
(34-2)_____	(34-8)_____	(34-14)_____
(34-3)_____	(34-9)_____	(34-15)_____
(34-4)_____	(34-10)_____	(34-16)_____
(34-5)_____	(34-11)_____	(34-17)_____
(34-6)_____	(34-12)_____	(34-18)_____

35. Nutritional labeling is a complex issue, is there anything that could be done to help you understand it better?

Ans._____

Anything else?_____

Anything else?_____

Now these are all the formal questions I have, but if you have any other thoughts about the subject you think I should record, I will be pleased to do so.

Ans._____

Lastly, I'd like you to check some background information about yourself and your family. Please remember, this information will be used only in our analysis and will be held strictly confidential. Kindly regard your answer on this card. Hand Card 8

In case I did not record everything, or my supervisor wants to check on me, would you mind giving me either your name or telephone number? I can assure you that we are not and will not be selling anything and you will not be bothered. Thank you.

Name: _____

Phone: _____

CARD 1

1. In general, I select the foods which provide the highest proportion of minerals and vitamins.

2. In general, I select foods which are the most convenient to prepare.

3. In general, I select foods according to taste.

4. In general, I select foods which provide the best unit value per dollar expended.

CARD 2

1	2	3	4	5
Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly Disagree

CARD 3

1	2	3
Agree	Neither agree or disagree	Disagree

CARD 4

1. I always read the food labels for nutrient information.
2. I frequently read the food labels for nutrient information.
3. I occasionally read the food labels for nutrient information.
4. I seldom read the food labels for nutrient information.
5. I never read the food labels for nutrient information.

CARD 5

1. anemia
2. heart disease
3. mineral deficiency
4. nutritional ignorance
5. obesity
6. poor quality proteins
7. unbalanced diet
8. vitamin deficiency
9. no nutritional concerns
10. other

CARD 6

1. Insurance against illness
2. Supplement or balance a diet
3. Give extra pep and energy
4. Keep a person feeling young
5. Prescribed by a physician

CARD 7

1. Vitamin A
2. Thiamin (Vitamin B_1)
3. Riboflavin (Vitamin B_2)
4. Niacin (a B Vitamin)
5. Vitamin C
6. Vitamin D
7. Vitamin E
8. Iron
9. Phosphorus
10. Calcium
11. Magnesium
12. Vitamin B_6
13. Vitamin B_{12}
14. Pantothenic Acid
15. Protein
16. Fat
17. Carbohydrates
18. Calories

Card 8

1. Sex: M_____ F_____

2. Age: _____ _____ _____ _____ _____ _____
(under 20) (21-30) (31-40) (41-50) (51-60) (over 60)

3. How many persons, including yourself, are living in your home?_____

4. Do you have any children living at home? Yes_____ No_____

If yes, please answer the following questions:

a) No. of children 0-4 years old_____
b) No. of children 5-10 years old_____
c) No. of children 11-15 years old_____
d) No. of children 16 over _____

5. Occupation of household head:_____

6. Occupation of respondent (if other than E)_____

7. Annual family income:

0-4,999, 5,000-9,999, 10,000-14,999, 15,000-19,999, 20,000-29,999,

30,000-39,999, 40,000-50,000, over 50,000

8. Education of respondent:

some grade school_____ some high school____ some college_____

grade school_____ high school____ college_____

graduate work_____

APPENDIX B

AVERAGE HOUSEHOLD INCOME BY CENSUS TRACTS IN EAST LANSING AND LANSING

Census Tracts	Average Household Income
East Lansing	
38.01	$22,474
38.02	19,015
39.01	37,550
39.02	19,610
0040	20,270
0041	12,534
0043	14,105
0044.02	7,097
0044.03	8,755
Lansing	
0001	10,516
0002	8,583
0003	11,048
0004	12,849
0005	10,506
0006	11,416
0007	8,612
0008	9,711
0009	11,570
0010	10,833
0011	9,667
0012	9,507
0013	8,826
0015	7,573
0016	12,628
0017	20,173
0018	7,214

Census Tracts	Average Household Income
0019	$11,109
0020	9,959
0021	9,303
0022	14,385
0023	11,834
0024	11,647
0025	13,638
0026	10,546
0027	11,536
0028	11,938
0029	11,904
0031.02	17,899
0032	9,930
0033.01	12,836
0033.02	17,121
0036.01	12,890
0036.02	9,685
0037	11,461
0051	10,038
0052	10,596
0053.01	11,783
0053.02	11,639

APPENDIX C

EXAMPLE OF ENVIRONMENTAL BLOCK MAP

Appraisal Number

Date _____

Structural Maintenance Code

Observers _____

NO. OF H.U.'s	NO. OF O.U.'s	DIRECTION	STREET NAME	APPEND.	LOW NO.	HIGH NO.

NO. OF H.U.'s

NO. OF C.U.'s

DIRECT.

STREET NAME

APPEND.

NO. OF H.U.'s

NO. OF O.U.'s

DIRECT

STREET NAME

APPEND.

NO. OF H.U.'s	NO. OF O.U.'s	DIRECTION	STREET NAME	APPEND.

CO. #	C.D. #	C.T. #	SECTION #	BLK. #

Total H.U.'s	Total O.U.'s

LOCAL OPTION					
1	2	3	4	5	6

STRUCTURAL MAINTENANCE (Exterior)

WELL MAINT.		
STRUCT.	H.U.'s	O.U.'s

DETERIORATING		
STRUCT.	H.U.'s	O.U.'s

DETERIORATING – Optional		
STRUCT.	H.U.'s	O.U.'s

DILAPIDATED		
STRUCT.	H.U.'s	O.U.'s

S-101 MCHS ENVIRONMENTAL APPRAISAL RECORD (2-1-72)

APPENDIX D

HOUSING UNITS SELECTED BY BLOCK BY CENSUS TRACT

Census Tract	Block	Housing Unit	Census Tract	Block	Housing Unit
38.01	101	26	38.01	209	19
		46		210.02	2
		86		210.03	19
	103	15	40	211	15
	104	10			40
	105.01	13		213	1
		33		216	4
		73		302	18
	105.02	25		304	20
	107	18		305	18
	109	2		307	3
	111	1		308	10
	201	4		309	13
	203	13			38
	204	40		68	
		60		310	19
		80		311	10
	206	1		312	7
	207	3		314	6
	208.01	9			31
		29			56
		49		315.01	36
		89			61
	210	11		316	4
	212	27			29
	102	12			54
	104	3		317	7
	106	1			32
	109	1			57
	112	5		412	1
	202	5		414	11
	204	10			
	208	13			

Census Tract	Block	Housing Unit	Census Tract	Block	Housing Unit
17	104	3		210.04	17
	105	5		210.07	29
	107	64		212	7
		87		214	34
	108	12		215	7
	111	11			41
	115	4		217	23
	116	12			46
		35		219	2
		58			25
		81		220	9
		104	39.01	102	13
	117	31		104	25
	119	12			52
	120	10			79
	121	10			106
	122	9		107	4
	124	27		110	6
	126	10		112	1
	201.01	7		114	1
		30		118	12
		76			
	201.02	7			
	203	23			
		46			
		69			
	204	11			
	205	12			
		68			
		91			
	206	13			
	207	16			
	208	19			
	209	19			

APPENDIX E

DISCUSSION ABOUT THE PRECISION OF THE SAMPLE ESTIMATE

In statistical analysis, the precision is stated in terms of relative accuracy; which implies constructing a confidence interval around the sample estimate of the population proportion.

To measure the probable accuracy of any one sample estimate, there must be some knowledge about the extent which estimates derived from different samples will differ from each other. In other words, if every possible sample of size n was drawn from the population, the estimates of the proportion of individuals having knowledge about nutrients from the respective samples would usually not be the same.[1] A measure of sample variability is computed through a theoretical construct known as the sampling distribution of a proportion. This specifies the probability that the sample estimate will fall within a stated interval.[2]

To predict deviations of the sample estimate from the true population proportion, the research design must be able to measure the extent of these deviations in terms of repetitive performance. Since it is impossible to know

---

[1]Whatever size sample is selected, there can be (n) samples of size n selected from the population N.

[2]If every possible sample of size n was taken from the population and an estimate of a proportion p was taken from each sample, then the collection of all these estimates is known as the sampling distribution of a proportion.

the exact sampling distribution of the population proportion estimate, an assumption must be made about its shape. For this research, it is assumed that the sampling distribution, which describes the chance fluctuations of the proportion estimate, is essentially the binomial distribution.[1] And to simplify mathematical operations, the normal distribution is used to approximate the binomial.[2] Thus, by knowing that the fluctuations in the sample proportion (p) from all possible random samples of size n can be shown on a continuous curve, probability statements about precision of p as an estimate can be made. Specifically, the central limit theorem asserts that with

---

[1]The conditions in which the binomial distribution is used include: (1) probability that an event will take place x times out of n; and the probability it will take place in any one trial is some constant number p; (2) the events are independent.

[2]A confidence interval estimate can be obtained from the normal approximation if the sample size is large and p does not deviate substantially from n. For a detailed discussion, see W. G. Cochran, 1946, "Relative Accuracy of Systematic and Stratified Random Samples for a Certain Class of Populations," Annuals of Mathematical Statistics, pp. 164-77.

probability $1-\alpha$ the sample proportion will differ from the population proportion by less than $z_{\alpha/2}\sqrt{\frac{p(1-p)}{n}}$.[1]

---

[1]The central theorem states that for large samples the sampling distribution of the mean can be approximated closely with a normal curve. This permits the following assertion: the sample proportion (p) will differ from the true population proportion (P) less than $\pm z_{\alpha/2}\sqrt{\frac{p(1-p)}{n}}$. In addition, the theorem postulated by Chebyshev permits statements to be made about the variability of the data. The theorem states that given a probability distribution with mean and standard deviation, the probability of obtaining a value within K standard deviations of the mean is at least $1-1/x^2$. For more discussion, see John E. Freund and Frank J. Williams, Elementary Business Statistics: The Modern Approach (Prentice-Hall, Inc., Englewood Cliffs, N.J.), pp. 45-47, 187-90, and 193-252.

APPENDIX F

MATHEMATICAL DERIVATION OF THE SAMPLE SIZE

The following formula is used to determine the size of the sample:

$$n = PQ \left[\frac{Z}{E}\right]^2 \quad \text{where}$$

n = size of sample

p = proportion of upper income consumers that have knowledge about nutrition

q = 1-p

e = error of estimate

z = probability of sample proportion not being off more than e

At p = 1/2 the proportion, pq assumes its maximum value.

$$n = (.5)(.5)\left[\frac{1.96}{.1}\right]^2$$

$$n \simeq 100$$

APPENDIX G

LETTER OF INTRODUCTION

MICHIGAN STATE UNIVERSITY EAST LANSING • MICHIGAN 48824

GRADUATE SCHOOL OF BUSINESS ADMINISTRATION

DEPARTMENT OF MARKETING AND TRANSPORTATION ADMINISTRATION • EPPLEY CENTER

March 22, 1973

Dear Respondent:

This letter is to introduce you to Mrs. Norma Auble, an interviewer with the Marketing Department at Michigan State University. She will ask you questions on your food shopping habits.

The interview should last approximately 20 minutes.

Your answers will be held in strict confidence. We assure you that there will be no attempt at any time to sell you any product or service: we only want your opinion.

If you have any questions concerning the study, please feel free to contact us at the following address:

Mr. Don Olson
355-0829
Michigan State University
Research Director

Dr. Olaf Mickelsen
355-7731
Michigan State University
Faculty Advisor

Don Olson

Dr. Olaf Mickelsen

APPENDIX H

WILCOXSON MATCHED-PAIRS SIGNED-RANK TEST

Wilcoxson Matched-Pairs Signed-Rank Test is computed as follows:

$$Z = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)\ (2n+1)}{24}}}$$

where T = rank with less frequent sign

N = number of matched pairs minus the number of pairs whose difference equals o.

For example, let N = 8
T = 4

Then: z = -1.96

The probability associated with the occurrence under H_o of a z as extreme as -1.96 is p = .05.

Computation of the average value for nutrients not included in the ranking from one to seven include:

1. Subtract the number of nutrients ranked 1-7 from 18.

2. Sum the ranks not used.

3. Divide by the number of unused ranks. For example, if a respondent ranked seven nutrients, then the average value assigned to the other eleven nutrients would be 13. This value is computed as follows: $\frac{\Sigma(11-18)}{11} = 13.$
   Thus the number 13 was used for nutrients not ranked from 1 to 7. Likewise, several respondents did not rank the top 7, but only 3,5,6, etc. In these situations the same mathematical procedure was followed in which all nutrients not ranked were assigned an average ranking.

APPENDIX I

CHI-SQUARE TEST

The chi-square distribution is used to test whether the distribution of observed responses is the same as the uniform distribution. The null hypothesis (H_o) is that there is "no difference" between the observed distribution and the uniform distribution.

The alternative hypothesis (H_1) is that there is a difference between the observed distribution and the uniform distribution. If the calculated value of chi-square is less than the tabled value, then accept H_o and reject H_1.

In terms of the problem, an acceptance of H_1 means that the sample came from a population where there is no consensus of opinion one way or the other.

The χ^2 statistic is computed as follows:

$$\chi^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i^2}$$

where O_i = observed number of cases categorized in the i^{th} category

E_i = expected number of cases in i^{th} category under H_o

$\sum_{i=1}^{k}$ directs one to sum over all (k) categories

For example, let K = 8 and E = 18

Then $\chi^2 = 16.3$

$\chi^2 \geq 16.3$ for 7 degrees of freedom has probability of occurrence between $p = .05$ and $p = .02$. Therefore at α of .05, the null hypothesis would be rejected.

APPENDIX J

NORMAL APPROXIMATION TO THE BINOMIAL

Where the population can be divided into two classes, the binomial distribution is the sampling distribution giving the values which might occur under H_o, where H_o is the hypothesis that the population value is P. Questions using the semantic differential permitted respondents to be grouped into two categories.

In this research, the normal approximation to the binomial is used. The statistical model is defined to be:

$$H_o : p \leq .5 \quad (x \leq n/2)$$

$$H_1 : p > .5 \quad (x > n/2)$$

The sampling distribution of the binomial is:

$$\sum_{i=0}^{x} \binom{N}{i} p^i Q^{n-i}$$

The normal approximation for the binomial is used whenever NPQ is at least 9. Under this criteria, the sampling distribution of x is approximately normal with mean = np and standard deviation = npq. Thus H_o is tested by:

$$Z = \frac{(x \pm .5) - np}{\sqrt{npq}}$$

Where: x = number of respondents in one category

±.5 = continuity

n = size of sample

p = proportion of cases expected in one of these categories

q = 1-p = proportion of cases expected in one one of the categories

---

The above is from Sidney Siegel's Nonparametric Statistics for the Behavioral Sciences (New York: McGraw-Hill Book Company, Inc., 1956), pp. 36-41.

APPENDIX K

NORMAL APPROXIMATION ABOUT HOW CONSUMERS ATTAIN PROPER NUTRITION

Research Hypotheses:

H_o: Upper income consumers believe that a well-balanced diet is the best method to attain proper nutrition.

H_1: Upper income consumers do not believe that a well-balanced diet is the best method to attain proper nutrition.

Statistical Hypotheses:

H_o: $x \geq (99/2)\ [p \geq .5] = x \geq 48.5$

H_1: $x < (99/2)\ [p < .5] = x < 48.5$

$$Z = \frac{(97-.5) - 48.5}{\sqrt{97(1/2)(1/2)}} = \frac{49}{\sqrt{24.25}} \simeq 10$$

since 10 > -1.645, accept H_o; no statistically significant difference

APPENDIX L

CONSTRUCTION OF CONFIDENCE INTERVALS FOR PROPORTION OF UPPER INCOME CONSUMERS WHO CAN NAME FOOD GROUPS

Confidence Interval

The formula to compute the confidence interval is:

$$p \pm \sqrt{\bar{p}}\ (Z)$$

where

p = sample proportion

$\sqrt{\bar{p}} = \sqrt{\frac{pq}{n}}$ = standard deviation of sampling distribution of p

Z = standardized value

n = size of sample

For:

p = .30
n = 100

then

$$.30 \pm \sqrt{\bar{p}}\ (Z)$$

$$.30 \pm \sqrt{\frac{pq}{n}}\ (1.96)$$

$$.30 \pm \sqrt{\frac{.3 \times .7}{100}}\ (1.96)$$

$$.30 \pm .09$$

For:

p = .35
n = 100

$$.35 \pm \sqrt{\frac{.35 \times .65}{100}} \quad (1.96)$$

$$.35 \pm .09$$

For:

$p = .23$

$n = 100$

$$.23 \pm \sqrt{\frac{.23 \times .77}{100}} \quad (1.96)$$

$$.23 \pm .08$$

For:

$p = .10$

$n = 100$

$$.10 \pm \sqrt{\frac{.10 \times .90}{100}} \quad (1.96)$$

$$.10 \pm .0\,6$$

For:

$p = .02$

$n = 100$

$$.02 \pm \sqrt{\frac{.02 \times .98}{100}} \quad (1.96)$$

$$.02 \pm .13$$

APPENDIX M

SUMMARY OF RESPONSES FOR FOOD GROUPS

Consumer Responses by Food Group	Percent
Meat	
1. Meat	82
2. Eggs	24
3. Fish	11
4. Poultry	4
Fruits-Vegetables	
1. Vegetables	84
2. Fruit	72
3. Green vegetables	13
4. Salads	11
5. Yellow vegetables	7
6. Potatoes	5
7. Leafy vegetables	4
8. Juice	4
9. Red vegetables	1
10. White vegetables	1
Dairy	
1. Dairy products	38
2. Milk	37
3. Cheese	9
4. Fats	5
5. Butter	3
6. Cooking oil	1

Bread-Cereal

1.	Cereals	37
2.	Bread	27
3.	Grain products	7
4.	Flour	1

Items not identified with any food group

1.	Proteins	27
2.	Carbohydrates	11
3.	Starches	9
4.	Sweets	8
5.	Cocoa	1
6.	Cookies	1
7.	Cake	1

APPENDIX N

CHI-SQUARE TEST FOR QUESTION ABOUT FOOD PURCHASING

Hypotheses:

H_o: There is no difference between the observed distribution and a uniform distribution.

H_1: There is a difference between the observed distribution and a uniform distribution.

$$\chi^2 = \frac{\Sigma\ (O - E)^2}{E}$$

Observed	37	10	28	25
Expected	25	25	25	25

$$\chi^2 = \frac{144}{25} + \frac{225}{25} + 9/25 = \frac{378}{25} = 15$$

Table value of χ^2 = 7.815 (3 degrees of freedom)

Therefore reject H_o and accept H_1

APPENDIX O

NORMAL APPROXIMATION FOR QUESTION ABOUT APPETITE BEING A GOOD GUIDE TO PROPER FOOD HABITS

Research Hypotheses:

H_o: Upper income consumers believe that appetite is a good guide to proper food habits.

H_1: Upper income consumers do not believe that appetite is a good guide to proper food habits.

Statistical Hypotheses:

H_o: $x \geq (86/2)$ $[p \geq .5] = x \geq 43$

H_1: $x < (86/2)$ $[p < .5] = x < 43$

$$Z = \frac{37 - 43}{\sqrt{86(1/2)(1/2)}} = \frac{-6}{\sqrt{21.5}} = \frac{-6}{4.6} = -1.30$$

Since -1.30 is greater than -1.645 accept H_o, no statistically significant difference.

APPENDIX P

CONSTRUCTION OF CONFIDENCE INTERVALS FOR PROPORTION OF UPPER INCOME CONSUMERS HAVING KNOWLEDGE ABOUT NUTRIENTS

Computation of Confidence Intervals

1. For 33-1/3%:

$$C.I. = \sqrt{\bar{p}} \times (Z)$$

$$= \sqrt{\frac{(33\text{-}1/3)(67\text{-}1/3)}{100}} \quad (1.96)$$

$$= .08$$

$$C.I. = 33\text{-}1/3 \pm .08$$

$$C.I. = 25\text{-}1/3 - 41\text{-}1/3$$

2. For 50%:

$$C.I. = \sqrt{\bar{p}} \ (Z)$$

$$= \sqrt{\frac{(.50)(.50)}{100}} \quad (1.96)$$

$$= .10$$

$$C.I. = .50 \pm .10$$

$$C.I. = .40 - .60$$

3. For 83-1/3%:

$$C.I. = \sqrt{\bar{p}} \ (Z)$$

$$= \sqrt{\frac{(83\text{-}1/3)(16\text{-}2/3)}{100}} \quad (1.96)$$

= .08

C.I. = 83-1/3 ± .08

C.I. = 75-1/3 - 91-1/3

APPENDIX Q

SUMMARY OF PRODUCTS IDENTIFIED AS USING NUTRITIONAL LABELING

Summary of Products Identified as Using Nutritional Labeling:

Product	Product Uses Nutritional Labeling	Product Does Not Use Nutritional Labeling
Shurfine Canned Vegetables		✓
Sunkist Prunes		✓
Campbell's Soup		✓
Delmonte Canned Fruit		✓
Land of Lakes Butter		✓
Dannon Yogurt		✓
Schmidt's Kidney Beans		✓
Uncle Ben's Rice	✓	
Royal Jello	✓	
Diet Soft Drinks	✓	
A&P Dried Lentils		✓
Hurst Barley Peas in Bag		✓
Ice Cream		✓
Lipton's Cup of Soup		✓
Domino Sugar		✓
Space Food Sticks	✓	
Shedd's Peanut Butter		
Milk		✓
Bread		
- Sanders Enriched		✓
- Schaffer's Salt Free		✓
- Pepperidge Farm Whole Wheat		✓
- Hillbilly Bread		✓
- Schaefer Diet Bread		✓
- Koepplingers White	✓	
- Butter Krust	✓	
- Schaffers Soft n Good	✓	

Product	Product Uses Nutritional Labeling	Product Does Not Use Nutritional Labeling
- Roskam's White	✓	
- A&P Protein	✓	
- A&P Glamour		✓
Saltine Crackers	✓	
Kroger Canned Vegetables		✓
Pop Tarts	✓	
Powdered Protein	✓	
Alpo Dog Food	✓	
Kraft Cheese		✓
Breakfast Cereal	✓	
Quaker Oatmeal	✓	
Wheat Germ	✓	
Cream of Wheat	✓	
Vitamin Pills	✓	
Instant Carnation Breakfast	✓	
Carnation Non-Fat Dry Milk	✓	
Honey	✓	
Cranberry Juice	✓	
Tang	✓	
Sugar	✓	
Hawaiian Punch	✓	
Kraft Orange Juice		✓
Dole Pineapple		✓
Sun-Maid Raisins		✓
Camelot Tomato Juice		✓
Herrud All Beef Weiners		✓
Meadowdale Juices		✓
Camelot Frozen Orange Juice		✓
Kraft Salad Dressing		✓
Fleischmann's Margarine	✓	

Product	Product Uses Nutritional Labeling	Product Does Not Use Nutritional Labeling
McDonald Orange Juice		✓
Bouillon Cubes	✓	
Chicken-of-the-Sea Tuna		✓
Pillsbury Cake Mix	✓	
Canned Fruit		✓
Libby's Tomato Juice		✓
Sunkist Prune Juice		✓
Pimento Sliced Cheese		✓
Crisco Shortening		✓
Gerber Cereals	✓	

APPENDIX R

NUMBER OF RESPONDENTS WHO IDENTIFIED NUTRIENTS ON LABELS OF FOOD PRODUCTS

	Vitamins	Vitamin A	Vitamin B	Vitamin B_1	Vitamin B_2	Vitamin B_3	Vitamin B_{12}	Vitamin C	Vitamin D	Vitamin E	Trace Minerals	Minerals	Calcium	Iron	Sodium	Phosphorus	Magnesium	Protein	Carbohydrates	Fat	Water
Sunkist Prunes																					
Land of Lakes Butter		x (no)												x (no)							
Schmidt's Kidney Beans									x (no)						x (no)				x (no)		
Uncle Ben's Rice				x	x									x							
Royal Jello								x	x												
Hurst & Burley Peas in Bags			x														x (no)				
Space Food Sticks		x			x							x						x		x	
Pimento Cheese																		x	x		
Gerber Baby Cereals				x	x																
Whole Milk		x							x												
Sanders Enriched Bread				x	x	x															
Pepperidge				x	x	x								x							
Schaefer Diet Bread																		x	x		
Schafers Soft n Good Bread					x	x													x (no)		

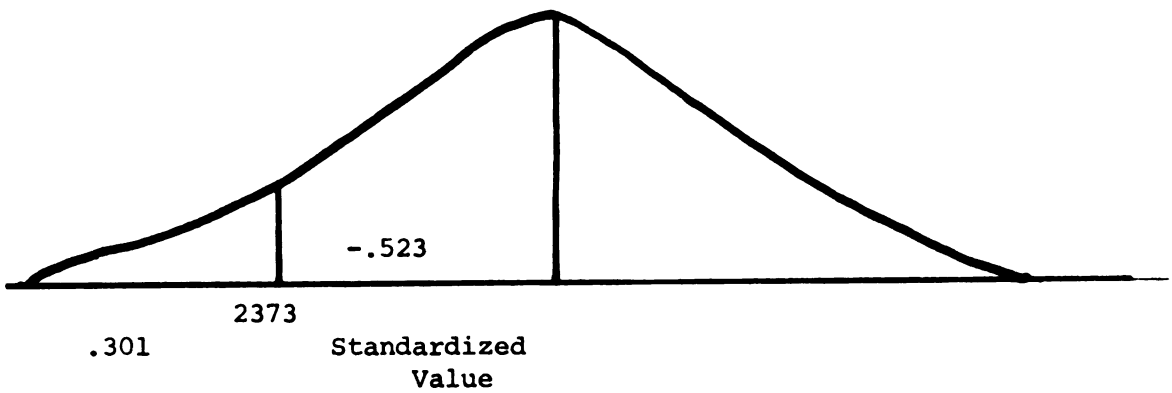
	Vitamins	Vitamin A	Vitamin B	Vitamin B_1	Vitamin B_2	Vitamin B_3	Vitamin B_{12}	Vitamin C	Vitamin D	Vitamin E	Trace Minerals	Minerals	Calcium	Iron	Sodium	Phosphorus	Magnesium	Protein	Carbohydrates	Fat	Water
Roskam's White Enriched Bread																			x (no)	x (no)	
Whole Wheat Pepperidge Farm Bread		x (no)								x (no)									x (no)		
Pop Tarts				x															x		
Thompson's Powdered P Protein			x																		
Alpo Dog Food		x		x	x	x				x	x		x			x		x			
Breakfast C Cereals		x	x	x	x	x	x	x	x			x	x								
Quaker Oatmeal				x									x						x		
Cream of Wheat												x	x						x		
Instant Carnation Breakfast																			x		
Carnation Nonfat Dry Milk		x		x	x	x			x				x			x	(no)				
Kraft Orange Juice								x (no)								x					
Hawaiian Punch		x						x						x							

	Vitamins	Vitamin A	Vitamin B	Vitamin B_1	Vitamin B_2	Vitamin B_3	Vitamin B_{12}	Vitamin C	Vitamin D	Vitamin E	Trace Minerals	Minerals	Calcium	Irons	Sodium	Phosphorus	Magnesium	Protein	Carbohydrates	Fat	Water
Sunmaid Raisins														x (no)							
Tang		x (no)	x																		
Imperial Margarine		x							x										x (no)	x (no)	
Pillsbury cake mixes																		x	x	x	
Chicken-of-the-Sea Tuna																					
McDonald Orange Juice								x (no)													

APPENDIX S

WILCOXSON MATCHED-PAIRS SIGNED-RANK TEST TO DETERMINE MOST PREFERRED NUTRIENTS

The Wilcoxson Matched-Pairs Signed-Rank Test determines if the distribution of two nutrients are from the same population. The following information is given for each pair of nutrients: positive rank sum, absolute value-negative rank sum, minimum (=, -) standardized, probability of not exceeding minimum rank sum if hypothesis of identical populations is true and number of zero differences. Interpretation of this information is shown diagrammatically for the nutrients iron and vitamin C.



Research Hypothesis:

H_o: Iron and Vitamin C are from the same population.

H_1: Iron and Vitamin C are not from the same population.

Statistical Hypothesis:

H_o: Sum of rank of Iron equals sum of rank of Vitamin C.

H_1: Sum of rank of Iron does not equal sum of rank of Vitamin C.

For Iron and Vitamin C, the probability of not exceeding 2,373 is .301. Since this is greater than .05, accept H_o that they are from the same population.

Nutrients Compared	Positive Rank Sum	Absolute Value Negative Rank Sum	Minimum (+, -) Standardized	Probability of Not Exceeding Minimum Rank Sum if Hypothesis of Identical Population is True	Number of Zero Differences
Iron-Vitamin C	2677.0	2373.0	- .523	.301	20
Iron-Protein	2516.0	2534.0	- .031	.488	19
Iron-Vitamin A	2285.0	2765.0	- .825	.205	21
Iron-Calcium	1555.0	3495.0	-3.335	.000	23
Iron-Vitamin B_1	1888.0	3162.0	-2.190	.014	19
Iron-Vitamin D	1594.0	3456.0	-3.201	.001	23
Vitamin C-Protein	2694.0	2356.0	- .581	.281	20
Vitamin C-Vitamin A	2588.0	2462.0	- .217	.414	24
Vitamin C-Calcium	1863.0	3187.0	-2.276	.011	23
Vitamin C-Vitamin B_1	2035.0	3015.0	-1.685	.046	22
Vitamin C-Vitamin D	1263.0	3787.0	-4.339	.000	27
Vitamin C-Vitamin B_2	1769.0	3281.0	-2.599	.005	20
Vitamin C-Carbohydrates	1627.0	3423.0	-3.088	.001	20
Protein-Vitamin A	2359.0	2691.0	- .571	.284	23
Protein-Calcium	1923.0	3127.0	-2.070	.019	25

Nutrients Compared	Positive Rank Sum	Absolute Value Negative Rank Sum	Minimum (+, -) Standardized	Probability of Not Exceeding Minimum Rank Sum if Hypothesis of Identical Population is True	Number of Zero Differences
Protein-Vitamin B_1	2010.0	3040.0	-1.771	.038	21
Protein-Vitamin D	1787.0	3263.0	-2.537	.006	23
Protein-Vitamin B_2	1760.0	3290.0	-2.630	.004	21
Protein-Carbohydrates	1315.0	3735.0	-4.160	.000	34
Vitamin A-Calcium	2334.0	2716.0	- .657	.256	24
Vitamin A-Vitamin B_1	2152.0	2898.0	-1.282	.100	29
Vitamin A-Vitamin D	1825.0	3225.0	-2.407	.008	32
Vitamin A-Vitamin B_2	1944.0	3106.0	-1.998	.023	27
Vitamin A-Carbohydrates	1934.0	3116.0	-2.032	.021	28
Calcium-Vitamin B_1	2661.0	2389.0	- .468	.320	25
Calcium-Vitamin D	2327.0	2723.0	- .681	.248	23
Calcium-Vitamin B_2	2420.0	2630.0	- .361	.359	24
Calcium-Carbohydrates	2210.0	2840.0	-1.083	.139	32
Vitamin B_1-Vitamin D	2411.0	2639.0	- .392	.348	29

Nutrients Compared	Positive Rank Sum	Absolute Value Negative Rank Sum	Minimum (+, -) Standardized	Probability of Not Exceeding Minimum Rank Sum if Hypothesis of Identical Population is True	Number of Zero Differences
Vitamin B_1-Vitamin B_2	2144.0	2906.0	-1.310	.095	41
Vitamin B_1-Carbohydrates	2252.0	2798.0	- .939	.174	27
Vitamin D-Vitamin B_2	2811.0	2239.0	- .983	.163	29
Vitamin D-Carbohydrates	2592.0	2458.0	- .230	.409	33
Vitamin D-Vitamin E	1827.0	3223.0	-2.400	.008	49
Vitamin D-Niacin	2597.0	2453.0	- .248	.402	35
Vitamin B_2-Carbohydrates	2565.0	2485.0	- .138	.445	33
Vitamin B_2-Vitamin E	2074.0	2976.0	-1.551	.060	45
Vitamin B_2-Niacin	2161.0	2889.0	-1.252	.105	46
Carbohydrates-Vitamin E	2537.0	2523.0	- .007	.497	51
Carbohydrates-Niacin	2811.0	2239.0	- .983	.163	39

APPENDIX T

SUMMARY OF RESPONSES ABOUT NUTRIENTS WHICH THE BODY NEEDS TO FUNCTION PROPERLY

Question: Can you please give me the names of the nutrients which the body needs to function properly.

Number of respondents who answered question: 100

Response	Percentage of Respondents
Proteins	67
Carbohydrates	52
Minerals	46
Vitamins	42
Vitamin C	30
Vitamin A	27
Fats	24
Calcium	20
Iron	20
Vitamin D	20
Vitamin E	16
Vitamin B	16
Fruits	8
Vegetables	8
Vitamin B_1	8
Vitamin B_2	8
Water	8
Sugar	8
Meat	7
Milk	7
Vitamin B_{12}	7
Niacin	7
Well-balanced diet	7
Magnesium	6
Trace minerals	5
Phosphorus	4
Vitamin K	4

Response	Percentage of Respondents
Starches	4
Bread	3
Juice	3
Iodine	3
Sodium	3
Potassium	3
Eggs	2
Glucose	2
Sweets	2
Nuts	1
Honey	1
Sesame seed	1
Calories	1
Enzymes	1

APPENDIX U

SUMMARY OF RESPONSES ABOUT NUTRIENTS THAT SHOULD BE INCLUDED ON ALL FOOD LABELS

Question: Are there any nutrients that you feel should be included on all food labels.

Number of respondents who answered question: 34

Responses	Percentage
Vitamins	44
Protein	41
Fat	38
Calories	26
Carbohydrates	23
Minerals	20
Iron	11
Calcium	6
Phosphate	6
Vitamin C	6
Vitamin D	3
Iodine	3
Salt	3

APPENDIX V

CONSTRUCTION OF CONFIDENCE INTERVAL FOR THE PROPORTION OF UPPER INCOME CONSUMERS WITH NUTRITIONAL PROBLEMS

Confidence Interval

$$.21 \pm \sqrt{\bar{p}}\ (Z)$$

$$.21 \pm \sqrt{\frac{pq}{n}}\ (1.96)$$

$$.21 \pm \sqrt{\frac{.21 \times .79}{100}}\ (1.96)$$

$$.21 \pm .08$$

APPENDIX W

SUMMARY OF RESPONSES ABOUT NUTRITIONAL PROBLEMS

Question: Are there any nutritional problems concerning members of your family?

Number of respondents who answered question affirmatively: 21.

Responses	Percentage
Overweight	20
High cholesterol	14
High blood pressure	14
Diabetes	14
Peptic ulcer	14
Anemia	14
Allergy	5
Nervous condition	5

APPENDIX X

SUMMARY OF RESPONSES ABOUT NUTRIENTS REQUIRED BY THE BODY FOR EACH NUTRITIONAL CONCERN

For: Anemia

Number of respondents: 19

Responses	Percentage of 19
1. Iron	52
2. Protein	30
3. Meat	20
4. Minerals	15
5. Vitamins	5

The percentages are not cumulative since subjects could list more than one nutrient for each nutritional concern.

For: Heart Disease

Number of Respondents: 31

Responses	Percentage of 31
1. Reduce fat in diet	42
2. Eat a balanced diet	30
3. Reduce high cholesterol fats, like animal fats	23
4. Exercise	6
5. Reduce protein in diet	6

For: Mineral Deficiency

Number of Respondents: 10

Responses	Percentage of 10
1. Iron	40
2. Vitamins	30
3. Balanced diet	20
4. Liver once a week	10
5. Drink milk	10

For: Nutritional Ignorance

Number of Respondents: 21

Responses	Percentage of 21
1. Study about proper nutrition	34
2. Take vitamin pills	10
3. No bedtime snacks or eating between meals	5

For: Obesity

Number of Respondents: 47

Responses	Percentage of 47
1. Reduce fats in diet	36
2. Well-balanced diet	30
3. Increase intake of protein	29
4. Reduce carbohydrates in diet	21
5. Reduce sweets in diet	21
6. Adjust intake of calories to body requirements	6

For: Poor Quality Protein

Number of Respondents: 18

Responses	Percentage of 18
1. Add protein to diet, like meat	55
2. Buy Grade A food	5
3. Increase intake of cottage cheese and fish	5

For: Unbalanced diet

Number of Respondents: 56

Responses	Percentage of 56
1. Well-balanced diet	52
2. Increase intake of protein	35
3. Increase intake of vitamins	35
4. Increase intake of minerals	11
5. Increase intake of carbohydrates	8
6. Reduce intake of sweets	8

For: Vitamin Deficiency

Number of Respondents: 37

Responses	Percentage of 37
1. Well-balanced diet	30
2. Increase intake of vitamin C	20
3. Increase intake of vitamin A	16
4. Increase intake of vitamin B	8
5. Increase intake of vitamin D	8
6. Take vitamin pills	8
7. Decrease intake of carbohydrates	3
8. Increase intake of calcium	3

For: Other Nutritional Concerns

Number of Respondents: 10

Nutritional Concerns	Percentage
1. Infections	10
2. Calcium deficiency	10
3. Acne	10
4. Diabetes	50
5. Weight control	10
6. Allergic to eggs	10

APPENDIX Y

CONSTRUCTION OF CONFIDENCE INTERVAL FOR PROPORTION OF UPPER INCOME FAMILIES USING VITAMIN AND MINERAL SUPPLEMENT

$$p \pm \sqrt{\bar{p}} \quad (Z)$$

$$p = .89$$

$$n = 100$$

therefore:

$$.89 \pm \sqrt{\bar{p}} \quad (Z)$$

$$.89 \pm \sqrt{\frac{pq}{n}} \quad (1.96)$$

$$.89 \pm \sqrt{\frac{.89 \times .11}{100}} \quad (1.96)$$

$$.89 \pm .06$$

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