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Relationships among nutrition attitudes, knowledge, and food purchasing practices of parents

by

Margaret Janet McKenzie Kelly

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of the Requirements for the Degree of DOCTOR OF PHILOSOPHY

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INTRODUCTION

Improving the nutritional status of Americans is a major goal shared by nutrition educators and governmental officials. Richmond (1980, p. 91) stated:

"... one of our key strategies for protecting and promoting health is improved nutrition. By good nutrition ... I am talking about our obligation to help people make food choices that will reduce the risk of heart disease, stroke, cancer, and diabetes--leading causes of death in this country."

Divine (1980, p. 138) pointed out that:

"... the rising costs of growing, transporting, processing, and preparing food has made it essential that consumers be provided with the knowledge and motivation to make informed decisions in a changing market place."

The literature suggests that nutrition education can play an important role in improving the nutritional status of individuals (Richmond, 1980; Caliendo and Sanjur, 1978). Peterson (1980, p. 92) defined nutrition education as "the sum total of the experience, knowledge, and skill possessed by the individual and the family and used to translate health concerns into the act of buying and consuming food."

Concomitantly, Divine (1980) delineated four goals of nutrition education:

1. to create positive attitudes toward good nutrition and to provide the motivation for improved dietary practices conducive to promoting and maintaining the best attainable level of wellness for an individual,
2. to provide adequate knowledge and skills necessary for critical thinking regarding diet and health so that the individual can make appropriate food choices from an increasingly complex food supply,

3. to assist the individual in identifying resources for continuing assessment to sound food and nutrition information, and

4. to coordinate knowledgeable professionals, informed citizenry, and a well-versed body of policy makers so that appropriate policies and programs will continue, good nutrition will be practiced, and support for food and nutrition research will exist.

While nutrition education is needed by all segments of our population, regardless of income, location, cultural, social, level of education, or economic practices (American Dietetic Association, 1978), nutrition educators are beginning to recognize the importance of reaching parents of preschool children with useful nutrition information (Gillespie, 1978; Smith & Justice, 1979; Eppright, Fox, Fryer, Lamkin, & Vivian, 1970). Four reasons for reaching this target audience are: (1) parents have been found to exert the strongest influence on dietary practices established by young children, (2) dietary practices established during the early years of life influence, to a large degree, lifetime eating habits, (3) good nutrition is essential for mental and physical growth and development, and (4) young families have greater potential for change in food behavior than other families in other stages of the life cycle because they are already in the process of adjusting their food patterns due to addition of children to the family (Public Law 95-166, 1977; Smith &
Efforts to reach more parents and children with relevant nutrition education have been advanced with the passage of Public Law 95-155, the National School Lunch Act. This law provided funds for assessing the nutrition education needs of school age children and their parents, and developing nutrition education programs to address these needs.

While nutrition education can be an effective strategy to use in improving the nutritional status of individuals, many researchers maintain that a cognitive orientation focused on the acquisition of nutrition knowledge has usually occupied a central place in nutrition education programs (Yetley & Roderuck, 1980; Ullrich, 1979; Sims, 1978). This orientation has been based on the assumption that those who know the basic concepts and principles of food and nutrition will apply this knowledge when making food choices.

Several investigators have studied the relationship between nutrition knowledge and food practices, however, contradictory findings have been reported. Young, Berresford, and Waldner (1956) found that the adequacy of the food used by homemakers appeared to be related to nutrition knowledge. Likewise, Al-Isi, Kanawati, and McLaren (1975) reported that mothers had deficient nutrition knowledge and poor feeding practices. Phillips, Bass, and Yetley (1978) also found that nutrition knowledge was associated with the percentage of
presweetened cereals the mother purchased. In contrast, Emmons and Hayes (1973) found that nutrition practices of homemakers seemed much better than nutrition knowledge. Walker (1975) also reported that while the homemakers exhibited a fair knowledge of nutrition, they had limited facility to select nutritious meals for their family. Phillips, Bass, and Yetley (1978) also concluded that homemakers do not use their nutrition knowledge when selecting food for their family.

The realization that knowledge of nutrition may not, in fact, be applied to food practices has been of recent concern (Poolton, 1972). Consequently, nutrition educators are increasingly recognizing that other factors, such as attitudes and beliefs, also may influence food practices.

Regarding the relationships among nutrition attitudes, knowledge, and food practices, conflicting findings have been reported. Some researchers have discovered that while attitudes and knowledge were significantly and positively related, knowledge had a stronger association with food practices than attitudes (Eppright et al., 1970; Sims, 1978). Contrary to these findings, other investigators have found that nutrition attitudes were more strongly related to practices than knowledge (Fusillo & Beloian, 1977; Byrd-Bredbenner, 1980). Schwartz (1975) found that nutrition attitudes and food practices were significantly related,
but there was no significant relationship between knowledge and practices.

To be more successful in designing nutrition education programs to effect positive changes in nutrition attitudes, knowledge, and food purchasing practices, it is important to understand how these variables are related, and to identify factors which influence them. Therefore, the present study was designed to accomplish the following objectives:

1. develop a valid nutrition questionnaire for parents,
2. identify certain nutrition attitudes of parents,
3. assess the nutrition knowledge of parents,
4. determine some food purchasing practices of parents,
5. compare parents' nutrition attitudes, knowledge, and food purchasing practices by selected demographic characteristics, and
6. examine relationships between demographic variables, nutrition attitudes, knowledge, and food purchasing practices.
Definition of Terms

The following definitions were included to add clarity to the discussion of this study:

1. Food and nutrition attitudes - organized and consistent ways of thinking, feeling, and reacting toward food and nutrition (Lambert, 1973).

2. Food and nutrition knowledge - comprehension of basic principles and concepts as measured through the administration of a valid test (Schwartz, 1975).

3. Food purchasing practices - actual activities performed when planning and making food purchases.

4. Parents - mothers and fathers who have preschool children attending a day care center or family day care home.

5. Day care center - an institution that has specially trained people who work with preschool children; includes headstart programs, nursery schools, and preschools.

6. Family day care home - a place where a licensed person keeps a maximum of six preschool children.

The Iowa State University Committee on the Use of Human Subjects in Research reviewed this project and concluded that the rights and welfare of the human subjects were adequately protected, that risks were outweighed by the potential bene-
fits and expected value of the knowledge sought, that confidentiality of data was assured and that informed consent was obtained by appropriate procedures.

This study was funded by the Iowa State Department of Public Instruction, Child Nutrition Division.
REVIEW OF LITERATURE

The primary purpose of this study was to examine relationships among nutrition attitudes, knowledge, and food purchasing practices of parents. An understanding of the interrelationships previous investigators have found among and between these variables could yield useful information needed for designing the conceptual framework for the present study.

An extensive review of the literature revealed that few studies have explored the associations between nutrition attitudes, knowledge, and practices. Therefore, the studies reviewed in this chapter will be presented in three major sections:

1. Relationship between nutrition knowledge and nutritional practices,
2. Relationship between nutrition knowledge and attitudes, and
3. Relationships among nutrition knowledge, attitudes, and practices.

A summary will be presented after each major section and a conceptual model depicting the relationships cited in the review will conclude this chapter.
Relationship Between Nutrition Knowledge and Nutritional Practices

It is generally assumed that those who know basic concepts and principles of nutrition will apply this knowledge when making food choices. However, in 1969, the White House conference on Food, Nutrition, and Health emphasized the need for more information on what homemakers know about nutrition and what effect, if any, this knowledge has on actual practice.

Conflicting findings regarding the degree of the relationship between knowledge of nutrition and actual nutritional practices have provided impetus for several investigations to gain additional information to explain this relationship. The results of five such investigations that were conducted to examine the relationship between nutrition knowledge and food practices are reported in this section.

In a classic study conducted by Young, Berresford, and Waldner (1956), the associations between knowledge of nutrition and eating practices were explored. In this study, 646 homemakers reported qualitative information regarding food served to their family in the previous 24 hours; quantitative data relative to the amounts of key foods either purchased or served in the previous week; and demographic information such as age, previous study of "what to eat", and family income.
Data on feeding practices and apparent nutritional knowledge were related by comparing the practices of those with little or no nutritional knowledge with those who indicated fair knowledge. Descriptive statistics were used to analyze the data.

Major findings indicated that actual performance of the homemaker in feeding her family was considerably better than her theoretical knowledge of what to feed them. In addition, the differences between age groups with respect to feeding performance were not as great as with respect to nutritional knowledge, although the younger homemakers appeared to do a more adequate job of feeding her family than the older homemakers.

Of the factors under study, the level of educational attainment appeared to be the variable most consistently related to adequate performance in family feeding. The effect of income level was considerably less consistent and of smaller magnitude. Both qualitatively and quantitatively, those homemakers who reported having "studied about what to eat" had better feeding practices than those who had not. Based on these findings, the authors concluded that the adequacy of food used appear to relate to nutritional knowledge. In a similar investigation, Al-Isi, Kanawati, and McLaren (1975) examined the associations between formal education of 60 mothers and their nutritional knowledge,
nutritional practices, and the growth pattern of their children.

The mothers were divided into four groups according to years of schooling; (1) no schooling; (2) 1, 2, or 3 years; (3) 5 years; and (4) 7, 8, or 9 years. Nutritional knowledge and nutritional practices were collected by means of a nutrition test consisting of 50 "yes" or "no" questions and a questionnaire to assess dietary practices. Data were analyzed by means of descriptive statistics and Pearson product-moment correlation coefficients.

Principal results revealed that the majority of the mothers in all four groups scored poorly on the knowledge test and on the practice questionnaire. However, mothers in Group 4 differed significantly in knowledge and practices from the other three groups. The difference in knowledge was attributed to the fact that some nutrition instruction is given in the 8th grade, and the mothers with nine years of schooling are more able to think critically and abstractly. The authors concluded that overall, all of the mothers were very deficient in nutrition knowledge and had poor feeding practices.

Realizing that nutrition knowledge is of little value unless it is put into practice, Emmons and Hayes (1973) were motivated to seek additional information regarding the extent to which mothers applied their nutrition knowledge to dietary
practices. A sample of 486 mothers of preschool children provided information on family composition, family income, the occupation of the head of household, and the age and educational level of the mother. Data on nutrition knowledge were obtained by asking the mothers two questions: (1) What foods or types of foods do you try to include in your child's diet each day? (2) Why do you feel each of these foods should be included?

A 24-hour recall of the child's diet for the same day was also ascertained. This facilitated the determination of whether the mother served at home the food she listed as being important in her child's diet. Descriptive statistics were used to analyze the data.

Findings relevant to this study indicated that more mothers served foods from different food groups than reported the food group as being important in the child's diet. In other words, nutrition practices seemed on the whole, much better than nutrition knowledge might indicate.

In 1975, Walker interviewed 2,545 households which included 7,463 individuals, five years of age and older. Information obtained during the interviews included questions to determine the respondent's knowledge of food and nutrition, their opinions regarding selected practices of household members, the food consumed by each member of the household on a weekday and on one day of the weekend,
the frequency with which various categories of foods were served to the family, and demographic information.

A fair knowledge of food and nutrition was exhibited by all of the homemakers, however, they indicated limited facility in using this knowledge to select meals and snacks for a desirable daily food intake. These findings led the researchers to conclude that nutrition education is needed to help homemakers gain the needed facility in selecting foods for the home from the foods the family will eat in order to provide at least a desirable nutritional foundation.

In response to findings which suggest that mothers of preschool children do not consistently use their food and nutrition knowledge when selecting foods for their families, Phillips, Bass, and Yetley (1978) interviewed a self-selected sample of 30 upper middle-class mothers. The primary purpose of the investigation was to study the effect that food and nutrition knowledge of the mothers had on the use of presweetened cereals.

The mothers revealed their nutrition knowledge by taking a test designed to measure application of food and nutrition knowledge to food practices. The percentage of cereals in the home which were presweetened, years of formal education, age, and estimated annual family income were also determined for each mother.
The sample was divided into two subgroups; (1) families with children present who were older than the preschooler, and (2) families with no children present who were older than the preschooler. This enabled the researchers to study the influence that experience with older children had on the mother's application of her food and nutrition knowledge. Statistical procedures employed to analyze the data included t-tests and Pearson product-moment correlation coefficients.

While findings revealed no significant difference in the test scores received by the two groups, the apparent application of the mother's knowledge to food behavior was different.

In families where older children were present, the mother's food and nutrition knowledge was related positively to the mother's age, the family income, and the mother's educational level. In addition, nutrition knowledge was negatively associated with the percentage of presweetened cereals purchased for the family. Mothers having high food and nutrition knowledge test scores purchased a lower percentage of presweetened cereals. On the other hand, mothers who had limited knowledge about food and nutrition purchased a higher percentage of presweetened cereals. Thus it was postulated that an association between food and nutrition knowledge and presweetened cereal purchased does exist in families where children older than the preschool child are
present.

As for families where the preschool child was the oldest, nutrition knowledge was again associated with the mother's educational level. However, it was not associated with the purchase of presweetened cereals.

Based on their findings, the authors pointed out the need to consider family composition when designing nutrition education programs for mothers of preschool children.

Summary

The literature reviewed in this section reported contrasting results relative to the extent to which knowledge of food and nutrition and nutritional practices were related. Overall, the findings were similar regarding the association between nutrition knowledge and education level. Those respondents with higher educational levels revealed the greatest knowledge of nutrition.

In two of the studies cited, nutritional knowledge was viewed as being related to practices. According to Young et al. (1956), those homemakers who had studied about what to eat had better feeding practices than those who had not. Support for the association between knowledge and practices was also evidenced in the findings of Al-Isi et al. (1975) who reported that respondents were deficient in knowledge and had poor feeding practices.
The limits of nutrition knowledge in influencing nutritional practices was reported by Emmons and Hayes (1975) and Walker (1975). Both studies found that practices were much better than nutrition knowledge would indicate, thereby suggesting that factors other than nutrition knowledge were associated with food choices.

Phillips et al. (1978) presented findings to support both views regarding the association between nutrition knowledge and practices. In their study, knowledge and practices were related for mothers who had children older than the preschooler. Conversely, for mothers who did not have children older than the preschool child, nutrition knowledge and practices were not related.

Implicit in these findings is the fact that the circumstances and conditions surrounding the environment in which one plans, purchases, and prepares foods, influence the extent to which nutrition knowledge is applied to actual nutritional practices.

Relationship Between Nutrition Knowledge and Attitudes

It has been hypothesized that attitudes may be as important as demographic characteristics in the translation of nutrition knowledge into actual food consumption behavior. However, few studies were found which attempted to examine
the nature of this relationship. Consequently, only three studies will be reviewed in this section related to the association between nutrition knowledge and attitudes.

Sims (1976) assessed the nutrition knowledge of a self-selected sample of 163 mothers of preschool children as it related to the basic four food groups. Certain environmental factors, both demographic and attitudinal were also measured and their relationship to nutrition knowledge.

Personal interviews and mailed questionnaires were used to collect data on nutrition knowledge, attitudes, and demographic characteristics. Nutrition knowledge was measured using a test developed by Eppright and coworkers (1970). The test was composed of 23 true-false items dealing with factual information about nutrition. The total number of correct responses was used in subsequent statistical analyses as Nutrition Knowledge Test score. Each mother was also asked to name the foods thought to be necessary for her child every day. Specific responses were evaluated to determine whether the foods named and number of servings corresponded to those in the Four Food Groups Guide.

Respondents' attitudes about child rearing, feelings about family life, and their role as parents, were assessed from responses to items on four attitude scales; Nutrition Is Important, Equalitarianism, Parents Are All Wise, and Powerless. The extent of agreement or disagreement was
scored on a Likert-type format using a four-point continuum. Demographic information included education level, occupation, income, stage in life cycle, food dollars spent, and total persons in the home. Since parental years of schooling and occupational rating were highly correlated, these two variables were combined to form an education-occupation scale. Similarly, the education and occupation of the head of the household and the amount of family income scores were summed to form the socioeconomic status for each mother. The authors pointed out that the demographic variables were measurement of the family as a unit, while attitude and nutrition knowledge were measurements of the mother as a unit.

Pearson product-moment correlation coefficients were used to examine the relationship between nutrition knowledge and the demographic and attitudinal variables. Multiple regressions were conducted to determine those variables which were the best predictors of nutrition knowledge.

Major findings revealed that socioeconomic status and the occupation-education scale were highly and positively correlated with nutrition knowledge, and income was weakly associated. In addition, stage in the life cycle, food dollars spent, and total number of persons in the home were negatively related to nutrition knowledge.

In terms of the attitude variables, those mothers who
believed that Nutrition is important and ranked high in equalitarianism exhibited the most nutrition knowledge. Conversely, mothers who strongly agreed with the items in the Parents Are All Wise scale and believed themselves to be powerless knew less about nutrition.

As for those variables found to be predictors of nutrition knowledge, results of regression analyses indicated that Socioeconomic Status ($r = .53$) and the nutrition is Important attitude ($r = .53$) were the primary explanatory variables for variation in nutrition knowledge. Occupational and education levels were the most important predictors. Secondary explanatory variables were number of persons in the home, food dollars spent, and the parents are all wise attitude.

The authors stated that this study demonstrated the viability of using attitudinal measures as well as demographic data to characterize families and to provide further insight about the factors associated with nutrition knowledge.

Nutritional inadequacy is thought to be related to a discrepancy between availability of nutrition information and adoption of acceptable nutrition practices. To better understand those factors which may affect nutrition practices, Kreutz (1974) investigated specific elements associated with nutritional choice as they related to nutrition knowledge. The major objective of the study was two-fold: to develop attitudinal constructs from interview statements, and to
examine the relationship and associations of those attitudes with specific characteristics of homemakers and their knowledge of nutrition.

Data were gathered as part of the Expanded Nutrition Evaluation Study designed by the Institute for Family and Child Study and conducted by the Michigan Cooperative Extension Service. A purposive sample of 272 homemakers who were a part of the Expanded Nutrition Program provided usable data.

Psychological constructs were developed from operational definitions as suggested by the Rockeanean theory of central peripheral dimension as a cognitive structure. Factor analysis oblique multiple groups analysis, was used to develop four constructs: management, homemaker role, parent role, and attitude toward education. A fifth construct consisting of statements used to measure nutrition knowledge was adopted from the original nutrition interview questionnaire. Coefficient alphas of .75, .76, .82, .71, and .71 were attained.

Five hypotheses were tested by using simple correlation coefficient analysis, multivariate-univariate analysis of regression, and analysis of variance. Four of the hypotheses were relevant to this study.
1. There are no significant relationships among managerial control, satisfying homemaker role, nonauthoritarian parent role, positive attitude toward education, education, age, amount of monthly income, number of children, size of financial sources received, residence, and ethnic background of homemakers to nutrition knowledge.

The overall null hypothesis was rejected at the .01 significance level. Positively correlated relationships existed between nonauthoritarian parent role, satisfying homemaker role, positive attitude toward education, managerial control, educational attainment and residence. Negatively correlated relationships were found between ethnic background and younger homemakers with higher level nutrition knowledge.

2. There are no predictable criteria of variation in nutrition knowledge from specific measures of homemaker attitudes.

The overall objective was rejected. Significant associations were found between an increase in nutrition knowledge scores for each cumulative degree in managerial control; between an increase in nutrition knowledge score for each cumulative degree in satisfying homemaker role; between an increase in nutrition knowledge score for each cumulative degree in nonauthoritarian parent role; and between an increase in nutrition knowledge score for each cumulative degree of positive attitude toward education.
3. There are no predictor criteria of variation in attitudes and nutrition knowledge from specific measures of homemaker characteristics.

The overall null hypothesis was rejected. Two significant associations were found for education. With each additional year of education, there were predictable associations between attitudes of managerial control, satisfying homemaker role, nonauthoritarian parent role, positive attitude toward education, and homemaker's knowledge of nutrition score.

4. There are no predictable differences between urban homemakers and rural homemakers in managerial control, satisfying homemaker role, positive attitude toward education and their knowledge of nutrition.

The overall null hypothesis was rejected. There were significant differences between nonauthoritarian parent role and nutrition knowledge score for rural nonfarm homemakers. The author maintained that the findings made a plea for precision in measurement for recognition of the role that attitudes can play in both acquisition of knowledge and use of knowledge for bringing about change.

Additional support for the hypothesis that attitudes can exert a consistent influence on the extent to which nutrition knowledge is used was offered by Penland (1976). In this study, an attempt was made to explain the relationship of nutrition knowledge and attitudes to nutrition education sources and demographic and personal characteristics.
The data producing sample consisted of 321 postpartum patients at the Ohio State University Hospital and St. Ann's Hospital. Nutrition knowledge and attitudes were measured using a questionnaire adapted from instruments used in previous studies. The nutrition knowledge section of the questionnaire consisted of a 45 true-false item test developed by Jack D. Osman. Attitudes relative to eating a balanced diet were determined by using a 20 item equal interval scale, which was a modified form of an instrument designed by Raymond J. Vincent. The estimated reliabilities, as determined by the Kuder Richardson 20, were .90 for the knowledge test and .73 for the attitude scale. Demographic characteristics obtained on each participant included age, education level, marital status, socioeconomic status, nutrition education received, and race. The questionnaires were self administered during the time the patients were hospitalized.

Nine hypotheses were tested to search for (1) significant differences in nutrition knowledge and attitude scores according to socioeconomic status (SES) and type of nutrition education, (2) significant relationships between nutrition attitudes and knowledge and predictor demographic and personal characteristics, and (3) a significant relationship between nutrition knowledge and nutrition attitudes.
Analysis of variance, correlational analyses, and multiple regression analyses were the major statistical techniques applied to the data.

Results of analysis of variance showed that mean scores for nutrition knowledge and attitudes of the three SES groups were significantly different from each other. However, there was no significant difference in nutrition knowledge or nutrition attitudes according to the most important type of nutrition education within the total group or within the three SES groups. Socioeconomic status and education level were the two variables generally most highly correlated with both nutrition knowledge and nutrition attitudes. Nutrition knowledge and nutrition attitudes were positively correlated, with a coefficient of .346. The variable which accounted for the largest amount of variance in nutrition knowledge was socioeconomic status, nearly 40 percent. Education level assumed the predominant role in variance for nutrition attitudes, slightly more than 11 percent.

In general, Penland found that previous nutrition education experiences of the sample seemed to have had little specific relationship to nutrition knowledge or nutrition attitudes. She suggested that further studies be conducted on this and other populations to examine the nature of the relationship and effect of nutrition education to nutrition knowledge and attitudes.
Summary

Commonality among the major findings discussed in the three studies provided support for the supposition that nutrition knowledge and attitudes are related. In general, those who exhibited more nutrition knowledge also had more favorable attitudes.

As for those demographic variables found to be associated with nutrition knowledge, all three studies reported that education level and occupation were the two variables most positively and highly correlated. In addition, Sims (1976) found that income was positively, but weakly, related to nutrition knowledge; and stage in the family life cycle, food dollars spent, and total number in the household were negatively associated with nutrition knowledge.

With respect to attitudes, Kreutz (1974) reported that education level and residence were positively related to attitudes; and age and ethnic background were negatively related to attitudes. Penland (1976) found that socioeconomic status and education level were highly correlated with nutrition attitudes, and found no relationship between nutrition education and nutrition attitudes, and nutrition education and nutrition knowledge.

On the basis of the findings reported in the studies reviewed for this section, the need for nutrition education programs to focus on ways of promoting more favorable
attitudes toward nutrition, in addition to increasing nutrition knowledge, cannot be overemphasized.

Relationships Among Nutrition Attitudes, Knowledge, and Practices

Basic challenges facing nutrition educators are the identification of factors which influence food consumption practices and modification of those which contribute to less than adequate nutrient intakes. In the past, educators have focused on teaching nutrition concepts and principles on the assumption that a greater knowledge would result in improved intake of essential nutrients. However, increasingly, nutrition educators are realizing the limits of knowledge in affecting food choices. Other endogenous factors, such as attitudes and beliefs, may also exert considerable influence on practices.

Two models were presented in the literature to illustrate the nature of the association among nutrition attitudes, knowledge, and practices.

Model 1. \( K \rightarrow A \rightarrow P \)

Model 2. \( A \rightarrow K \rightarrow P \)

The first model suggests that knowledge and attitudes are directly related, attitudes and practices are directly related, but knowledge and practices are indirectly related,
thus, attitudes mediate knowledge and practices. The second model also denotes a direct relationship between attitudes and knowledge, but suggests a direct relationship between knowledge and practices, and an indirect relationship between attitudes and practices. Thus, knowledge mediates attitudes and practices.

In an attempt to gather information to support the relationships demonstrated in the above models, five studies will be reviewed in this section.

In a landmark North Central Regional study of diets of preschool children, Eppright et al. (1970) interviewed 2,000 mothers of preschool children regarding the eating behavior of their children and certain family characteristics.

Trained interviewers administered tests and scales designed to indicate nutrition knowledge and attitudes toward (1) meal planning, (2) food preparation, (3) nutrition, and (4) permissiveness in feeding children. The instruments were prepared at Iowa State University. The nutrition test consisted of 35 highly intercorrelated test items. Answers included "true," "false," or "don't know." Provisions were made for indicating one of five degrees of certainty for the response. The scales for the attitudes were similarly developed, except that the statements for them were derived from interviews and open-end questionnaires. Possible responses were "agree" or "disagree" and "favorable" or
"unfavorable," with the degree of certainty indicated. The final scale was comprised of the most highly correlated items. For dietary quality, mothers were asked to record a three-day food intake for her child. Demographic information obtained on each mother included educational level, income, amount of money spent on food, and number in the household.

Simple linear correlations revealed that the mothers' knowledge of nutrition was highly and positively correlated with attitudes toward nutrition. Knowledge scores were also positively related to attitudes toward meal planning and, to a lesser degree, with attitudes toward food preparation. Permissiveness was significantly, but negatively, correlated with attitudes toward nutrition, nutrition knowledge, and attitude toward food preparation, respectively. All inter-correlations among nutrition knowledge, attitudes toward meal planning, food preparation, and nutrition were positive and significant at the 1 percent level.

Regarding the relationship of nutrition knowledge and attitudes to dietary quality, results showed some tendency for the overall diet quality to improve when mothers had more nutrition knowledge and certain favorable attitudes toward child feeding. However, attitude toward nutrition had little relationship to the nutrient content of food eaten, whereas attitudes toward meal planning and food
preparation were as significantly related to nutritive quality of the food as was knowledge of nutrition.

Additional findings revealed that amount of money spent for food was more highly correlated with energy and nutrient content of the diet than were family income, number in the household, or education of the mother. Income was significantly related to nutrition knowledge, attitudes toward meal planning, and toward nutrition, but not attitudes toward food preparation or permissiveness in child feeding. The larger the household, the less the mother knew about nutrition and the more favorable were attitudes toward meal planning and nutrition. The more educated the mother, the greater was nutrition knowledge and the more favorable were attitudes toward nutrition and meal planning, but not toward food preparation. Also, the more educated the mother, the less permissive were attitudes toward child feeding.

On the basis of their findings, the authors stated that nutrition education must focus not only on nutrition facts but also on their application under various conditions. Moreover, they recommended that increased efforts in nutrition education be exerted for mothers of preschool children living in large cities, with large families, with low food budgets, and who are poorly educated.

To provide a basis for adult education program development, Davis (1981) explored the relation between the estimated
quality intake of women and their knowledge of nutrition concepts, attitude toward nutrition, food preferences, and perception of personal control of dietary intake.

A random sample size of 34 from three populations provided data in interview or conference situations. The three samples were Home Economics Extension Advisors, paraprofessionals in the Expanded Nutrition Program of the Illinois Cooperative Extension Service, and Homemakers eligible for this program. Two 24-hour food recalls were used to measure the estimated quality of dietary intake, and original instruments were constructed to measure the other variables.

Findings relevant to this study indicated that homemakers had the poorest diets of the three groups. Nutrition knowledge and dietary quality were positively related even though both factors were relatively low within these samples. Correlation coefficients, significant at the one and five percent level were found among Advisor and Program Assistant scores. Food preferences were significantly related to nutritional quality of diets in all groups, at the one percent level among homemakers, and at the five percent level among advisors and Program Assistants. Knowledge and attitude toward nutrition were significantly correlated at the one percent level and five percent level for Homemakers and Program Assistants. Attitudes toward nutrition were generally favorable, with those of Homemakers most favorable.
Since all three groups exhibited limited nutrition knowledge, the author concluded that additional nutrition knowledge is needed in all three groups.

In 1977, Fusillo and Beloian administered, through personal interviews, questionnaires to a national sample of 1,664 U.S. adult respondents who did at least one-half of the food shopping for their household. A national area probability sampling technique was employed to select the households. People 50 years old and over were sampled at half the rate at which they would naturally occur, thus increasing the base size of younger homemakers. Men were over sampled in order to provide a sufficient number for analysis. This survey was the second phase of a longitudinal study conducted for F.D.A.

For knowledge about nutrition, shoppers were queried in the following five areas: (1) how easy or difficult it is to get nutrients from foods eaten, (2) whether or not the nutrients are stored in the body or have to be eaten each day, (3) what foods contain certain nutrients, (4) what benefits certain foods have for the body, and (5) what foods can be substituted for one another. Shopper's beliefs about the nutritive value of foods, snacks, nutrition, and food buying was also obtained. Shopping behavior was determined on the bases of the shoppers' responses to several practices related to planning and making food purchases, such as making a
shopping list, reading labels, and looking at dates on food products.

Principal results showed that the majority of shoppers lacked knowledge about accessibility, food sources, and storage of iron, thiamin, riboflavin, vitamin A and D, calcium, and carbohydrate. Fat, vitamin C, and protein were better known. Education level had a strong association with low nutrition knowledge. Those with low nutrition knowledge tended to be older rather than younger and to be men rather than women.

Cross tabulation results revealed that nutrition knowledge was positively and rather strongly associated with food beliefs. Food beliefs and careful shopping were also strongly and positively related. As for knowledge and shopping behavior, the association was again positive, but knowledge had a weaker association with careful food shopping than it did with food beliefs. Examination of the relationships among the three variables revealed that the positive association between nutrition knowledge and careful shopping endured even when the food beliefs index was introduced as an intervening variable.

The authors concluded that while persons with varying backgrounds were in need of nutrition education, the high risk groups which tended to have the poorest nutritional knowledge were the lower socioeconomic and older age group.
Realization of the possibility that knowledge of cognitive material may not be applied to dietary practices, prompted Sims (1978) to investigate the relationships among nutritional knowledge, attitudes, and beliefs about nutrition, and demographic characteristics of 61 lactating women whose mean age was 28 years.

Nutritional knowledge and attitude data were collected by means of a questionnaire. Dietary data were obtained from three one-day food records, on which participants recorded all foods, beverages, and supplements consumed, a description of each, and the quantities eaten. Nutrient data from the three-day food recall were subjected to factor analysis. As a result, four group indexes were formulated: protein, energy, dairy, and ascorbic acid. These four group indexes represented the nutrient intake variables. The nutritional knowledge section of the questionnaire consisted of 20 true-false and multiple choice items on general nutrition information. Respondents expressed their attitudes about nutrition and diet related matters by using a five-point Likert scale, ranging from "strongly agree" (scored as 5) to "strongly disagree" (scored as 1). The attitude items were subsumed under four scales: (1) nutrition is important, (2) vitamin supplements are necessary, (3) meal planning is important, and (4) meal preparation is enjoyable. The instruments used in this study were used by other researchers in
previous studies. Statistical procedures used to analyze the data included factor analysis, reliability calculation to determine construct validity and reliability of scales; Pearson product-moment correlation coefficient to determine relationships between continuous variables; Chi square statistic to evaluate relationships between categorical variables, one-way analysis of variance to determine the relationships between a continuous and a categorical variable; and subprogram regression to determine path coefficients.

Major findings indicated that as a group, the respondents were fairly knowledgeable about nutrition. The number of years of education was the variable most strongly related to performance on the nutritional knowledge test. Education was inversely related to the attitude that vitamin supplements are necessary, but none of the other demographic characteristics were significantly related to knowledge, attitudes, or practices. The nutritional knowledge score correlated positively with each dietary factor. The nutrition is important attitude was related positively to the protein group index only. None of the other attitudes were significantly related to any of the dietary factors. Results of path analysis showed that attitudes led to knowledge and knowledge to nutrient intake. The betas were significant at the .05 confidence level.

Sims (1978) stated that the research suggests that nu-
trition education programs should adopt as a primary goal, that of instilling positive attitudes about nutrition and demonstrating to learners that nutrition is important.

To answer the question of whether nutrition education in high school has a lasting effect in instilling sound dietary habits in students, Schwartz (1975) measured the nutritional knowledge, attitudes, and practices of high school graduates. The objectives of the study were to: (1) assess the effectiveness of a state high school nutrition education program, (2) contribute to present information derived from nutrition surveys, and (3) apply a knowledge-attitudes-practices model to determine the nature of the relationship of nutritional knowledge to attitudes and practices and the interrelationship of knowledge and attitudes with practices among the subjects in the study.

Through mailed questionnaires, 1,000 randomly sampled graduates were invited to participate in the study. As a result, 313 respondents (31.3 percent) provided usable data. Of the 313, 171 had been enrolled in home economics courses, including food and nutrition, in high school, while 142 graduates had not taken such courses.

Three instruments were used to collect the data. Knowledge of nutrition was assessed by means of a test consisting of 30 true-false items related to general nutritional concepts, food composition, misconceptions about food, and
the application of basic nutrition principles. A test consisting of 30 statements reflecting attitudes toward nutrition and eating habits, meal planning, and food preparation, was used to ascertain attitudes toward nutrition. Both tests were adapted from those used in previous studies. To determine dietary intake, the frequency of intake during a three-day period, of foods in 17 good groups as compared with the Basic Four patterns, was obtained on all participants. Each of the four food groups were assigned a maximum possible score of six points from any combination of foods within each of the four general groups. A total score for nutritional practices was computed by summing the scores obtained for the four food groups.

Results of statistical analyses revealed that there was no significant difference in the mean scores for nutrition knowledge, attitudes, or practices, although those who had taken home economics courses achieved higher mean scores. In general, all 313 women indicated a relatively high knowledge of nutritional concepts.

With respect to associations among the three variables, significant correlation coefficients were found between nutrition knowledge and attitudes, and between nutritional attitudes and practices. The correlation between nutritional knowledge and practices was nonsignificant. Based on these findings, Schwartz accepted the knowledge-attitudes-practices
model.

As a general conclusion, Schwartz maintained that young women did not apply their knowledge of nutrition in their choice of food, as there was no significant correlation between nutritional knowledge and practices.

Byrd-Bredbenner (1980) investigated the interrelationships of nutrition knowledge, attitudes toward nutrition, dietary behavior, and commitment to the concern for nutrition education. A second aim of her study was to determine if varying amounts of nutrition education at the baccalaureate level caused a significant difference in attitudes toward nutrition, dietary behavior, and commitment to the concern for nutrition education.

The population for this study consisted of alumni from The Pennsylvania State University who earned the baccalaureate degree from winter term, 1968, until fall term, 1978. Graduates from the fields of nutrition, home economics education, nursing, elementary education, and health and physical education were five of the groups surveyed. The sixth group was comprised of graduates from any other field of study. Three hundred individuals were randomly selected from each of the six groups for a total sample of 1,800 graduates. Data were collected by means of a structured questionnaire which included an information sheet, a nutrition knowledge test, instructions for dietary recall, a
nutrition attitude scale and a scale to measure commitment to the concern for nutrition education. Each graduate was mailed a questionnaire to which 578 responded. All returns were usable.

Tukey's Wholly Significant Difference Test indicated that nutritionists achieved significantly higher mean scores on the nutrition knowledge test and attitude scale than all other groups. Similarly, home economists scored significantly higher mean scores on the nutrition knowledge test and attitude scale than all other groups except nutritionists.

The mean attitude score for elementary educators was significantly higher than the score of college graduates in general, health and physical educators, and nurses. However, elementary educators scored significantly lower on the nutrition knowledge test than any other group. In addition, elementary educators had the lowest mean commitment score.

Nutritionists and home economists had significantly higher scores on the commitment scale than all groups except health and physical educators. Health and physical educators scored significantly higher than college graduates in general and elementary educators, but their scores were not different from nurses. Home economists, nutritionists, and health and physical educators had similar mean commitment scores, perhaps reflecting their common responsibility to teach
nutrition.

Analysis of variance further indicated the following:
(1) Females achieved significantly higher scores on measures of nutrition knowledge, attitudes, and commitment, but males scored significantly higher than females on dietary behavior; (2) Graduates who had enrolled in secondary home economics classes scored significantly higher on knowledge and attitudes than those who had no home economics at the secondary level; (3) Graduates who had enrolled in college-level courses scored significantly higher on nutrition knowledge than graduates not having this instruction; and (4) No significant differences on any measure were associated with enrollment in postbaccalaureate education.

In an analysis of the graduates, highly significant correlation coefficients were found between nutrition attitudes and knowledge, attitudes and commitment, and between nutrition knowledge and commitment. The correlation between nutrition attitudes and behavior was also significant. Significant correlations were found between the number of years of home economics taken and three dependent variables; attitudes, knowledge, and commitment. Additionally, a significant correlation was found between college background in nutrition and commitment and college background in nutrition and attitudes.

A stepwise regression analysis was conducted to deter-
mine the variables that significantly contributed to the prediction of the dependent variables. Nutrition attitude scores accounted for a significant proportion of the variation for all other dependent variables (dietary behavior score, commitment score, nutrition knowledge test score). In all of the regression analyses, whether with dietary behavior, commitment, or nutrition knowledge as the dependent variable, nutrition attitude scores explained the most variation.

Summary

Both similarities and differences were found among the studies reviewed in this section. All six studies reported findings to support the hypothesis that nutrition attitudes and knowledge are positively and strongly related. In addition, all studies treated practices as a dependent variable which are influenced, to varying degrees, by attitudes, knowledge, and selected demographic characteristics. Similarly, of the demographic variables under study, most of the studies found education level to be the variable most highly and positively related to nutrition attitudes, knowledge, and practices.

Major differences were observed regarding the nature of the associations among nutrition attitudes, knowledge, and practices. Moreover, except for education level, a disparity was noted in the degree to which the same demo-
graphic variables were related to nutrition attitudes, knowledge, and practices.

Major differences were observed regarding the nature of the associations among nutrition attitudes, knowledge, and practices. Moreover, except for education level, a disparity was noted in the degree to which the same demographic variables were related to nutrition attitudes, knowledge, and practices.

Based on their findings, Eppehert and coworkers (1970) concluded that knowledge was more directly related to dietary quality than nutrition attitudes. Therefore, the attitudes-knowledge-practices model appeared to fit their results. Since nutrition knowledge score correlated positively with each dietary factor and nutrition attitudes only correlated with one, Sims (1978) stated that her findings supported the attitudes-knowledge-practices model. The results of Davis' (1981) study also appear to support this model since she only reported a positive relationship between nutrition knowledge and dietary quality and did not address the relationship between attitudes and practice.

In contrast to the findings reported above, Schwartz (1975) found no significant relationship between knowledge and practices, but a strong association between attitudes and practices. Similarly, Fusillo and Beloian (1977) who found that while both nutrition knowledge and beliefs were positively
correlated with shopping behavior, food beliefs had the stronger association. The findings of these two studies substantiate the knowledge-attitude-practice model. Byrd-Bredbenner (1980) also discovered that, compared to the other variables, attitudes toward nutrition explained the largest amount of variation in dietary quality. Therefore, one can conclude that the findings of these three studies provide evidence to support the knowledge-attitude-practices model.

As evidenced in the previous discussions, conflicting results have been found regarding the nature of the relationships among nutrition knowledge, attitudes, and practices. This difference among findings could be attributed to the fact that each study used a different sample with different personal characteristics; varying amounts and kinds of information were collected on each sample; the statistical techniques applied to the data were somewhat different; and the instruments used to assess attitudes, knowledge, and practices were not the same for all of the studies.

Rationale for Conceptual Model

Throughout the review of literature, conflicting findings were reported regarding the nature of the association among nutrition attitudes, knowledge, and practices. Therefore, since no consensus was reached on the nature of the relationship between attitudes, knowledge, and practices,
for the conceptual model, nutrition attitudes and knowledge will be viewed as being related variables which interact to influence food purchasing practices.

As for the relationship of demographic variables to attitudes, knowledge, and practices, the following associations were cited in the review.

1. Variables related to nutrition attitudes; education level, occupation, and nutrition education.

2. Variables related to nutrition knowledge; education level, occupation, nutrition education, sex, age, residence, food dollars spent, and number in household.

3. Variables related to food purchasing practices; nutrition education, education level, amount of money spent on food, and number in the household.

On the basis of the relationships among nutrition attitudes, knowledge, and practices cited in the review of literature, the conceptual model presented in Figure 1 was designed. This model will be tested in the present study.
Figure 1. Conceptual model of relationships among variables
METHODS OF PROCEDURE

This chapter delineates the purposes of the study, assumptions, limitations, and the hypotheses to be tested. In addition, the procedures employed during the selection of the sample, development of the instrument, collection of the data, and analysis of the data, will be discussed.

Purposes of the Study

The primary purpose of this study was to examine the relationships among the nutrition attitudes, knowledge, and food purchasing practices of parents. More specifically, this study endeavored to accomplish the following objectives:

1. develop a valid nutrition questionnaire for parents,
2. identify certain attitudes parents have toward nutrition,
3. assess parents' knowledge of nutrition,
4. determine some selected food purchasing practices of parents,
5. compare parents' nutrition attitudes, knowledge, and food purchasing practices by sex, age, education level, family size, residence, occupation, nutrition training, money spent on food eaten at home, and money spent on food eaten outside the home monthly, and
6. determine relationships among nutrition attitudes, knowledge, and food purchasing practices.
Assumptions

This study was conducted under the following assumptions:

1. The nutrition questionnaire will be a valid measure of food and nutrition concepts.

2. The questionnaire will be appropriate for parents of preschool children.

3. Respondents will interpret the questionnaire items correctly.

4. Respondents will respond to the questionnaire honestly.

5. Both mothers and fathers will complete a questionnaire.

Limitations

The following limitations were set for this study:

1. Content areas in which questionnaire items were written are limited to basic food groups, calories, day care center meals, food buying, food sources, and nutrients.

2. Results of this study can only be generalized to parents who have children attending a day care center and family day care home.

Hypotheses to be Tested

The following hypotheses were tested in this study:

1. There are no significant differences in parents' nutrition attitudes by sex, age, education level, family size, residence, occupation, nutrition training, money spent on food eaten at home, and outside the home monthly.
2. There are no significant differences in parents' nutrition knowledge by sex, age, education level, family size, residence, occupation, nutrition training, money spent on food eaten at home, and outside the home monthly.

3. There are no significant differences in parents' food purchasing practices by sex, age, education level, family size, residence, occupation, nutrition training, money spent on food eaten at home, and outside the home monthly.

4. There will be no significant relationships among parents' nutrition attitudes, knowledge, and food purchasing practices.

Selection of the Sample

The target population for this study was parents who had preschool children attending a day care center or family day care home in Iowa.

To reach a representative sample of parents from this population, three lists containing all day care centers and family day care home operating within the state of Iowa were obtained from the Child Nutrition Division of the Iowa Department of Public Instruction. The first list contained all the day care centers that were receiving school lunch funds from the Department of Public Instruction. The second list consisted of all day care centers that were receiving funds from the Department of Social Services. The third list was comprised of all family day care homes that were receiving funds from the Department of Public Instruction and/or the Department of Social Services.
The systematic sampling technique was used to select 50 day care centers from each of the first two lists, and 50 family day care homes from the last list. As a result, parents who had preschool children attending 100 day care centers and 50 family day care homes, comprised the sample for this study.

Development of the Instrument

The questionnaire was the instrument chosen to collect the data because of its ability to retrieve a variety of information from a large sample. In addition, the Nutrition Questionnaire for Parents developed by Beavers, Fleener, and Kelly (1980) was used as a model for developing the questionnaire.

Questionnaire format

In order to obtain the data necessary for accomplishing the objectives specified for this study, the questionnaire was divided into four major parts. The first part of the questionnaire contained questions designed to identify selected personal characteristics of parents. These characteristics served as the independent variables for this study.

The second part of the questionnaire was comprised of several statements written to determine parents' attitudes toward food and nutrition. Parents indicated their attitudes
toward each statement by using a five-point Likert-type scale, ranging from "strongly agree" (coded as 5) to "strongly disagree" (coded as 1).

Multiple choice statements designed to assess parents' knowledge of nutrition comprised the third part of the questionnaire. The multiple choice format was chosen because it is recognized as the most effective and versatile of all objective measures (Cross, 1973; Gronlund, 1976). In addition, three options were written for each multiple choice statement because they have been found to be more reliable, less difficult, and take less time to complete than two, four, and five option multiple choice statements (Catts, 1978; Costin, 1970).

The fourth part of the questionnaire consisted of several practices related to planning and making food purchases. For each practice, parents indicated the extent to which they performed it by using a five-point Likert-type scale, ranging from "always" (coded as 5) to "never" (coded as 1).

The literature was reviewed to determine some of the most important content areas to include on the questionnaire (Sims, 1976; Prefontaine, 1975; Nece, 1979; FDA, 1975). Results of the review revealed that parents continually exhibit limited knowledge of essential nutrients needed by the body, best food sources of nutrients, basic food groups, food buying, and the caloric content of food. Day care
center meals was another content area considered important, since parents who had children attending day care centers comprised the sample for this study. Therefore, questionnaire items were written in six major content areas: basic food groups, calories, day care center meals, food buying, food sources, and nutrients.

**Selection and construction of questionnaire items**

Several of the items from the model questionnaire (Beavers et al., 1980) were applicable to the present study and were included. In addition, selected items from questionnaires used in previous studies were used (Nece, 1979; Daly, 1974; Eppright et al., 1970). Guidance in writing additional questionnaire items was obtained from food and nutrition guides and booklets (Iowa Guide for Teaching Food and Nutrition, 1978; Nutrition Sourcebook, 1978; Food is More than Something to Eat, 1976).

In an effort to achieve content validity, a minimum of five items were selected and/or written in each content area for the knowledge part of the questionnaire. Varying numbers of attitude statements were written in all content areas except calories, and all food purchasing practices were in the content area of food buying. The evaluation plan presented in Appendix A reflects the amount of emphasis placed on each content area.
Review and pilot testing of the questionnaire

The initial draft of the questionnaire was reviewed in a meeting with representatives from the Child Nutrition Division of the Iowa Department of Public Instruction and the Child Care Programs. On the basis of their recommendations, a few items were rewritten, some were deleted, and additional ones were written.

The second draft of the questionnaire was reviewed for content validity, plausibility of items, appropriateness, and to determine if the items adhered to the principles of questionnaire construction. The review was conducted by experts from the Departments of Food and Nutrition, Home Economics Education, and Institutional Management (see Appendix G). The questionnaire was revised based on the recommendations of the experts.

To determine its usability, the third draft of the questionnaire was pilot tested in Ames, Iowa, in November, 1980. Parents (n = 22) who had children attending one day care center and those who had children attending one family care home, comprised the pilot sample. The responses and comments on the pilot tested questionnaires were reviewed and an item analysis was computed on the multiple choice items. Results of the item analysis indicated that the knowledge part of the questionnaire was quite reliable, with a coefficient of .87. Additional findings revealed that some
of the options were not functioning, some of the statements were too difficult or too easy, and some of the options were not discriminating. Revisions were made to alleviate these deficiencies.

The final draft of the Nutrition Questionnaire for Parents consisted of nine demographic questions (1-9); 27 attitude statements (10-36); 35 multiple choice statements (37-71); and 14 food purchasing practices (72-85). A letter to parents was included on the first page of the questionnaire to explain the nature of the study, encourage participation, and to provide general directions (see Appendix B).

Data Collection

Data collection commenced on December 4, 1980, and terminated on March 6, 1981. Prior to the collection of data, a letter was sent to each director by Mrs. Eleanor Hunsley of the Child Nutrition Division. This letter explained the study and requested their participation. Following this initial contact, permission to use the selected sample of 100 day care centers and 50 family day care homes in reaching parents was obtained by mailing a letter (Appendix B) and postage-paid self-addressed postcard (Appendix B) to the director of each center/home. The letter explained the purpose of the study, the desired sample, and instructions for distributing and collecting the question-
naires. The postcard was included for directors to complete and return, indicating whether permission to use their center in this study was granted or denied.

As the completed postcards were received from the directors, telephone calls were made to those who granted approval for their centers/homes to participate in the study. Information obtained during the telephone calls included a convenient day and time for a representative to visit the center, and the approximate number of preschool children from one and two parent families. The following materials were left during each visit; a specified number of questionnaires, follow-up letters to parents who did not return a completed questionnaire within a week (see Appendix B), and one or more large envelopes in which to mail back completed questionnaires.

When several directors had not returned a completed postcard within a month, their telephone numbers were obtained from directory assistance and calls were made to get their responses. Results of the telephone calls revealed that many of the centers/homes were no longer operating, were not appropriate for this study, or denied permission for their centers to participate. Thus, of the 100 day care centers invited to participate in the study, 71 granted approval to participate, five were no longer operating, two were not appropriate, and 22 denied approval to par-
ticipate. Of the 50 family day care homes invited to participate, 19 granted approval, 11 were no longer operating, and 21 denied approval.

A total of 6,370 questionnaires were distributed to the centers/homes. Of this number, 1,970 completed questionnaires were received yielding a relatively low return of 32.3%. A thank you letter (see Appendix B) was mailed to all directors whose centers/homes participated in the study.

Data Analysis

Data analyzed for this study were supplied by 1,769 parents. Questionnaires with missing responses to at least one demographic question, and ten or more of the multiple choice statements and food purchasing practices, were eliminated from the analysis. Missing responses to the attitude statements were coded "3" to represent "don't know."

Reversed scoring was used for ten attitude statements with negative orientations (see Appendix G). These statements were identified by three experts from the Department of Food and Nutrition, and one arbitrator from the Department of Home Economics Education (see Appendix D).

Utilizing the coding plan designed specifically for this study, coding was applied directly on the completed questionnaires in the left column. Key punching was done
by the staff in the computation center at Iowa State University.

Statistical techniques employed to analyze the data were selected from the Statistical Package for Social Sciences (Nie, Hull, Jenkins, Steinbrenner, & Bert, 1975; Hull & Nie, 1979). A brief discussion of each procedure follows.

Descriptive statistics (frequencies and percentages) were calculated on the personal characteristics of parents to facilitate a general discussion of the findings. A review of the initial frequency results showed that a small number of parents were represented in groups 1 and 2 for age, 1 and 2 for education level, 5 and 6 for family size, 5 and 6 for occupation, 1 and 2 for money spent on food eaten at home, and 4 and 5 for money spent on food eaten outside the home. Therefore, these groups were combined for subsequent analyses.

An item analysis was computed to determine the quality of the multiple choice items. This analysis was done by the Testing and Evaluation Service at Iowa State University (see Appendix A).

To determine if the attitude statements could be formed into an attitude scale, a Cronbach's Alpha reliability was obtained. A preliminary review of the results showed 13 items that did not reach the specified item total correlation.
coefficient of .25. These items were eliminated and the attitude scale was comprised of the 14 remaining items (see Appendix E). The estimated reliability coefficient for the attitude scale was .74. A total score for attitude was computed for each parent by summing responses to each item in the scale.

Similarly, a Cronbach Alpha reliability was calculated in an effort to form a food purchasing practices scale. Initial results revealed that two of the 14 practices did not reach an item total correlation coefficient of .25. Therefore, these items were deleted from the scale and the food purchasing practices scale consisted of 12 items (see Appendix E). The estimated reliability coefficient for the food purchasing practices scale was .77. A total score for food purchasing practices was attained for each parent by summing responses to the 12 items on the scale.

Kuder Richardson Formula 20 was used to calculate the reliability for the knowledge scale (Test and Evaluation Services, 1980). All 35 items were included on the scale. The estimated reliability coefficient for the knowledge scale was .69. Although quite low, this was considered adequate since the parents were not given prior training in food and nutrition before taking the test. All correct responses to the items on the knowledge scale (coded as 1) were summed to yield a total score for knowledge for each
parent.

Significant differences in parents' nutrition attitudes, knowledge, and food purchasing practices for each of the personal characteristics were determined by one-way analysis of variance. Relationships among nutrition attitudes, knowledge, and food purchasing practices were tested using Pearson's Product-Moment Correlation (PPMC). The PPMC can be used to compute the correlation coefficient from two sets of scores. The coefficient is an estimation of the closeness of the relationship between the two variables correlated.

In an attempt to study the influence of several personal characteristics on parents' nutrition attitudes, knowledge, and food purchasing practices, a step-wise regression analysis was conducted. In this procedure, independent variables are added one at a time. The independent variable with the highest correlation coefficient is entered first and the beta value is calculated. The variable which increased the $R^2$ the most is entered next. Independent variables are then added to the regression equation until none of the remaining variables increase the $R^2$ significantly. A path analysis was performed to explicate the results of the regression analysis. Path analysis is a method of decomposing and interpreting linear relationships among a set of variables by assuming that (1) a weak causal
order among these variables is known and (2) the relationships among these variables are causally closed. The .01 level was used to test for statistical significance.
FINDINGS AND DISCUSSION

The primary purpose of this study was to examine relationships among nutrition attitudes, knowledge, and food purchasing practices of parents. Findings relative to this purpose are discussed in nine major sections: (1) general characteristics of parents, (2) influence of independent variables on nutrition attitudes, (3) influence of independent variables on nutrition knowledge, (4) influence of independent variables on food purchasing practices, (5) relationships among nutrition attitudes, knowledge, and food purchasing practices, (6) variables regressed on nutrition attitudes, knowledge, and food purchasing practices, (7) general discussion of findings, (8) discussion of conceptual model, and (9) conclusion.

General Characteristics of Parents

The independent variables used in this study were obtained by asking parents to indicate the following personal characteristics: sex, age, education level, family size, residence, occupation, nutrition training, money spent on food eaten at home, and money spent on food eaten outside the home. The number and percent of parents who were represented in each variable category are shown in Tables 1 through 9.
Sex

The data producing sample for this study consisted of 1,769 parents. Of this number, two-thirds (67%) were females and one-third (33%) were males (see Table 1).

Table 1. Sex of parents by number and percent

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>1192</td>
<td>67.4</td>
</tr>
<tr>
<td>Male</td>
<td>577</td>
<td>32.6</td>
</tr>
<tr>
<td>Total</td>
<td>1769</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Age

Examination of the data in Table 2 revealed that the largest group of parents in this study was in the age range of 26-30 (36%). The second largest group was between the age of 31-35 (33%). Eighteen percent were age 25 and under, and 12% were age 36 and over.

Table 2. Age of parents by number and percent

<table>
<thead>
<tr>
<th>Age range</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 and under</td>
<td>317</td>
<td>17.9</td>
</tr>
<tr>
<td>26-30</td>
<td>634</td>
<td>35.8</td>
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<tr>
<td>31-35</td>
<td>592</td>
<td>33.5</td>
</tr>
<tr>
<td>36 and older</td>
<td>226</td>
<td>12.8</td>
</tr>
<tr>
<td>Total</td>
<td>1769</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Education level

Findings in Table 3 revealed that 66% of the parents were high school graduates or had some college. Almost one-third (34%) were high school graduates, 32% had some college education, 16% had a bachelor's degree, and 11% had education beyond the bachelor's level. Seven percent had grade school education or some high school.

Table 3. Education level of parents by number and percent

<table>
<thead>
<tr>
<th>Education level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade school or some high school</td>
<td>126</td>
<td>7.1</td>
</tr>
<tr>
<td>High school graduate</td>
<td>594</td>
<td>33.6</td>
</tr>
<tr>
<td>Some college</td>
<td>564</td>
<td>31.9</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>285</td>
<td>16.1</td>
</tr>
<tr>
<td>Beyond bachelor's degree</td>
<td>200</td>
<td>11.3</td>
</tr>
<tr>
<td>Total</td>
<td>1769</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Family size

As indicated in Table 4, nearly half (47%) of the parents reported a family size of four. Twenty-one percent indicated a family size of three, 18% reported a family size of five, 7% reported a family size of six or more, and 7% indicated a family size of two.
Table 4. Family size by number and percent

<table>
<thead>
<tr>
<th>Family size</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>119</td>
<td>6.7</td>
</tr>
<tr>
<td>3</td>
<td>362</td>
<td>20.5</td>
</tr>
<tr>
<td>4</td>
<td>833</td>
<td>47.1</td>
</tr>
<tr>
<td>5</td>
<td>325</td>
<td>18.4</td>
</tr>
<tr>
<td>6 or more</td>
<td>130</td>
<td>7.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1769</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Residence

Almost half of the parents (46%) participating in this study were from towns with a population of 2,500 to 49,999. Twenty-five percent were from a city of 50,000 and above, 11% lived on a farm, 10% were from a small town with a population less than 2,499, and 7% were from rural nonfarms (see Table 5).

Table 5. Residence by number and percent

<table>
<thead>
<tr>
<th>Residence</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm</td>
<td>200</td>
<td>11.3</td>
</tr>
<tr>
<td>Rural nonfarm</td>
<td>131</td>
<td>7.4</td>
</tr>
<tr>
<td>Small town</td>
<td>175</td>
<td>9.9</td>
</tr>
<tr>
<td>Town</td>
<td>821</td>
<td>46.4</td>
</tr>
<tr>
<td>City</td>
<td>442</td>
<td>25.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1769</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
Occupation

The occupations used for parents were coded according to the Dictionary of Occupational Titles Classification (U.S. Department of Labor, 1965). Inspection of the data presented in Table 6 showed that most of the parents were either in service occupations (35%) or professional, technical, or managerial occupations (31%). Thirteen percent of the parents were in transportation or skilled semiskilled occupations, and 13% were in clerical and sales. Since only 3% of the parents indicated occupations other than the ones listed, the category of other was eliminated from further analysis.

Table 6. Occupation by number and percent

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional, managerial, technical</td>
<td>549</td>
<td>31.0</td>
</tr>
<tr>
<td>Clerical and sales</td>
<td>234</td>
<td>13.2</td>
</tr>
<tr>
<td>Service</td>
<td>618</td>
<td>34.9</td>
</tr>
<tr>
<td>Agricultural</td>
<td>82</td>
<td>4.6</td>
</tr>
<tr>
<td>Skilled, semiskilled or transportation</td>
<td>238</td>
<td>13.4</td>
</tr>
<tr>
<td>Other</td>
<td>48</td>
<td>2.7</td>
</tr>
<tr>
<td>Total</td>
<td>1769</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Nutrition training

The decline in the nutritional quality of American diets has been attributed to the assumption that many people lack nutrition training. As shown in Table 7, a majority of the
parents (63%) indicated that they had not received any type of nutrition training. Only 37% had received some type of nutrition training. These findings suggest that a large percentage of parents are in need of nutrition training.

Table 7. Nutrition training by number and percent

<table>
<thead>
<tr>
<th>Training</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>1111</td>
<td>62.8</td>
</tr>
<tr>
<td>Yes</td>
<td>658</td>
<td>37.2</td>
</tr>
<tr>
<td>Total</td>
<td>1769</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Money spent on food eaten at home

Based on the findings presented in Table 8, most parents spend from $101–$250 on food eaten at home monthly. Twenty-eight percent spend $151–$200, 23% spend $201–$250, 22% spend $101–$150, and 11% spend $251–$300. Only a few parents (9%) spend under $100 monthly on food eaten at home, and an even lesser percentage (7%) spend $301 and over.
Table 8. Amount of money spend on food eaten at home by number and percent

<table>
<thead>
<tr>
<th>Amount of money spent</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $100</td>
<td>165</td>
<td>9.3</td>
</tr>
<tr>
<td>$101-$150</td>
<td>389</td>
<td>22.0</td>
</tr>
<tr>
<td>$151-$200</td>
<td>495</td>
<td>28.0</td>
</tr>
<tr>
<td>$201-$250</td>
<td>400</td>
<td>22.6</td>
</tr>
<tr>
<td>$251-$300</td>
<td>201</td>
<td>11.4</td>
</tr>
<tr>
<td>$301 and over</td>
<td>119</td>
<td>6.7</td>
</tr>
<tr>
<td>Total</td>
<td>1769</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Money spent on food eaten outside the home

It has been postulated that more of the family meals are being eaten outside the home. However, findings presented in Table 9 suggest that most families still eat most of their meals at home. Almost half of the parents (47%) indicated that they spend $25 or less on food eaten outside the home monthly. Thirty-four percent reported spending $26-$50 on food eaten outside the home monthly, 11% spend $51-$75, and only 6% spend $76 and over.
Table 9. Amount of money spent on food eaten outside the home by number and percent

<table>
<thead>
<tr>
<th>Amount of money spent</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25</td>
<td>873</td>
<td>49.3</td>
</tr>
<tr>
<td>$26-$50</td>
<td>592</td>
<td>33.5</td>
</tr>
<tr>
<td>$51-$75</td>
<td>195</td>
<td>11.0</td>
</tr>
<tr>
<td>$76 and over</td>
<td>109</td>
<td>6.2</td>
</tr>
<tr>
<td>Total</td>
<td>1769</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Summary of Demographic Characteristics of Parents

A review of the demographic data revealed that two-thirds (67%) of the parents were female. Over half of the parents fell within the 26-35 age group (69%), were high school graduates (34%) or had some college (32%), and had a family size of four (47%). Forty-six percent lived in a town with a population of 2,500 to 49,999. Most were in service (35%) or professional, technical, or managerial occupations (31%), had received no nutrition training (63%), spent $101 to $250 on food eaten at home (73%), and spent $50 or less on food eaten outside the home monthly (83%).
Influence of Independent Variables on Nutrition Attitudes

One-way analysis of variance results revealed significant differences in parents' nutrition attitudes by sex, family size, educational level, occupation, and nutrition training. These differences were significant at the .01 level. No significant differences were found in parents' nutrition attitudes based on age, residence, amount of money spent on food eaten at home, and amount of money spent on food eaten outside of the home. Mean scores and f-ratios for those variables in which significant differences were found are presented in Table 10.

Sex

A comparison of the mean scores between males and females showed that females scored significantly higher for nutrition attitudes than did males.

Educational level

As shown in Table 10, the highest mean score for nutrition attitudes was made by parents who had a bachelor's degree, followed closely by those who had education beyond the bachelor's level. The lowest mean score for nutrition attitudes was attained by parents who had only grade school education.
Table 10. F-ratios and mean attitude scores for significant independent variables

<table>
<thead>
<tr>
<th>Source of variation&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Mean Scores</th>
<th>F-ratios</th>
</tr>
</thead>
</table>
| a. Sex | 1. 57.50  
2. 54.77 | 105.87** |
| b. Educational Level | 1. 54.87  
2. 55.88  
3. 57.06  
4. 57.60  
5. 57.34 | 10.08** |
| c. Family Size | 1. 57.93  
2. 56.91  
3. 56.60  
4. 56.17  
5. 55.68 | 3.63** |
| d. Occupation | 1. 57.53  
2. 56.38  
3. 56.91  
4. 54.29  
5. 54.65 | 17.06** |
| e. Nutrition Training | 1. 55.62  
2. 58.27 | 106.44** |

<sup>a</sup>Key:  
a = 1) female, and 2) male;  
b = 1) less than high school diploma, 2) high school graduate, 3) some college, 4) bachelor's degree, and 5) beyond bachelor's degree;  
c = 1) 2, 2) 3, 3) 4, 4) 5, and 5) 6 or more;  
d = 1) professional, managerial, and technical, 2) clerical and sales, 3) service, 4) agricultural, fishery, forestry, and related occupations, and 5) skilled and unskilled workers;  
e = 1) no, and 2) yes.

** p ≤ .01
Family Size

On the basis of the data presented in Table 10, parents with a family size of two made the highest mean score for attitudes, followed by parents with a family size of three. The lowest mean score was made by parents with a family size of six or more.

Occupation

A comparison of mean scores of parents based on occupation showed parents in professional, technical, and managerial occupations scoring the highest. Parents in agricultural occupations had the lowest mean score, followed closely by parents in skilled, semiskilled, and transportation occupations.

Nutrition Training

As shown in Table 10, parents who indicated they had received some type of nutrition training yielded a significantly higher mean score than those who had no training.

Influence of Independent Variables on Nutrition Knowledge

On the basis of one-way analysis results, parents knowledge of nutrition differed with respect to sex, age, educational level, occupation, nutrition training, and money spent on food eaten outside the home. All differences were signif-
icant at the .01 level. No significant differences were found in parents' nutrition knowledge by family size, residence, and money spent on food eaten at home. Mean scores and f-ratios for variables in which significant differences were found are shown in Table 11.

Sex

As was the case for nutrition attitudes, females mean score was significantly higher than males regarding nutrition knowledge (see Table 11).

Age

As shown in Table 11, parents who were age 36 and over showed the highest mean score for nutrition knowledge, followed closely by parents in the 31-35 age range. The lowest mean score for nutrition knowledge was seen among those parents age 25 and under.

Educational level

The highest mean score for nutrition knowledge was made by parents who indicated an educational level beyond the bachelor's degree. The lowest mean score was made by parents who had grade school level education or some high school.

Occupation

Parents in professional, technical, and managerial occupations made the highest mean score for nutrition knowledge.
Table 11. F-ratios and mean scores for knowledge and significant independent variables

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Mean scores</th>
<th>F-ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Parents' sex</td>
<td>1. 18.80</td>
<td>18.43**</td>
</tr>
<tr>
<td></td>
<td>2. 17.79</td>
<td></td>
</tr>
<tr>
<td>b. Age</td>
<td>1. 16.74</td>
<td>21.61**</td>
</tr>
<tr>
<td></td>
<td>2. 18.43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. 19.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. 19.27</td>
<td></td>
</tr>
<tr>
<td>c. Education</td>
<td>1. 15.16</td>
<td>87.13**</td>
</tr>
<tr>
<td></td>
<td>2. 16.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. 18.86</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. 20.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. 21.16</td>
<td></td>
</tr>
<tr>
<td>d. Occupation</td>
<td>1. 20.33</td>
<td>40.11**</td>
</tr>
<tr>
<td></td>
<td>2. 17.62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. 18.02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. 18.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. 16.40</td>
<td></td>
</tr>
<tr>
<td>e. Nutrition training</td>
<td>1. 17.53</td>
<td>130.97**</td>
</tr>
<tr>
<td></td>
<td>2. 20.07</td>
<td></td>
</tr>
<tr>
<td>f. Money spent for food</td>
<td>1. 18.06</td>
<td>6.70**</td>
</tr>
<tr>
<td>outside the home each month</td>
<td>2. 18.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. 18.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. 19.39</td>
<td></td>
</tr>
</tbody>
</table>

*Key: a = 1) female, and 2) male; b = 1) 25 and under, 2) 26-30, 3) 31-35, and 4) 36 and over; c = 1) less than a high school diploma, 2) high school graduate, 3) some college, 4) bachelor's degree, and 5) beyond bachelor's degree; d = 1) professional, managerial, and technical, 2) clerical and sales, 3) service, 4) agricultural, fishery, forestry, and related occupation, and 5) skilled, semiskilled, unskilled, or transportation workers; e = 1) no, and 2) yes; f = 1) $25 or less, 2) $26-$50, 3) $51-$75, and 4) $76 and more.

**p ≤ .01.
The lowest mean score was shown for parents in skilled, semiskilled, and transportation occupations.

**Nutrition training**

As indicated in Table 11, parents who had received some type of nutrition training made a higher mean score than those parents who had not received training.

**Money spent on food eaten outside the home**

On the basis of the data shown in Table 11, the mean score on nutrition knowledge was highest among those parents who spent the most money on food outside the home. The highest mean score was seen for parents who spent $76 or more on food eaten outside the home, while the lowest mean score reflected the group who spent $25 or less.

**Influence of Independent Variables on Food Purchasing Practices**

One-way analysis of variance results revealed significant differences in parents' food purchasing practices by sex, occupation, nutrition training, and money spent on food eaten outside the home. These differences were significant at the .01 level. No significant difference was noted in parents' food purchasing practices based on age, educational level, family size, residence, and money spent on food eaten
Table 12. F-ratios and mean scores for food purchasing practices and significant independent variables

<table>
<thead>
<tr>
<th>Source of variation&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Mean scores</th>
<th>F-ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>40.36</td>
<td>117.91**</td>
</tr>
<tr>
<td>2.</td>
<td>37.05</td>
<td></td>
</tr>
<tr>
<td>b. Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>39.38</td>
<td>14.91**</td>
</tr>
<tr>
<td>2.</td>
<td>38.60</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>40.41</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>36.45</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>37.63</td>
<td></td>
</tr>
<tr>
<td>c. Nutrition training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>38.28</td>
<td>81.94**</td>
</tr>
<tr>
<td>2.</td>
<td>40.98</td>
<td></td>
</tr>
<tr>
<td>d. Money spent on food eaten outside the home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>40.00</td>
<td>10.69**</td>
</tr>
<tr>
<td>2.</td>
<td>38.96</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>38.18</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>37.22</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Key: a = 1) female and, 2) males; b = 1) professional, managerial, and technical, 2) clerical and sales, 3) service, 4) agricultural, fishery, forestry, and related occupations, 5) skilled, semiskilled, or transportation; d = 1) $25 or less, 2) $26-$50, 3) $51-$75, and 4) $76 and over.

** p ≤ .01.

Mean scores and f-ratios for variables in which significant differences were found are listed in Table 12.

**Sex**

As was found for both nutrition attitudes and nutrition knowledge, females made a significantly higher mean score for food purchasing practices than did males.
Occupation

As shown in Table 12, parents in service occupations (including homemakers) had the highest mean score for food purchasing practices. The lowest mean score was seen among parents in agricultural related occupations.

Nutrition training

The influence of nutrition training on food purchasing practices was reflected in the mean score (highest) of those indicating having received some type of training in nutrition (see Table 12). The lowest mean score was made by parents who had not received training in nutrition.

Money spent on food eaten outside the home

On the basis of the data shown in Table 12, the highest mean score was seen for parents spending $25 or less on food eaten outside the home. The lowest mean score was made by parents spending $76 or more.

Relationships Among Nutritional Attitudes, Knowledge, and Food Purchasing Practices

Pearson-product moment correlation coefficients were obtained to determine relationships among nutrition attitudes, knowledge, and food purchasing practices. The size of the correlation coefficient is indicative of the strength of the relationship between the variables correlated.
Resulting coefficients revealed that all three variables were positively and significantly related. These relationships were significant at the .01 level. The correlation between nutrition attitudes and nutrition knowledge was .29; the correlation between nutrition attitudes and food purchasing practices was .49; and the correlation between nutrition knowledge and food purchasing practices was .19. Examination of the relationships among the three variables showed that all relationships were rather low. However, a stronger relationship was manifested between nutrition attitudes and food purchasing practices than between nutrition knowledge and food purchasing practices.

Variables Regressed on Nutrition Attitudes, Knowledge, and Food Purchasing Practices

Since significant differences were found in parents' nutrition attitudes, knowledge, and food purchasing practices by selected independent variables, the step-wise regression technique was used to determine predictor variables. Results of step-wise regression analysis are shown in Tables 13 through 15 for each regression equation presented. All three equations were significant at the .01 level. The predictor variables are listed in order of entry into the equation. The $R^2$ denotes the amount of variance in the dependent variables that is explained by the predictor variables. The
standardized regression coefficients (beta values) and unstandardized regression coefficients (B values) indicate the relative influence in a statistical sense, of each independent variable in predicting the dependent variable (Nie et al., 1975).

**Variables regressed on nutrition attitudes**

Examination of the regression equation presented in Table 13 showed that four independent variables exerted a significant influence on nutrition attitudes: nutrition training, sex, educational level, and family size. Close inspection of the partial beta values for each predictor variable in the final equation showed that sex had the highest beta value of the four variables. This suggests that although nutrition training was the first predictor entered, sex also has an influence on nutrition attitudes. Also reflected in Table 13 was the fact that only a small amount of the variance in nutrition attitudes was explained by the four variables in the regression equation. This is based on the low $R^2$ (.11) produced by the predictor variables.

**Variables regressed on nutrition knowledge**

As shown in the regression equation listed in Table 14, educational level, nutrition training, sex, and age made a significant influence on nutrition knowledge. As anticipated, education level was the first variable entered. On the basis
Table 13. Variables regressed on nutrition attitudes

<table>
<thead>
<tr>
<th>Variables</th>
<th>B values</th>
<th>Beta</th>
<th>F ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition training</td>
<td>1.79</td>
<td>0.16</td>
<td>45.01**</td>
</tr>
<tr>
<td>Sex</td>
<td>-2.32</td>
<td>-0.20</td>
<td>65.32**</td>
</tr>
<tr>
<td>Education level</td>
<td>0.63</td>
<td>0.13</td>
<td>23.60**</td>
</tr>
<tr>
<td>Family size</td>
<td>-0.27</td>
<td>-0.13</td>
<td>4.57**</td>
</tr>
<tr>
<td>Multiple R</td>
<td>0.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td>5.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** $p \leq .01$.

Table 14. Variables regressed on nutrition knowledge

<table>
<thead>
<tr>
<th>Variables</th>
<th>B values</th>
<th>Beta</th>
<th>F ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education level</td>
<td>1.57</td>
<td>0.37</td>
<td>252.54**</td>
</tr>
<tr>
<td>Nutrition training</td>
<td>1.85</td>
<td>0.19</td>
<td>73.05**</td>
</tr>
<tr>
<td>Sex</td>
<td>-1.32</td>
<td>-0.13</td>
<td>33.66**</td>
</tr>
<tr>
<td>Age</td>
<td>0.41</td>
<td>0.08</td>
<td>11.20**</td>
</tr>
<tr>
<td>Multiple R</td>
<td>0.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td>4.11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** $p \leq .01$. 
of the low $R^2$ obtained by this model, a relatively small amount of the variance in nutrition knowledge was accounted for by the variables listed in the equation.

Variables regressed on food purchasing practices

In addition to demographic characteristics, nutrition attitude score and nutrition knowledge score were regressed on food purchasing practices. This was done because it is generally assumed that attitudes and knowledge also exert influence on practices. On the basis of the findings presented in Table 15, nutrition attitude was the first variable entered into the equation. Other variables, in order of entry, were sex, money spent on food eaten outside the home, family size, nutrition training, residence, and knowledge. Based on entry into the equation, it appeared that nutrition knowledge exerted the least amount of influence on food purchasing practices.

General Discussion of Findings

Findings showed that overall, parents had mean scores slightly above the midpoint for nutrition attitudes, knowledge, and food purchasing practices (Appendix A, Table 18). Nevertheless, significant differences were found in these factors based on certain demographic characteristics.
For nutrition attitudes, knowledge, and food purchasing practices, females achieved a significantly higher mean score than did males. These findings were anticipated because usually it is the female who assumes the major responsibility for planning, purchasing, and preparing family meals. These experiences can serve to improve the females' nutrition attitudes, knowledge, and food purchasing practices.
chasing practices.

Few researchers in nutrition education have included both males and females in their studies. Fusillo and Beloian (1977) reported that among the 1,664 consumers studied, low knowledge was more often present among male shoppers. Byrd-Bredbenner (1981) discovered that females achieved significantly higher scores on measures of nutrition knowledge and attitudes, but males scored significantly higher than females on dietary behavior. Previous researchers have found that fathers exert a strong influence on the food choices of family members (Cosper & Wakefield, 1975; Burt & Hertzler, 1978). Therefore, it is important that nutrition educators discover avenues of reaching more men with nutrition education.

The supposition that those who have studied something about nutrition have more favorable nutrition attitudes, are more knowledgeable of nutrition and use sound practices regarding food, was demonstrated in this study. Parents who indicated that they had received some type of nutrition training made the highest mean score for attitudes, knowledge, and practices. This supports the idea that nutrition education programs can be effective in improving the nutritional practices.

Support for these findings was provided by Caliendo and
Sanjur (1978). In their study of the diets of preschool children, the researchers found that nutrition education was the variable most significantly related to the dietary quality of the child's diet. Similarly, Prefontaine (1975) and Morse et al. (1967) reported that those who had taken previous courses in food and nutrition scored significantly higher on nutrition tests than those who had not. Contrary to these findings were those offered by Schwartz (1975) who found that young homemakers who had taken high school courses in food and nutrition scored significantly lower on nutrition than those who had not taken courses. In addition, Penland (1976) reported that previous nutrition education experiences seemed to have had little specific relationship to nutrition knowledge or nutrition attitudes of respondents.

Significant differences were also noted in parents nutrition attitudes, knowledge, and food purchasing practices with respect to occupation. For nutrition knowledge and attitudes, parents who were in professional, technical, and managerial occupations achieved the highest mean scores. For food purchasing practices, parents in service occupations (including homemakers) made the highest mean score. Since professionals usually have high education levels, it was no surprise to discover that they made the highest mean score for knowledge and attitudes. Usually they possess the skills
needed for analyzing and interpreting nutrition information in a way so as to improve nutrition attitudes and contribute to nutrition knowledge. The fact that many homemakers were included in the service occupations, and usually homemakers do most of the food shopping for the family, could have been a factor in the high mean score achieved by parents in service occupations. In her study of mothers of preschool children, Sims (1976) found that nutrition knowledge was highly correlated with the occupation-education scale, the more prestigious the occupation and the higher the education level, the greater was nutrition knowledge.

Education level was influential regarding parents' nutrition attitudes and knowledge. In general, mean scores for attitudes and knowledge increased as education level became higher. The relationship between formal education and cognitive information regarding food and nutrition has been shown by previous researchers (Fusillo and Beloian, 1977; Phillips et al., 1978). Similarly, Penland discovered that respondents' education level assumed the predominant role in variance for nutrition attitudes. Jalso and associates (1965) also reported that education level correlated positively with nutritional beliefs. These findings suggest that people with low education levels represent a target audience in need of useful nutrition information.
The amount of money spent on food eaten outside the home made a difference in parents' nutrition knowledge and food purchasing practices. For nutrition knowledge, as amount of money spent on food increased, so did mean scores. Conversely, for food purchasing practices, mean scores decreased as amount of money spent increased. While it is difficult to determine the nature of these differences, findings do point out the importance of recognizing the effects of these factors when planning nutrition education programs. In Sims' (1976) study, those who spent more money on food were less knowledgeable of nutrition than those who spent less money. Eppright et al. (1970) reported that amount of money spent on food was the most influential demographic variable on the quality of children's diets.

Differences in parents' nutrition knowledge were noted with respect to age. Basically, mean scores became higher as age increased. This suggests that older parents have had more experiences with foods which could increase their nutrition knowledge. Beavers et al. (1980) also found that except for those age 41 and over, nutrition knowledge tended to increase with age. Contrary to these findings were those offered by Fusillo and Beloian (1977) and Sims (1978). In both studies, as respondents became older, nutrition knowledge scores became lower. It is important to point out that the majority of the parents in this study were rather young,
age 26-36. Whereas over half of the respondents in the other two studies were age 50 or older, and had a mean age of 38.

Parents' nutrition attitudes tended to differ significantly by family size. The smaller the family size, the more positive were nutrition attitudes as evidenced by higher mean scores achieved. Eppright et al. (1970) also found that the larger the household, the less favorable were attitudes toward nutrition. Although it appears that family sizes are getting smaller, findings suggest that efforts need to be made to improve the nutrition attitudes of parents with large families.

Regarding relationships among nutrition attitudes, knowledge and food purchasing practices, findings showed all three variables to be positively related although relatively low. However, nutrition attitudes were more highly related to food purchasing practices than was nutrition knowledge to food purchasing practices. This supports the conviction that attitudes are just as influential, if not more, as knowledge on food practices adopted by parents. Comparable results regarding the nature of the association among nutrition attitudes, knowledge, and practices were reported by other researchers. Fusillo and Beloian (1977) reported that while all three factors were positively related, a stronger association was observed for food beliefs and practices than for knowledge and practices. Sims (1978) reported a stronger relation-
ship between knowledge and dietary behavior than between attitudes and dietary behavior. Schwartz (1975) discovered significant correlations between nutrition attitudes and knowledge and between attitudes and dietary practices, while no significant relationship was found between nutrition knowledge and dietary practices.

As revealed in the three regression equations, while all of the differences in nutritional attitudes, knowledge and practices based on demographic characteristics were significant at the .01 level, these characteristics are very weak predictors as indicated by the low $R^2$ produced for each equation. Significant among the findings was the fact that education level was the predominant variable influencing nutrition knowledge, and nutrition attitude was the primary variable influencing food purchasing practices.

**Discussion of hypotheses**

One-way analysis of variance and Pearson-product moment correlations were used to test the hypotheses in this study. All hypotheses were tested at the .01 level. A brief discussion of the findings related to each hypothesis follows.

**Hypothesis 1:** There are no significant differences in parents' nutrition attitudes by sex, age, education level, family size, residence, occupation, nutrition training, money spent on food at home, and money spent
Findings revealed that parents' nutrition attitudes differed significantly by sex, education level, occupation, family size, and nutrition training. Therefore, the hypothesis was rejected as it related to these five variables and was not rejected as it related to age, residence, money spent on food eaten at home, and money spent on food eaten outside the home.

Hypothesis 2: There are no significant differences in parents' nutrition knowledge by sex, age, education level, family size, residence, occupation, nutrition training, money spent on food at home, and money spent on food outside the home.

On the basis of findings presented in this study, significant differences were observed in parents' nutrition knowledge with respect to sex, age, education level, occupation, nutrition training, and money spent on food eaten outside the home. Therefore, the hypothesis was rejected for these six variables and was not rejected for residence, family size, and money spent on food eaten at home.

Hypothesis 3: There are no significant differences in parents' food purchasing practices by sex, age, education level, family size, residence, occupation, nutrition training,
money spent on food at home, and money spent on food outside the home.

Findings showed significant differences in parents' food purchasing practices by sex, occupation, nutrition training, and money spent on food eaten outside the home. Thus, the hypothesis was rejected for these four variables and was not rejected for age, family size, residence, education level, and money spent on food eaten at home.

Hypothesis 4: There are no significant relationships among nutrition attitudes, knowledge, and food purchasing practices.

This hypothesis was rejected since findings showed that all three variables were significantly related.

Discussion of Conceptual Model

The conceptual model tested in this study is presented in Figure 2. As indicated in the model, two independent variables would be related to nutrition attitudes, knowledge, and food purchasing practices: education level and nutrition training. Occupation was shown to be related to nutrition attitudes and knowledge, money spent on food and family size were both related to knowledge and food purchasing practices. Age, sex, and residence were shown to be related to knowledge. In addition, the model suggested that both nutrition attitudes and knowledge would be related to food
Figure 2. Path analysis of relationships among variables
purchasing practices.

Using the beta values that resulted from the regression analysis, a path model was designed to make explicit the regression findings. The straight lines with the arrows denote the direction of the significant relationship \( p < .01 \) and the beta values listed on the lines indicated the relative strength of the relationship. The curved line suggests that nutrition attitudes and knowledge are related. Hypothesized relationships not achieving statistical significance were not included in the path model.

Observation of the results presented in the path model showed that some of the proposed relationships were supported and some were not. The relationship of nutrition training to all three dependent variables was confirmed in the path model. However, education level was related to nutrition attitudes and knowledge. Occupation was not found to have a significant influence on any of the three dependent variables. Money spent on food outside the home was related to food purchasing practices, and family size was related to nutrition attitudes and practices, and not to nutrition knowledge. As suggested in the conceptual model, age was related to knowledge. As for sex, findings revealed that it was related not only to knowledge, but also to nutrition attitudes and food purchasing practices. Residence was shown to be related to food purchasing practices and not to nutrition knowledge.
In addition, correlation coefficients showed that nutrition attitudes and nutrition knowledge were significantly related. As indicated by the low beta values, all of the relationships were quite weak, except for the one between education level and knowledge, and between nutrition attitudes and food purchasing practices. Therefore, particular attention should be placed on these two factors when designing nutrition education programs for parents.

Conclusions

Findings in this study clearly demonstrated that parents' nutrition attitudes, knowledge, and food purchasing practices are related. More importantly, results indicated a stronger relationship between nutrition attitudes and food purchasing practices, than between knowledge and food purchasing practices. Based on these findings, nutrition educators should adopt as a major goal, that of designing educational experiences that promote favorable nutrition attitudes, and, which encourage parents to apply their knowledge of nutrition when making food choices.

The findings in this study also suggested the importance of understanding the circumstances and conditions surrounding parents' environment. While the independent variables investigated in this study were weakly related to nutrition attitudes, knowledge, and practices, they do offer useful
information for nutrition educators to consider when trying to modify effects on program results.

In conclusion, findings revealed that a large amount of the variance in nutrition attitudes, knowledge, and food purchasing practices was unexplained by the variables used in this study. Therefore, the influence of other variables should be investigated. Only when the most influential variables are identified and controlled, can nutrition education programs be effective in facilitating positive changes in nutrition attitudes, knowledge, and food purchasing practices.
SUMMARY AND RECOMMENDATIONS

Summary

The primary purpose of this study was to examine relationships among parents' nutrition attitudes, knowledge, and food purchasing practices. More specifically, an attempt was made to accomplish the following objectives: (1) develop a valid food and nutrition questionnaire; (2) assess parents' knowledge of nutrition; (3) determine some nutrition attitudes of parents; (4) identify certain food purchasing practices of parents; (5) compare parents' nutrition attitudes, knowledge, and food purchasing practices by selected demographic characteristics, and (6) determine relationships among parents' nutrition attitudes, knowledge, and food purchasing practices.

A food and nutrition questionnaire was developed to collect the data. The six major content areas for questionnaire items were: basic food groups, calories, day care center meals, food buying, food sources, and nutrients. The questionnaire was divided into four major parts: (1) general information, (2) attitudes, (3) knowledge, and (4) food purchasing practices.

The food and nutrition questionnaire was reviewed for content validity by specialists in the following Departments: Food and Nutrition, Home Economics Education, Institution Management, Child Nutrition Division, Department of Public
Instruction, and the Cooperative Child Care Service. Revisions were made based on recommendations from the experts. The questionnaire was pilot tested with parents who had characteristics similar to those used in the sample. Revisions were made based on results of the item analysis on the knowledge section, and a review of the other parts of the questionnaire.

The final questionnaire used in this study consisted of 85 items: 9 demographic questions, 27 attitude statements, 35 multiple choice statements, and 14 food purchasing practices.

Subjects for this study were parents who had preschool children attending a day care center or day care home in Iowa. To reach a representative sample of parents, a list of all the day care centers and family day care homes in Iowa was obtained from the Department of Public Instruction. Using the systematic sampling technique, 100 day care centers and 50 family day care homes were selected. Permission to use the parents of the children attending these centers was obtained from the center directors. A total of 6,370 questionnaires were delivered to each center to be distributed to the parents by the director. Of this number, 1,970 questionnaires were returned, yielding a 32.3% response. Usable data were obtained from 1,769 questionnaires.

Data from the questionnaires were analyzed as follows:
(1) frequencies and percentages were obtained for all four parts of the questionnaire; (2) an item analysis was computed to determine the quality of the multiple choice items; (3) an estimated reliability coefficient was calculated for the attitude, knowledge, and food purchasing practices scales; (4) differences in parents' nutrition attitudes, knowledge, and food purchasing practices by selected personal characteristics were determined by using a one-way analysis of variance; (5) relationships among nutrition attitudes, knowledge, and food purchasing practices were determined by using Pearson product-moment correlation coefficients; and (6) step-wise regression technique was used to determine variables that exerted the greatest amount of influence on nutrition attitudes, knowledge, and food purchasing practices. A path model was designed to explicate the regression analysis results.

An analysis of the demographic data indicated that two-thirds (67%) of the parents in this study were female. Most of the parents were 26 to 35 years of age (69%); were high school graduates (34%) or had some college (32%); had a family size of four (46%); lived in a town with a population of 2,500 to 49,999 (46%); were in service (35%) or professional, technical, or managerial occupations (31%); had received no nutrition training (63%); spent $101 to $250 on food eaten at home monthly (73%); and $50 or less on food eaten outside
The estimated reliability coefficient for the knowledge scale, as calculated by Kuder Richardson Formula 20, was .69. The estimated reliability for the nutrition attitude and food purchasing practices scale, as calculated by Cronbach Alpha, was .74, and .79, respectively.

Findings from the one-way analysis of variance showed that females made a significantly higher mean score for nutrition attitudes, knowledge, and practices than males. Parents who were age 36 and over made the highest mean score for knowledge; parents who had a bachelor's degree or beyond made the highest mean score for knowledge and attitudes; parents with a family size of 2 made the highest mean score for nutrition attitudes, followed by parents with a family size of 3; parents in professional, technical, or managerial occupations made the highest mean scores for nutrition attitudes and nutrition knowledge, while those in service occupations made the highest mean score for practices. For nutrition attitudes, knowledge, and food purchasing practices, parents who had received some type of nutrition training made the highest mean score. Parents who spent $76 or more monthly for food made the highest mean score for knowledge, and parents who spent $25 or less made the highest mean score for food purchasing practices.

Resulting correlation coefficients indicated that
nutrition attitudes, knowledge, and food purchasing practices were positively and significantly related. Nutrition attitudes were more strongly correlated with food purchasing practices than nutrition knowledge. Stepwise regression analysis results revealed that nutrition training, sex, education level, and family size explained 11% of the variance in nutrition attitudes. Twenty-two percent of the variance in nutrition knowledge was explained by education level, nutrition training, sex, and age. Nutrition attitudes, sex, money spent on food eaten outside the home, family size, nutrition training, residence, and knowledge, respectively, explained 28% of the variance in food purchasing practices. Since a large amount of the variance in nutrition attitudes, knowledge, and food purchasing practices was unexplained by variables used in this study, considerable caution should be used when interpreting these results.

When the hypotheses for this study were tested, findings indicated that:

(1) There was a significant difference in parents' nutrition attitudes with respect to sex, education level, family size, occupation, and nutrition training. Therefore, the hypothesis was rejected for these five independent variables and was not rejected as it related to age, residence, money spent on food eaten at home, and money spent on food
eaten outside the home.

(2) There was a significant difference in parents' nutrition knowledge based on age, sex, education level, occupation, nutrition training, and amount of money spent on food eaten outside the home. Thus, the hypothesis was rejected for these six independent variables and was not rejected for family size, residence, and amount of money spent on food eaten at home.

(3) There was a significant difference in parents' food purchasing practices based on sex, nutrition training, occupation, and amount of money spent on food eaten outside the home. Therefore, the hypothesis was rejected for these four independent variables and was not rejected for age, education level, family size, residence, and money spent on food eaten at home.

(4) There was significant relationship among parents' nutrition attitudes, knowledge, and food purchasing practices. Therefore, the hypothesis was rejected.

Recommendations

Recommendations for nutrition education programs:

(1) For nutrition attitudes, knowledge, and food purchasing practices, males consistently made a significantly lower mean score than females. Therefore, a concerted effort should be made to reach more men with useful nutrition
information.

(2) Parents age 25 and under made a significantly lower mean score for nutrition knowledge. Thus, avenues for disseminating nutrition information to young parents should be identified.

(3) Since parents with less than a high school education achieved the lowest mean score for nutrition attitudes and nutrition knowledge, nutrition education programs should be designed to meet the nutrition education needs of people with low education levels.

(4) Parents who had received some type of nutrition training made a significantly higher mean score for nutrition attitudes, knowledge, and food purchasing practices than those who had not. Thus, efforts to reach more people with reliable nutrition information should be continued.

(5) A relatively strong relationship was found between nutrition attitudes and food purchasing practices. Therefore, more time and effort should be devoted toward designing educational materials and experiences that promote favorable attitudes toward nutrition, in addition to imparting nutrition information.

(6) Since nutrition attitudes appear to influence food purchasing practices, emphasis should be placed on instilling positive attitudes in parents regarding menu planning, comparison shopping, reading food labels, and other food buying
concepts.

(7) Many of the demographic characteristics had a significant influence on the parents' nutrition attitudes, knowledge, and food purchasing practices. Therefore, although these influences were found to be weak in this study, their possible effects on nutrition education programs should be considered.

Recommendations for Further Research

(1) Since a weak relationship was found between nutrition knowledge and food purchasing practices, research should be conducted to evaluate current materials and strategies being used in nutrition education programs to help parents apply knowledge of nutrition to food purchasing practices.

(2) A large amount of the variance in nutrition attitudes, knowledge, and food purchasing practices was not explained by the independent variables used in this study. Therefore, the influence of other variables should be investigated such as family members, self concept, and values.

(3) Since such a weak relationship was found between nutrition knowledge and food purchasing practices, the items included on these scales should be evaluated to determine if any should be added or deleted to make the two scales more congruent.

(4) The items on the knowledge scale that did not
have an item total correlation coefficient of .25 should be deleted in order to improve the reliability of the knowledge scale.

(5) Research needs to be conducted to develop more consistent measures to use in determining the nutrition attitudes, knowledge, and food purchasing practices of different population groups.
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APPENDIX A. TABLES
Table 16. General evaluation plan for the food and nutrition questionnaire

<table>
<thead>
<tr>
<th>Content areas</th>
<th>Knowledge</th>
<th>Attitudes</th>
<th>Practices</th>
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<td>Nutrients/nutrition</td>
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<td></td>
</tr>
<tr>
<td>Food sources</td>
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<td>6</td>
<td></td>
</tr>
<tr>
<td>Calories</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Basic food groups</td>
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<td></td>
</tr>
<tr>
<td>Day care meals</td>
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<td>4</td>
<td></td>
</tr>
<tr>
<td>Food purchasing</td>
<td>5</td>
<td>10</td>
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Table 17. Item analysis for multiple choice knowledge statements

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<tr>
<th>Item number</th>
<th>Distractor analysis</th>
<th>Difficulty index</th>
<th>Discrimination index</th>
<th>Standard deviation</th>
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<td></td>
<td>a</td>
<td>b</td>
<td>c</td>
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<td>37^a</td>
<td>115</td>
<td>782^b</td>
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<td>38^a</td>
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<td>1145^b</td>
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<td>40^c</td>
<td>797</td>
<td>46</td>
<td>901</td>
<td>51</td>
</tr>
<tr>
<td>41^c</td>
<td>1408^b</td>
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</tr>
<tr>
<td>42^c</td>
<td>1732^b</td>
<td>31</td>
<td>16^b</td>
<td>97</td>
</tr>
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<td>250</td>
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<td>70^c</td>
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<td>71^c</td>
<td>1453^b</td>
<td>73</td>
<td>247</td>
<td>82</td>
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</table>

^a Items that met all the following criteria: 1) difficulty index, 30-70%; 2) discrimination index, .20-.40 or over .40 with a standard deviation above .20; and 3) all distractors functioning.

^b Correct response.

^c Items that met at least two criteria.
Table 18. Reliabilities and mean scores for the scales (n = 1769)

<table>
<thead>
<tr>
<th>Scales^a</th>
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<th>P</th>
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<tr>
<td>Number of items</td>
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<tr>
<td>Mean</td>
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<td>39.31</td>
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<tr>
<td>Standard deviation</td>
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<tr>
<td>Average interitem correlation</td>
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<td>.24</td>
<td>.01</td>
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<tr>
<td>Correlation minimum</td>
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<td>Correlation maximum</td>
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<td>Reliability (alpha)</td>
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<td>Standardized (alpha)</td>
<td>.75</td>
<td>.77</td>
<td>.68</td>
</tr>
</tbody>
</table>

^aScales indicated as follows (A - attitudes, P - food purchasing practices, and K - knowledge).
APPENDIX B. CORRESPONDENCE
LETTER TO EXPERTS REVIEWING QUESTIONNAIRE

The Department of Home Economics Education will be conducting a study for the Child Nutrition Department of Iowa's Department of Public Instruction. The title of the study will be "Parents' Conceptions and Attitudes About Food and Nutrition." The target audience for this study will be parents who have preschool children attending day care centers in Iowa.

Based on a review of the literature and several instruments on food and nutrition, the attached questionnaire was constructed. The six major content areas which comprise the questionnaire are: nutrition/nutrients, daily food guide, food sources, food purchasing, day care center meals, and calories.

You are requested to examine each section of the questionnaire for clarity, brevity, plausibility, and appropriateness. Specifically, you are requested to check whether:

1. the item selected for the correct answer in the multiple choice section is really the best answer,
2. there are better alternatives than the ones listed in the multiple choice section,
3. the statements in the multiple choice section adequately sample each of the six major content areas,
4. all statements are fair for the intended audience, and
5. all statements are clear and the concept in each statement is correct.

A table of specifications is enclosed to aid you in your examination of the questionnaire. You are urged to make as many comments as you deem necessary on the questionnaire. Your input will aid us in refining the questionnaire before pretesting.

If you have any questions regarding this study and/or the questionnaire, feel free to call Dr. Irene Beavers at 294-1234; if no answer, call 294-6444 and leave a message, or write to 215 MacKay Hall, Iowa State University, Ames, Iowa 50011.

We ask that you return the questionnaire in the self-addressed envelope by or as soon as possible.

Thank you in advance for your time and cooperation.

Sincerely,

Irene Beavers, Professor
Home Economics Education
Dear

The staff for the Nutrition Education Project in the Department of Home Economics Education expresses sincere thanks to you for evaluating the Nutrition Questionnaire for Parents. Your comments and suggestions were instrumental in helping us refine the questionnaire for use in the final study.

If we can be of assistance to you in the future, feel free to call upon us.

Sincerely,

Irene Beavers
Professor
Home Economics Education

Margaret J. M. Kelly
Graduate Assistant
Home Economics Education

Jan Pleener
Graduate Assistant
Home Economics Education
LETTER TO PARENTS PARTICIPATING IN PRETEST

October 30, 1980

Dear parent:

The Department of Home Economics Education is conducting a study for the Child Nutrition Division of Iowa's Department of Public Instruction. The title of the study is "Parents Conceptions And Attitudes About Food And Nutrition." This study is designed to determine your food knowledge, attitudes, and practices. The results will enable us to plan better nutrition education programs for children and their parents which can help promote good nutritional practices.

Your child's day care center has been selected to participate in the pilot study. The purpose of the pilot study is to determine if the questionnaire is appropriate for preschooler's parents. Therefore, we are requesting that both mothers and fathers read the instructions on the questionnaire carefully, complete the entire questionnaire, and make comments about whether there were any problems with understanding the questionnaire.

It should take approximately thirty (30) minutes to complete the questionnaire. You are asked not to sign your name. We are only interested in your responses and comments. Please return the completed questionnaire to the day care center's director on the next school day. Your immediate response to this questionnaire will be greatly appreciated.

Thank you in advance for your cooperation.

Sincerely,

Irene Beavers, Professor
Home Economics Education
LETTER TO SUPERVISORS RESPONSIBLE FOR SEVERAL CENTERS
REQUESTING PERMISSION FOR THE STUDY

The Department of Home Economics Education is conducting a study for the Child Nutrition Department of Iowa's Department of Public Instruction. The title of the study is "Parents Conceptions and Attitudes About Food and Nutrition." The target audience for this study will be parents who have preschool children attending day care centers in Iowa.

Fifty (50) family day care centers in Iowa have been selected to participate in this study. Some of these day care centers are under your sponsorship, therefore, we would like to request your permission to contact these centers about participating in the study.

Enclosed is a list of the family day care centers that have been selected. Also enclosed is a self-addressed stamped postcard for you to complete and return to us, indicating whether approval is granted or denied for us to contact the family day care centers listed.

Thank you for your cooperation.

Sincerely,

Irene Beavers
Professor
Home Economics Education
LETTERS TO DIRECTORS OF DAY CARE CENTERS AND HOMES
REQUESTING PARTICIPATION IN THE STUDY

The Department of Home Economics Education is conducting a study for the Child Nutrition Department of Iowa's Department of Public Instruction. The title of the study is "Parents' Conceptions and Attitudes About Food and Nutrition." The target audience for this study will be parents who have preschool children attending day care centers in Iowa.

Your day care center has been selected as one of those to participate in this study. Your involvement in the study will include the following:

1. Allow a graduate assistant to visit your center for not more than ten minutes, to explain the study and the questionnaire which will be sent home to each parent.

2. Give each parent a questionnaire (both mothers and fathers).

3. Ask the parents or children to return the completed questionnaires to you the following school day.

4. Return the completed questionnaires to us in the self-addressed stamped envelope which will be left when the graduate assistant visits your center.

5. If within a week, most of the parents have not returned a completed questionnaire, give each parent a follow-up letter which will also be left with you when the graduate assistant visits your center.

If permission is granted to use your day care center in this study, we will contact you by telephone to arrange a convenient date and time to visit. We hope to receive the postcard from you soon.

Thank you so much for your cooperation.

Sincerely,

Irene Beavers
Professor
Home Economics Education
Please check one of the following statements and complete the section below if appropriate. Return the post card as soon as possible.

____ Approval is granted for this day care center to participate in this study.

____ Approval is denied for this day care center to participate in this study.

Name of director

Name of day care center

Day care center's address

City, state and zipcode

Telephone number
LETTER TO DAY CARE CENTERS RESPONDING TO A PREVIOUS REQUEST
TO PARTICIPATE IN THE STUDY

October 16, 1980

Dear

The Department of Home Economics Education is conducting a study for the Child Nutrition Department of Iowa's Department of Public Instruction. The title of the study is "Parents' Conceptions and Attitudes About Food and Nutrition." The target audience for this study will be parents who have preschool children attending day care centers in Iowa.

Ms. Hunsley of the Department of Public Instruction informed me of your approval to allow your day care center to participate in this study. Your involvement in the study will include the following:

1. Allow a graduate assistant to visit your center for not more than ten minutes to explain the study and the questionnaire which will be sent home to each parent.

2. Give each parent a questionnaire (both mothers and fathers).

3. Ask the parents or children to return the completed questionnaires to you on the following school day.

4. Return the completed questionnaires to us in the self-addressed stamped envelope which will also be left by the graduate assistant.

5. If within a week most of the parents have not returned a completed questionnaire, give each parent a follow-up letter which will be left with you when the graduate assistant visits your center.

We will contact you by telephone in the near future to arrange a convenient date and time to visit your center.

Thank you so much for your cooperation.

Sincerely,

Irene Beavers
Professor
Home Economics Education
FOLLOW-UP LETTER TO PARTICIPANTS

Approximately a week ago the day care center's director gave you a questionnaire on food and nutrition. You were asked to complete the entire questionnaire and return it the following school day to the director. As indicated in the letter to you, see second page of the questionnaire, you do not need to sign your name. We are only interested in your responses to the items listed.

It is important that we have your input in order to make this study worthwhile, we would appreciate your completing the questionnaire at your earliest convenience and returning it to the day care center's director. If you have misplaced your questionnaire, feel free to request another one from the director.

If you have already returned a completed questionnaire to the director, our thanks to you for your time and cooperation.

Sincerely,

Irene Beavers
Professor
Home Economics Education

IB:da
THANK YOU LETTERS TO DAY CARE DIRECTORS AND HOME PROVIDERS

Dear

On behalf of the Home Economics Education Department and the Child Nutrition Program Division of the Iowa State Department of Public Instruction, we would like to express our sincere thanks to you for administering the nutrition questionnaire to the parents of children attending your family day care home. We are also grateful to you for collecting the completed questionnaires from the parents and mailing them to us.

Your cooperation in this very important phase of our study is greatly appreciated.

Sincerely,

Irene Beavers
Professor
Home Economics Education

Margaret J. M. Kelly
Graduate Assistant
Home Economics Education

Jan Fleener
Graduate Assistant
Home Economics Education
APPENDIX C. QUESTIONNAIRE
Nutrition Questionnaire for Parents

Home Economics Education Department
College of Home Economics
Iowa State University
Ames, Iowa 50011
Dear parent:

The Department of Home Economics Education is conducting a study for the Child Nutrition Department of Iowa's Department of Public Instruction. The title of the study is "Parent Conceptions and Attitudes About Food and Nutrition." This study is designed to determine your food knowledge, attitudes, and practices. The results of this study will enable us to plan better nutrition education programs for children and their parents which can help promote good nutritional practices.

Your child's day care center was selected as one of those to participate in this study. Therefore, the parents of each child at the center, both mothers and fathers, will be asked to complete a questionnaire. Parents are asked not to sign their names. We are only interested in the responses to each item on the questionnaire. Therefore, we encourage you to read the instructions for each section of the questionnaire carefully before completing it.

The questionnaire should take about 30 minutes to complete. Please complete the entire questionnaire as soon as possible and return it to the day care center's director. Your immediate response to this questionnaire will be greatly appreciated.

Thank you in advance for your cooperation.

Sincerely,

Irene Beaver
Irene Beaver, Professor
Home Economics Education
FOOD AND NUTRITION QUESTIONNAIRE FOR PARENTS

PART 1

GENERAL INFORMATION

DIRECTIONS: Please read each of the following questions carefully before responding. For each question, place a circle around the response that best describes you.

EXAMPLE: What is your marital status?

a. single
b. married
c. widowed
d. divorced

1. What is your sex?
   a. female
   b. male

2. What is your age group?
   a. under 20
   b. 21-25
   c. 26-30
   d. 31-35
   e. 36 and over

3. What is the highest educational level you have attained?
   a. grade school
   b. some high school
   c. high school graduate
   d. some college
   e. bachelor's degree
   f. beyond bachelor's degree

4. What is your family size?
   a. 2
   b. 3
   c. 4
   d. 5
   e. 6
   f. 7 or more

5. In what type of community do you live?
   a. farm
   b. rural non-farm
   c. small town (less than 2,499)
   d. town (2,500 to 49,999)
   e. city (50,000 and above)

Please go on to the next page
6. What is your main occupation?
   a. Professional, Technical, and Managerial - teacher, nurse, doctor, lab technician, shop owner, etc.
   b. Clerical and Sales - secretary, postal clerk, bank teller, store clerk, telephone operator, etc.
   c. Service - homemaker, cook, waiter-waitress, police officer, dry cleaner, janitor, hairdresser, etc.
   d. Agricultural, Fishery, Forestry, or Related Occupations - farmer, etc.
   e. Skilled, Semi-skilled Worker - mechanic, inspector, factory worker, toolmaker, construction worker, etc.
   f. Transportation - trucker, railroad employee, etc.
   g. Other - (please specify) _________________________________

7. Have you received any training (courses, workshops, newsletters, etc.) in food and nutrition?
   a. no
   b. yes

8. Approximately how much money is spent on food eaten at home by your family monthly?
   a. under $50
   b. $51-$100
   c. $101-$150
   d. $151-$200
   e. $201-$250
   f. $251-$300
   g. $301 and over

9. Approximately how much money is spent on food eaten outside the home by your family monthly?
   a. under $25
   b. $26-$50
   c. $51-$75
   d. $76-$100
   e. $101 and over
PART II

DIRECTIONS: The purpose of this section of the questionnaire is to provide a way for you to express your attitudes toward various statements related to food and nutrition. You are asked to respond to each statement in terms of your agreement with it. Please respond to each statement in the following manner.

SCALE: 5 4 3 2 1

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Don't Know</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

5 - if you strongly agree with the statement, write 5
4 - if you agree with the statement but do not feel strongly about it, write 4
3 - if you don't really know how you feel about the statement, write 3
2 - if you disagree with the statement but don't feel strongly about it, write 2
1 - if you strongly disagree with the statement, write 1

EXAMPLE: 4 Everything you eat is good for you.

10. Some ingredients in foods are harmful when continually consumed in large amounts.
11. If my child eats the recommended daily allowances of nutrients, he/she will not need to take vitamin supplements.
12. Serving well balanced meals assures that my child's nutrient needs will be met.
13. Since so many nutrients are added to foods, I don't have to worry about nutrition.
14. If my child eats three balanced meals a day, her/his daily nutrient needs will be met.
15. I need to learn more about food and nutrition.
16. Too much attention is being given to nutrition.
17. Children develop better eating habits when exposed to a wide variety of foods.
18. Cooked fresh fruits and vegetables are more nutritious than canned fruits and vegetables.

Please go on to the next page
19. If given a choice, children would eat more nutritious foods than junk foods.

20. A knowledge of the basic food groups can aid me in planning more nutritious meals.

21. I can make the best decision about what my child should eat.

22. A variety of fruits and vegetables are served in day care center meals.

23. As long as my child drinks plenty of milk, I don't have to worry about nutrition.

24. Hot lunches should be served daily at the day care center.

25. The day care center is an ideal place for young children to learn about food and nutrition.

26. The person responsible for planning day care center meals should have received some training in food and nutrition.

27. Family needs, likes and dislikes should be considered when planning food purchases.

28. Brand name foods are better buys nutritionally than store brand foods.

29. When making food purchases, following a written shopping list can help prevent me from making unnecessary purchases.

30. Reading the nutrition information on food labels can help me compare the nutritional quality of two different kinds of food.

31. Newspaper advertisements can help me plan more nutritious low-cost meals.

32. The nutrition information on food labels can help me choose foods for special diets.

33. Reading the nutrition information on food labels takes too much of my shopping time.

34. The nutrition information on food labels is too complicated for me to understand.

35. The nutrition information on food products really isn't needed.

36. Food bought in health food stores is more nutritious than food bought in other food stores.
DIRECTIONS: Read each of the following multiple choice statements carefully before responding. For each statement, circle the letter that represents the best answer as shown in the example below. Please answer every statement.

EXAMPLE: A food that is found in the milk group is

- a. eggs
- b. cheese
- c. orange

37. A definition of nutrition is

- a. amounts and kinds of foods eaten
- b. foods eaten and how the body uses them
- c. vitamins and minerals needed by the body

38. Thiamin, riboflavin and niacin are

- a. amino acids
- b. B vitamins
- c. minerals

39. The nutrient that would most likely be harmful to health if continually consumed in large amounts is

- a. calcium
- b. niacin
- c. Vitamin A

40. Water is important to the body because it

- a. maintains the acid-base balance
- b. prevents blood clotting
- c. regulates body temperature

41. An important function of carbohydrates in the body is to

- a. provide energy
- b. repair cells
- c. stimulate digestion

42. A nutrient that is very important for building red blood cells is

- a. iron
- b. riboflavin
- c. thiamin

43. A nutrient that is important for growth and maintenance of body tissues is

- a. phosphorus
- b. potassium
- c. protein

Please go on to the next page
44. A vitamin that helps build strong bones and teeth is
   a. A
   b. B12
   c. D

45. Calcium, iron and fat are
   a. minerals
   b. nutrients
   c. vitamins

46. Fortified milk as compared to whole milk has
   a. fewer nutrients
   b. more nutrients
   c. similar nutrients

47. A food that is a good source of Vitamin C is
   a. apples
   b. canteloupe
   c. grapes

48. A good source of calcium is
   a. dark green leafy vegetables
   b. lean meats
   c. yellow fruits

49. Squash, pumpkin and sweet potatoes are all good sources of Vitamin
   a. A
   b. B
   c. C

50. Lean pork is an outstanding source of
   a. iron
   b. riboflavin
   c. thiamin

51. The best food source of iron listed below is
   a. spinach
   b. sweet potatoes
   c. tomatoes

52. A calorie is a unit of
   a. energy
   b. fat
   b. protein
DIRECTIONS: The following label should be used to answer statement 53.

NUTRITION INFORMATION
(PER SERVING)
SERVING SIZE = 1 CUP
SERVINGS PER CONTAINER = 24

<table>
<thead>
<tr>
<th>FLAKES+MILK, WATER, SALT*</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLAKES</td>
</tr>
<tr>
<td>PROTEIN, GRAMS</td>
</tr>
<tr>
<td>CARBOHYDRATE, GRAMS</td>
</tr>
<tr>
<td>FAT, GRAMS</td>
</tr>
</tbody>
</table>

PERCENTAGE OF U.S. RECOMMENDED DAILY ALLOWANCES (U.S. RDA)

| PROTEIN | 4 | 6 |
| VITAMIN A | 2 | 10 |
| VITAMIN C | 80 | 80 |
| THIAMIN | 10 | 10 |
| RIBOFLAVIN | 2 | 5 |
| NIACIN | 10 | 10 |
| CALCIUM | 2 | 4 |
| IRON | 4 | 4 |

*PREPARED ACCORDING TO RECIPE ON BACK OF PACKAGE.

53. Using the above nutrition label for potato flakes, the number of calories in a 1/2 cup serving of prepared potatoes is

a. 70
b. 140
c. 280

54. The nutrient that is the most concentrated source of calories is

a. carbohydrates
b. fat
c. protein

55. To lose one pound of fat, the number of calories that must be expended is

a. 2500
b. 3000
c. 3500

56. The change that would bring about the greatest amount of calorie savings without greatly altering the amounts of nutrients is

a. mashed potatoes for hash browns
b. fruits for bread products
c. skim milk for whole milk

Please go on to the next page
57. The list of foods that contains an item from each of the basic four food groups is
   a. bacon, eggs, orange juice and milk
   b. grapes, macaroni, carrots and beef
   c. ice cream, muffins, beets and eggs

58. The best way for children to attain all the essential nutrients is to
   a. consume three meals a day
   b. include vitamin and mineral supplements in the diet
   c. eat a wide variety of foods in recommended amounts

59. The minimum number of servings of milk recommended for children under the age of nine years is
   a. two
   b. three
   c. four

60. The number of servings of bread and cereal products recommended for both children and adults each day is
   a. two
   b. three
   c. four

Refer to the following menus to answer statement 61.

<table>
<thead>
<tr>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banana</td>
<td>Peanut Butter Sandwich</td>
<td>Pork Chops</td>
</tr>
<tr>
<td>Scrambled Eggs</td>
<td>Carrot Sticks</td>
<td>Baked Potatoes</td>
</tr>
<tr>
<td>Toast</td>
<td>Baked Apples</td>
<td>Bean Salad</td>
</tr>
<tr>
<td>Milk</td>
<td>Milk</td>
<td>Rolls</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vanilla Ice Cream</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ice Tea or Milk</td>
</tr>
</tbody>
</table>

61. A change that would best insure that all essential nutrients are included in the diet above would be to substitute
   a. orange juice for the banana
   b. roast beef for the peanut butter
   c. spinach for the carrot sticks
62. The proportion of recommended daily nutrients for children in a day care center's lunch is
a. 1/4
b. 1/3
c. 1/2

63. A day care center's lunch that meets the minimum government requirements for 3 to 6 year old preschoolers is
a. 3/4 cup of milk, 1 1/2 ounces of meat or a similar meat alternative, 1/2 cup of fruit or vegetable and 1/2 slice of bread.
b. 1 cup of milk, 1 ounce of meat or a similar meat alternative, 1/2 cup of fruit or vegetable and 1 slice of bread.
c. 1/2 cup of milk, 2 ounces of meat or a similar meat alternative, 1/3 cup of fruit or vegetable and 1 slice of bread.

64. The federal agency that regulates nutrition programs for children in day care centers is the
a. Federal Commodity Food Commission
b. Food And Drug Administration
c. Department of Agriculture

65. A substitution for a bread product in a day care center's meal might be a serving of
a. popcorn
b. potatoes
c. rice

66. The group of foods that would best meet the requirements for a day care center's snack is
a. cookies and orange drink
b. fruit gelatin and apple slices
c. milk and muffin

67. The term that identifies the addition of certain B vitamins and iron to bread products is
a. enriched
b. fortified
c. restored

68. Nutrition labeling can be used to compare the nutritive value of
a. canned green beans with frozen green beans
b. cured ham with canned ham
c. fresh potatoes with french fries
69. The item that is required on nutrition labels, but is not a nutrient is
   a. calories
   b. fat
   c. water

70. The food which would have the highest nutritive value, per serving, for the amount of money spent is
   a. bananas as compared to oranges
   b. cabbage as compared to lettuce
   c. lima beans as compared to kidney beans

71. The label below indicates the contents of a can. According to this label, the ingredient that is present in the largest amount is
   a. beans
   b. pork
   c. sugar
PART IV

DIRECTIONS: People adopt various practices related to meal planning and food purchasing. Listed below are several of those practices. Please use the following scale to indicate the degree to which you do each practice. Please read each statement carefully before responding.

SCALE: 5 4 3 2 1

Very Often Sometimes Seldom Never

EXAMPLE: 2 Carry children along when shopping for food.

72. Choose food according to its quality.
73. Consider family needs, likes and dislikes when planning food purchases.
74. Take an inventory of foods on hand before shopping for food.
75. Follow a written shopping list when shopping for food.
76. Read the expiration date on food products before making a purchase.
77. Choose food according to its price.
78. Shop at stores that offer trading stamps.
79. Compare the cost of purchasing food in large quantities with that of purchasing in small quantities before making a purchase.
80. Use the nutrition information on food labels to compare the nutritive value of two different brands of food.
81. Choose food according to its nutritive value.
82. Use newspaper advertisements to help plan more nutritious low-cost meals.
83. Use the nutrition information on food labels to help purchase foods for special diets.
84. Use food coupons to help purchase food more economically.
85. Choose foods that are quick and easy to prepare.

COMMENTS:
APPENDIX D. CODING PLAN
### Coding Plan for Data Analysis

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<th>Card 1</th>
<th>Column number</th>
<th>Code number and variable</th>
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<tbody>
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<tr>
<td></td>
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<td>2- rural nonfarm</td>
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<td>3- small town</td>
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<td></td>
<td>4- town</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5- city</td>
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</tbody>
</table>
### Column number and Code number and variable

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<th>Occupation:</th>
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<tbody>
<tr>
<td>1</td>
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</tr>
<tr>
<td>2</td>
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<td>3</td>
<td>service</td>
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<td>4</td>
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<td>5</td>
<td>skilled, semi-skilled</td>
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<tr>
<td>6</td>
<td>transportation</td>
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<td>7</td>
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<td>2</td>
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<td>3</td>
<td>$101-$150</td>
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<tr>
<td>4</td>
<td>$151-$200</td>
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<td>$51-$75</td>
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<tr>
<td>2</td>
<td>disagree</td>
</tr>
<tr>
<td>3</td>
<td>don't know</td>
</tr>
<tr>
<td>4</td>
<td>agree</td>
</tr>
<tr>
<td>5</td>
<td>strongly agree</td>
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<td>2</td>
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<td>3</td>
<td>c</td>
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**Card 2**

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<table>
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<th>Food purchasing practices:</th>
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<td>1</td>
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<td>2</td>
<td>seldom</td>
</tr>
<tr>
<td>3</td>
<td>sometimes</td>
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<tr>
<td>4</td>
<td>often</td>
</tr>
<tr>
<td>5</td>
<td>very often</td>
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</tbody>
</table>
12. Serving well-balanced meals assures that my child's nutrient needs will be met.

13. Since so many nutrients are added to foods, I don't have to worry about nutrition.

16. Too much attention is being given to nutrition.

18. Cooked fresh fruits and vegetables are more nutritious than canned fruits and vegetables.

23. As long as my child drinks plenty of milk, I don't have to worry about food and nutrition.

28. Brand name foods are better buys nutritionally than brand name foods.

33. Reading nutrition information on food labels takes too much of my shopping time.

34. Reading the nutrition information on food labels is too complicated for me to understand.

35. The nutrition information on food products really isn't needed.

36. Food bought in health food stores is more nutritious than foods bought in other food stores.
APPENDIX E. SCALES
16. Too much attention is being given to nutrition.
17. Children develop better eating habits when exposed to a wide variety of food.
20. A knowledge of the basic food groups can aid me in planning more nutritious meals.
23. As long as my child drinks plenty of milk, I don't have to worry about nutrition.
26. The person responsible for planning day care center meals should have received some training in food and nutrition.
27. Family needs, likes, and dislikes should be considered when planning food purchases.
28. Brand name foods are better buys nutritionally than store brand foods.
29. When making food purchases, following a written shopping list can prevent me from making unnecessary purchases.
30. Reading the nutrition information on food labels can help me compare the nutritional quality of two different kinds of foods.
31. Newspaper advertisements can help me plan more nutritious low-cost meals.
32. The nutrition information on food labels can help me choose foods for special diets.
33. Reading the nutrition information on food labels takes too much of my shopping time.
34. The nutrition information on food labels is too complicated for me to understand.
35. The nutrition information on food products really isn't needed.
Statements Included on the Food Purchasing Practices Scale

72. Choose food according to its quality.

73. Consider family needs, likes, and dislikes when planning food purchases.

74. Take an inventory of foods on hand before shopping for food.

75. Follow a written shopping list when shopping for food.

76. Read the expiration date on food products before making a purchase.

79. Compare the cost of purchasing food in large quantities with that of purchasing in small quantities before making a purchase.

80. Use the nutrition information on food labels to compare the nutritive value of two different brands of food.

81. Choose food according to its nutritive value.

82. Use newspaper advertisements to help plan more nutritious low-cost meals.

83. Use the nutrition information on food labels to help purchase foods for special diets.

84. Use food coupons to help purchase food more economically.

85. Choose foods that are quick and easy to prepare.
APPENDIX F. LIST OF DAY CARE CENTERS AND HOME PROVIDERS PARTICIPATING IN THE STUDY
## Participating Day Care Centers Receiving Funds from the Child Nutrition Program, Iowa Department of Public Instruction

<table>
<thead>
<tr>
<th>Day Care Center</th>
<th>City in Iowa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Hawk Buch Head Start</td>
<td>Waterloo</td>
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<tr>
<td>Cedar Valley Child Care Center</td>
<td>Cedar Falls</td>
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<tr>
<td>Fun-Time Preschool and Child Care Center</td>
<td>Postville</td>
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<tr>
<td>University of Northern Iowa Education Center</td>
<td>Cedar Falls</td>
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<td>Grin and Grow, LTD</td>
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<tr>
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<td>C Brown Community Day Care</td>
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<td>Waterloo Child Care Center</td>
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<tr>
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<td>Burlington</td>
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<tr>
<td>University of Dubuque Day Care</td>
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<tr>
<td>Dubuque Child Care, Inc.</td>
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<tr>
<td>Coral Nursery and Day Care Center</td>
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<td>Hawkeye Area Community Action</td>
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<td>Emmetsburg Child Care Center</td>
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<td>Day Care Center</td>
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<tr>
<td>Upper Des Moines Opportunity</td>
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<td>Iowa East Center Train-Kids</td>
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<td>Zion Lutheran Preschool</td>
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<td>Hawarden</td>
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### Participating Family Day Care Homes

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<tr>
<td>Joann Fritz</td>
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</table>
APPENDIX G. LIST OF EXPERTS
List of Experts

Eleanor Hunsley, State Coordinator, Nutrition Education and Training Program, Child Nutrition Programs Division, Iowa Department of Public Instruction

Teresa Nece Breidingner, Area Consultant, Nutrition Education and Training Program, Child Nutrition Programs Division, Iowa Department of Public Instruction

Sheryl Harrison, Food Service Coordinator, Cooperative Child Care Services, Ames, Iowa

Janet Stammer, Nutrition Outreach Worker, Cooperative Child Care Services, Ames, Iowa

Dr. Rosalie Amos, Assistant Professor, Home Economics Education, I.S.U.

Dr. Jerelyn Schultz, Associate Professor, Home Economics Education, I.S.U.

Maxine Marie Corey, Assistant Professor, Food and Nutrition, I.S.U.

Dr. William Runyan, Associate Professor, Food and Nutrition, I.S.U.

Dr. Nancy Brown, Associate Professor, Institution Management, I.S.U.

Jim Huss, Institution Management Specialist, Iowa Extension Service