A food purchasing behavior device for upper elementary students

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A FOOD PURCHASING BEHAVIOR DEVICE FOR UPPER ELEMENTARY STUDENTS

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A food purchasing behavior device
for upper elementary students

by

Shirley Cline Gilmore

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

Major: Home Economics Education

Approved:
Signature was redacted for privacy.

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Signature was redacted for privacy.

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For the Graduate College

Iowa State University
Ames, Iowa
1983
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INTRODUCTION

A major goal of nutrition education is that each person be adequately nourished to meet both biological and social needs. This goal has ramifications for individuals throughout all stages of the life cycle including pre-adolescent years. The implications for nutrition education were delineated in 1969 in the White House Conference on Food, Nutrition, and Health report. This comprehensive document outlines seven major conceptual areas within the nutrition education framework. One of the conceptual areas is food handling, which includes everything that happens to food while it is being processed, stored, and prepared. An important concept within food handling is food purchasing.

Studies to determine the need for education related to food purchasing at the elementary level were conducted by surveying the perceptions of adults, elementary teachers, and mothers (Hackleman & Jones, 1981; Chamberlin, 1979; and Ward & Wackman, 1972). The results of these studies supported that education to develop food purchasing skills should begin during the early formative years.

The extent to which food purchasing concepts were taught in elementary grades was determined by a survey of 12 elementary food and nutrition curriculum guides. This survey showed that concepts in this area did not receive major emphasis and were scattered throughout the guides. If education is to have as one of its goals increasing consumer knowledge and skills related to food purchasing, then greater
emphasis on these skills needs to occur during the elementary school years.

Suggestions for content in food purchasing can be obtained from the field of consumer education. A variety of consumer skills needed to perform satisfactorily in the marketplace have been identified. Among the skills a consumer needs to have are: how to obtain and use information, how to compare packages to determine which contains the most product, and how to determine unit pricing. These skills are broadly based; therefore, they must be subdivided and sequenced. Subsequently, skills appropriate for elementary students can be identified.

Research studies that assess consumer knowledge and skills of elementary students can be one basis for identifying appropriate consumer skills. Three such studies were found. Two of these assessed the whole domain of consumer education (Farnsworth & Dunoskovic, 1980; and Turner & Brandt, 1978). One study assessed the food purchasing behaviors of students by exposing them to consumer choices using actual food products (Fanslow, 1981). The findings provided information concerning the food purchasing behaviors that could be expected at different grade levels.

Although it is important for elementary students to obtain consumer knowledge and skills on which to base their actions, competence in these areas does not necessarily ensure appropriate behaviors. It is necessary to identify what behaviors the students need to have, measure their present behaviors, and define the discrepancy that exists before
decisions can be made as to which food purchasing behaviors to include in nutrition education.

Needs assessment is one technique that can be used to determine this discrepancy. Information obtained during the needs assessment may be used as a basis for determining educational needs and making educational decisions. Although the literature related to needs assessment discusses the importance of using a needs assessment to determine the discrepancies, the procedure on how to accomplish the actual needs assessment is not identified. The individual conducting the needs assessment is on his/her own to determine the standard and design the needs assessment device.

Two approaches for developing evaluation devices seem plausible, that is, using either a norm-referenced or a criterion-referenced procedure. The norm-referenced procedure is concerned with the relative behavior of pupils and uses item difficulty and discrimination as criteria for item selection. The criterion-referenced procedure is used to interpret the data in terms of specific learning tasks being measured. Because the norm-referenced procedure is empirically based and provides data on students, this procedure is preferable and will be used in this study.

Therefore, the purpose of this study is to develop a group-administered valid device to be used as a needs assessment in the area of food purchasing for upper elementary students. The quality of the needs assessment will be evaluated using the norm-referenced procedure. This study is a part of the project, Nutrition Education for Elementary
Students: Instruction and Evaluation of the Iowa Agriculture and Home Economics Experiment Station, Project #2592. This study is funded by National Dairy Council and Iowa State University.

For this study, the following definitions are used:

**Food purchasing behaviors:** Actions concerned with food selection in the supermarket.

**Needs assessment:** A process of ascertaining the discrepancy between what one knows and what one is expected to know.
REVIEW OF LITERATURE

Food consumed in the home is influenced by the choices made in the marketplace. Therefore, helping students become better purchasers of food is an important area of nutrition education.

Family food buying habits are influenced by children with the older child having a greater influence (Ward & Wackman, 1972). Because of this influence, there is need to determine if upper elementary school children have the consumer skills needed to perform satisfactorily in the marketplace. The review of literature is organized into two areas: consumer education needs of elementary school children and assessment techniques for determining educational needs.

Consumer Education Needs of Elementary School Children

Consumer education is defined as "the process that arms an individual with the knowledge and self-confidence needed ... to make decisions related to spending and conserving ... available resources with an eye toward individual satisfaction, marketplace efficiency, and the public good" (Willet, 1977, p. 12). Buyers and sellers are better matched when all come to the marketplace with accurate information and acknowledged rights and responsibilities. However, in most instances, buyers do not come to the marketplace with adequate information.

An aspect of consumer education that is important is helping the consumer make satisfactory food choices. The 1969 White House Conference on Food, Nutrition, and Health (WHC) report includes food purchasing within the concept of food handling (Mayer, 1969). This concept states
that the way a food is handled influences the amount of nutrients in
the food, its safety, appearance, taste, and cost; handling means
everything that happens to food while it is being grown, processed,
stored, and prepared. The WHC report is a comprehensive document for
all of nutrition education. Topics relevant to different age groups
need to be delineated within this framework.

Studies conducted with adults, elementary teachers, and mothers
demonstrate the need for consumer education related to food purchasing
at the elementary level. Consumer usage of and satisfaction with
information on food labels was evaluated by the Food and Drug Administra-
tion in a national survey of 864 "chief food buyers" for their respective
households (Hackleman & Jones, 1981). The survey revealed that nearly
27% of the respondents found the nutrition labeling information to be
confusing and that not much attention is paid to the nutrition label.
Approximately 73% of "the chief food buyers" indicated they were
interested in learning more about nutrition.

Although it appears that remedial work with adults is needed,
educational programs that contain food purchasing concepts are needed
for students at all grade levels. The authors suggest the following
implications for teaching: 1) teachers should try to ensure that the
students have more knowledge in food purchasing than the present genera-
tion apparently has, 2) students should be encouraged to think about
and discuss their own (and their family's) actual behavior while in the
grocery store, and 3) students must have an opportunity to deal with
practical application of this knowledge.
Support for consumer education at the elementary level was identified by a survey of the 2,953 elementary teachers in British Columbia, Alberta, and Saskatchewan (Chamberlin, 1979). Teachers verified that they believed consumer education should help broaden the children's perception of the marketplace and equip them with knowledge and skill so they can pursue their interests as consumers. To operationalize the findings of this study, a task force recommended that the schools offer the means to encourage consumer skills at the earliest possible age through 1) offering workshops to assist teachers in their consumer education programs, 2) developing consumer education resources for children, and 3) encouraging education faculties to enhance their preparation of elementary teachers in consumer studies.

Classroom activities related to consumer education were developed for 11 areas. Nutrition was one of the areas that received attention. Subject matter included such topics as advertising, prices, and critical consumer choice. In addition, the task force encouraged that the formation of essential analytical and literary skill be assisted by applying these skills to consumer problems in the classroom.

The influence of children on purchasing behaviors of parents was determined by a survey of 109 mothers of 5- to 12-year-old children. The participants were recruited from service clubs in the Boston metropolitan area and represented the upper to middle-upper socio-economic classes. Findings showed that children's attempts to influence family purchases tended to decrease somewhat with age, but mothers yielded more to the influence attempts of older children. A probable
factor may be the perceived increased competence of older children in making judgments about purchase decisions. The overall percentage of yielding ranged from 51.6% with 5- to 7-year-old children to 59.4% with 11- to 12-year-olds (Ward & Wackman, 1972).

The need for education in the area of food purchasing is demonstrated by the results of these studies. Therefore, 12 food and nutrition curriculum guides (see Appendix A) for elementary students were surveyed by the investigator to determine the concepts that are taught in this area. Concepts related to food purchasing were scattered throughout the guides and did not receive major emphasis. It is apparent that education aimed at increasing consumer skills during the elementary school years has been minimal.

Consumer educators have identified a variety of consumer skills needed to perform satisfactorily in the marketplace. Among the skills the consumer needs to have are: how to obtain and use information, how to compare packages to determine which contains the most product, and how to determine unit pricing. While consumers make choices daily, their ability to assess and use information to guide these choices is low (Turner & Brandt, 1978).

Because children do not automatically learn to function as consumers, education to develop food purchasing skills needs to begin during the early formative years. Therefore, it is necessary to determine what consumer skills are used by elementary children.
Consumer skills utilized by elementary children

Only three research studies related to the consumer skills used by elementary children were found. In one study, a simulated market was used to measure the use of selected consumer skills of children (Turner & Brandt, 1978). The simulated market was composed of three progressively more difficult levels. The test involved skills related to determining the best buy for the money spent. Two forms of the simulated market were used, one as a test and one as a retest with approximately 15 minutes between the tests.

In the first level of the simulated market, each child was given one piece of token money and an opportunity to earn a second piece. The child could make a purchase before or after earning the additional money. One item could be purchased with one token or three items with two tokens. A best buy was considered to be the purchase of three items as opposed to the purchase of two items.

The second level tested the child's ability to compare quantity in different sizes and shapes of packages. The child was given two packages of the same product, one containing many individually wrapped pieces and the other containing one large piece. To determine the best buy, the child first had to assess which package contained the most product.

Level three tested the child's ability to compute and use unit pricing. The child had to compare three different sizes and shapes of similar type products to determine the most product for the money spent.
In levels two and three, the child was requested to tell the interviewer how their answer was determined.

Findings indicated that the older children did better on both the test and retest than did younger children. Further, the more opportunities available to the child to participate in the consumer education decision-making process and the more responsibilities the child assumed, the higher the subjects scored.

The "Primary Test for Economic Understanding" was used to determine the effectiveness of the consumer education program for elementary students in the Granite School District in Utah (Farnsworth & Dunoskovic, 1980). The program was designed to provide learning activities during a time when values and attitudes were being developed, because these traits are such an integral part of buying. The test was given to one group of students who would receive instruction and to a similar group of students who would not receive instruction. After the 8-week period of instruction, the same test was administered to both groups of students. The test assessed concepts related to purchasing, advertising, basic economics, and money management. It was concluded that the students who received instruction in consumer concepts had a significantly greater understanding of these concepts than students who did not receive instruction.

Although knowledge is an important aspect in food purchasing, knowledge does not necessarily translate into behaviors. The only study related to the assessment of food purchasing behaviors was done with first, third, and fifth grade students in central Iowa.
(Fanslow, 1981). The major concepts assessed were product quality, food labeling, and shopping techniques. Product quality emphasized the selection of foods in the grocery store that have optimum characteristics for consumption. Food labeling surveyed behavior related to selection of food based on the use of product labels. Shopping techniques emphasized wise selection of food products.

Situations using actual food items were designed to expose students to consumer choices that elementary students might encounter. The survey provided information about behaviors that might be expected at different age/grade levels.

Findings suggested the following content areas at each grade: grade 1, product quality and shopping techniques (limited); grade 3, product quality, shopping techniques, and food labeling (limited); and grade 5, shopping techniques and food labeling. The survey was individually administered. Because 30 minutes per child are required for administration, this survey is not usable for group assessment.

These studies show that elementary students are able to learn consumer skills related to food purchasing and should be involved in the marketplace. However, most food purchasing concepts are sketchy and occur in consumer education rather than nutrition education. To identify what elementary children need to learn, it is necessary to assess the food purchasing behaviors of these students. One technique that can be used is a needs assessment.
Assessment Techniques for Determining Educational Needs

A needs assessment is a process for obtaining and analyzing factual information of a specific group. Information obtained will be used as a basis for determining educational needs and making educational decisions (Price, 1982).

A needs assessment provides a view of the present by giving critical benchmark data and identifying the discrepancies that exist as well as the focus needed to reduce these discrepancies (Hays & Linn, 1977). The discrepancy refers to some lack in the individual; a gap in knowledge, attitude, or skill measured according to some objective criterion.

Needs assessment techniques can be an integral part in effectively planning and evaluating educational programs (Rimmer & Burt, 1980). Depending on the results of the needs assessment, on-going activities can be maintained, modified, or eliminated from the program and new activities can be developed or implemented.

A needs assessment involves an understanding of the concept of need as well as insight into the purpose for conducting the needs assessment. An accepted definition of need is: "the measurable discrepancy existing between a present state of affairs and desired state of affairs" (Beatty, 1981). In order to determine demonstrable needs, the need must be compared to some sort of standard.

Labeling a need as educational implies that it is capable of being satisfied by means of appropriate learning experiences (Monette, 1977). Defining need as a discrepancy between desired results and observed
results ensures that no solutions or processes for closing the gap are included in the need statement (Kaufman et al., 1981).

A need may be determined by either an "owner" of a need or an "authority" on need. In the latter instance, the need is described as prescriptive and is viewed as a condition of deficiency relative to a publicly proclaimed goal or a desired state of affairs (Beatty, 1981).

Needs assessments that produce objective results are usually more acceptable than those producing subjective results. In addition, care must be taken during the assessment process to avoid the imposition of values and biases of the assessor onto the data gathered.

A well-planned needs assessment includes these basic criteria:
1. It involves a broad spectrum of persons affected.
2. In determining a need, the concerns of people are matched with the best information (facts) available.
3. The focus is on the learner needs or deficiencies, not on institutional needs.
4. Needs are reported in such a way as to provide maximum assurance that action will occur to meet the need (Price, 1982).

The process of collecting data to change an expressed concern into a validated need is the assessment part of the needs assessment.

Need assessment models vary in purpose and application. Three models that have been identified are: self-fulfillment, individual appraisal, and system discrepancy models (Price, 1982). The self-fulfillment model is aimed at discovering the needs of a segment of population in order to attract people to educational programs.
The needs are usually defined as interests and wants. A major problem with this model is the tendency toward creating and maintaining a program rather than focusing on learner needs.

Individual appraisal needs assessment model engages the participation of individual learners in determining their own learning needs. The potential lack of vision by the learners in recognizing and understanding essential learning needs is a problem.

The system-discrepancy model seeks to identify the gaps between what is and what ought to be in a given situation. An attempt is made to define the deficiencies and then develop programs to eliminate these deficiencies. Educational needs and educational objectives are directly related to the defined difficulties within the learning system. This results in educational programs with a general improvement thrust rather than a specific remedial thrust.

Although literature related to needs assessment discusses the need to determine the discrepancies that occur in educational programs, few have wrestled with the procedure on how to accomplish the actual needs assessment. The individual conducting the needs assessment is on their own to determine the standard for expected behavior, design the needs assessment device, and evaluate the quality of the device.

The norm-referenced technique is one possible solution for evaluating the device. This procedure involves determining content validity, factor structure, reliability, and quality of items.
Summary

Consumer education for elementary school children is supported by studies with adults, elementary teachers, and mothers. Skills needed to perform satisfactorily in the marketplace have been identified. Little, however, has been done in consumer education for elementary school children.

Three studies were found related to consumer skills used by elementary children that included concepts related to food purchasing. Only one of the studies assessed the food purchasing behaviors of elementary school children. This study utilized an individually-administered survey that did not lend itself to group assessment. The other two studies evaluated a gain in consumer knowledge and an increase in consumer skill. Although knowledge and skill are important aspects of consumer education, they do not necessarily translate into behaviors.

Before decisions related to food purchasing can be made, the needs of elementary students must be identified. A needs assessment is one method that can be used as a basis for determining educational needs and making educational decisions. Therefore, the purpose of this study is to develop a group-administered valid device to be used as a needs assessment in the area of food purchasing for upper elementary students.
An important area of nutrition education is helping elementary students become able purchasers of food. Although consumer educators have identified a variety of food purchasing skills needed to perform satisfactorily in the marketplace, education aimed at increasing these skills has been minimal. Concepts related to food purchasing occur in elementary food and nutrition curriculum guides, but they do not receive major emphasis.

Food purchasing concepts that need to be taught to elementary students are determined by identifying the behaviors students need to have, measuring their present behaviors, and defining the discrepancy that exists. The objective of this study was to develop a group-administered valid device to be used as a needs assessment in the area of food purchasing for upper elementary students.

Plan for Needs Assessment Device

Three major concepts related to food purchasing were identified as appropriate for elementary students (Fanslow, 1981). The three concepts were 1) product quality, 2) food labeling, and 3) shopping techniques. Product quality is the selection of foods that have optimum characteristics for consumption. Food labeling is the selection of food based on the use of product labels. Shopping techniques are the wise selection of food products. Ideas for selected behaviors were obtained from elementary food and nutrition curriculum guides.
(see Appendix A) and the dietary guidelines (U.S. Senate Select Committee on Nutrition and Human Needs, 1974).

The following outline identifies the behaviors that were judged to be of importance to fifth and sixth grade students.

A. Food quality
   1. Select foods based on fat, sugar, sodium, and fiber content.
   2. Select food products using dating information.
   3. Select food containers that are intact.

B. Food labeling
   1. Select food products using nutritional information obtained from the labels.
   2. Select food products using economic information obtained from the labels.

C. Shopping techniques
   1. Select food products to get the best buy.
   2. Choose the most useful information to select food products.
   3. Organize shopping trips using detailed shopping lists.

A table of specifications was developed to be used as a basis for the needs assessment device. The percentages of the total device planned for each area are shown in Table 1.

Development and Validation of Needs Assessment Device

Given that the content for each area had been identified, it was necessary to develop a format that could be used for group assessment.
Table 1. Table of specifications

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
<th>Item number</th>
<th>No. of items</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Shopping techniques</td>
<td>Shopping techniques emphasize behaviors related to unit pricing, getting the best buy, use of coupons, organization of shopping trip, and use of reliable information to select food products.</td>
<td>2, 5, 6, 7, 11, 16, 20, 21, 23, 24, 27</td>
<td>11</td>
<td>38</td>
</tr>
<tr>
<td>Food labeling</td>
<td>Food labeling emphasizes the selection of foods based on information obtained from the labels on food products. Situations involve selecting foods which meet nutritional or economic needs.</td>
<td>4, 9, 12, 18, 22, 26, 28</td>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>Food quality</td>
<td>Food quality emphasizes the selection of food as it relates to health and foods that have optimum characteristics for consumption. Situations involve selection of food based on sugar, sodium, fat, and fiber content; use of food dating information and selection of food containers that are intact.</td>
<td>1, 3, 8, 10, 13, 14, 15, 17, 19, 25, 29</td>
<td>11</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>29</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Important considerations were that the format be practical and usable in terms of cost and time for administration.

An audio-visual format using colored slides to depict each of the behaviors was investigated. However, due to the cost of reproducing the slides, this format was not workable.

A second format that could be used for group administration was black and white pictorial items to illustrate the behaviors. This method appeared to be cost and time effective. Therefore, 11 trial items including a practice item were developed. The items were designed to expose students to individual consumer choices that upper elementary students might encounter.

Each item presented to the students had three options: e.g., three cans of fruit cocktail and labels containing the ingredient list were depicted. Two lists of ingredients listed sugar before pineapple and one listed sugar after pineapple. The students were asked to indicate which they would choose using a specific criterion, rather than what they would choose based on personal preference; e.g., "Which would you choose to get more pineapple than sugar?" The specificity in the stems was necessary to ensure only one correct answer.

After students chose the option they would buy, they were asked to write their reason for that choice. It was important to know why the students selected a particular option as some students might select the correct option for the wrong reason.

The trial device was pretested with one fifth grade class (18 students) and one sixth grade class (36 students) to determine if the
device was of interest to the students and understood by them. The pretest indicated the students were able to choose from among the three options and give a reason for their choice. The students also indicated an interest in the device.

Therefore, 19 additional items were drawn in black and white pictures. The decision was made to continue to ask the students to give their reason for their choice of options. Thus, the question why was retained for each item.

The device was pilot tested with 46 students from three fifth grade classes and 45 students from three sixth grade classes. The items were analyzed to determine how many students answered the item: 1) correctly for the right reason, 2) correctly for the wrong reason, and 3) incorrectly. This analysis was used to review the items to determine if the students were able to relate to the behaviors and complete the task.

The difficulty ranged from 20% to 87% for the fifth grade and 21% to 96% for the sixth. The mean was 18.5 and 20.4 for the fifth and sixth grades, respectively. In both grades, 16-30 minutes were needed to complete the device with most students completing the device within 25 minutes. Therefore, it appeared that the content was appropriate for fifth and sixth grade students and that the task could be completed in a reasonable length of time.

Four knowledgeable persons from food and nutrition and education reviewed the device for validity and usability. Slight revisions were necessary. Two stems were made more specific, and three options were revised to keep them consistent with the other options. Thus, the
device was judged to be a valid and usable group-administered device for assessing the food purchasing behaviors of upper elementary students. The device was named "Buying My Food" to appeal to the students. "Buying My Food" is in Appendix B.

Data Collection

Data collection sites were arranged by the evaluation research associate at the National Dairy Council through the Dairy Council Coordinators. The coordinators contacted the schools in their area to obtain their willingness to participate in the needs assessment and arranged the dates for data collection. Materials for the Dairy Council Coordinators were prepared. These materials included information on selection of schools and the responsibilities of the Dairy Council Coordinator during data collection (see Appendix D).

To create a diversity in the background among the students, schools representing the low-, middle-, and high-socioeconomic levels were selected. Schools were chosen using criteria such as the percentage of school lunches that are federally subsidized and the general range of total family income. Complete details are given in Appendix E. In addition, schools were selected from major geographical areas, i.e., West, Central, and East (see Table 2).

Prior to the data collection, the Dairy Council Coordinators sent a list of participating schools and classes to the investigator. The needs assessment data were also returned by the National Dairy Council Coordinators to the investigator for processing.
Table 2. Data-producing sample by grade level, major geographical area, and socioeconomic level

<table>
<thead>
<tr>
<th>Geographical area</th>
<th>Grade 5</th>
<th>Socioeconomic level</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (class-rooms)</td>
<td>Middle (class-rooms)</td>
<td>High (class-rooms)</td>
<td>No. of schools</td>
<td>Total students</td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>11</td>
<td>239</td>
<td></td>
</tr>
<tr>
<td>East</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>No. of schools</td>
<td>7</td>
<td>8</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total students</td>
<td>135</td>
<td>190</td>
<td>135</td>
<td>460</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Grade 6

<table>
<thead>
<tr>
<th>Socioeconomic level</th>
<th>Low (classrooms)</th>
<th>Middle (classrooms)</th>
<th>High (classrooms)</th>
<th>No. of schools</th>
<th>Total students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>11</td>
<td>283</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>146</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>8</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>173</td>
<td>221</td>
<td>144</td>
<td></td>
<td>538</td>
</tr>
</tbody>
</table>
Teacher directions for administering the needs assessment device were developed (see Appendix F). A Classroom Data form was developed requesting grade level, hours of education related to food purchasing, racial or ethnic background of students, and the time required to complete the needs assessment device. In addition, a letter to the teacher and confidentiality statement were developed (see Appendix G).

Data collection occurred in 21 different school systems in nine states. The field test occurred during January and February, 1983. Each of the participating teachers was paid $20 by the National Dairy Council.

The students marked their answers in the booklet and wrote why they chose their answer. The only identification required was the sex and grade level of each student.

The needs assessment device was administered to 460 fifth grade and 538 sixth grade students. The sample included 50% female students and 50% male students from both grades; 78% were white, 15% were black, and 7% represented other minority groups.

Data Analysis

The quality of the needs assessment was determined using the norm-reference procedure. Prior to analysis of data, the data from each class were randomly divided into two groups. In group one, the answers were coded using a hierarchical format. A three was coded for the correct answer with a right reason, a two for the correct answer with a wrong reason, and a one for the wrong answer. The answers in group two were coded by the alphabetical option selected, i.e., A, B, or C.
The responses were transferred to machine-scorable answer sheets. Each answer sheet from both grades was coded to indicate school and student number, socioeconomic level, and group. Code numbers were assigned to ensure the anonymity of schools and students.

The data from group one for each grade were subjected to factor analysis using the iterated principal axis factor solution. A two-factor solution resulted. Eigenvalues associated with this solution were 3.52, 1.34, .81, .73, .60, .55, .45, and .42 for fifth; and 4.24, 1.17, .79, .68, .59, .47, .46, and .36 for sixth grade. The discontinuity of the eigenvalues suggested that there was one general factor but that two through four factors ought to be explored for verification of the structure. Solutions with two through four factors were subjected to Varimax rotation. The one-factor solution was not rotated because the loadings on the primary axis were already determined.

Items for the one-, two-, three-, and four-factor solutions were identified and the underlying constructs were studied. A one-factor solution was accepted. Kuder-Richardson formula #20 was used to calculate the reliability of the factor.

The Pearson product moment correlation coefficient was used to determine the item-total score correlations for the one-factor solution. These numeric values were inspected as further evidence of the additivity of items.

The quality of individual items was determined through item analysis. The first component involved item difficulty and item discrimination; the second, a distracter analysis. The difficulty
index was computed for each item by determining the percentage of respondents answering the item correctly for the right reason. The discrimination index was the same value as item-total score correlation. The criterion used in the analysis of the items was a discrimination index of .20 or above if it occurred in conjunction with a difficulty in the 30% to 70% range. The distracter analysis was not applicable because all answers had been recoded in a hierarchial pattern.

Data from group two were also analyzed using an item analysis consisting of item difficulty, item discrimination, and distracter analysis. The distracters were analyzed by determining the frequency with which each option was selected. The criterion considered was that all distracters had been selected at least once in a group of 50 respondents or 10 times in a group of 500 respondents.

The two scoring methods were compared on both average and individual difficulty and discrimination indices. The better method of scoring was determined by the procedure that resulted in more optimum values of the indices.
FINDINGS AND DISCUSSION

The objective of the study was to develop a group-administered valid device to be used as a needs assessment in the area of food purchasing for upper elementary students. The data were collected through the use of a needs assessment consisting of 29 black and white pictorial items. The data producing sample consisted of 460 fifth grade and 538 sixth grade students. The data from each grade were randomly divided into two groups and analyzed using the norm-referenced technique.

The findings are reported and discussed in three parts. The first part describes the factor structure, the second part discusses the quality of the items, and the third part compares the two scoring methods.

Factor Structure

The factor loadings for the one-, two-, three-, and four-factor solutions were studied for each grade. The items that had numerically high factor loadings on only one factor were determined for each solution. The four-factor solution was rejected at this stage because four independent factors were not apparent.

The three solutions consisting of one, two, and three factors were studied for the underlying constructs. Names identified for factors based on the item content showed that the two- and three-factor solutions were not viable because they did not clearly define the underlying constructs. Further, the factor solution differed between grades five
and six with the solution being less apparent in grade six. Hence, it was concluded that the device was assessing one general construct, and the one-factor solution was accepted.

Inspection of factor loadings in Table 3 showed that all the loadings were above .20 except items 1, 16, and 20. These items were retained because they were assessing content that was judged important for students at these grade levels.

The item-total score correlations further supported the one-factor solution because 27 items had a correlation above .19 in both grades. A condition of additivity is that the item-total score correlation is equal to or greater than $1/\sqrt{n}$ where $n$ equals the number of items (Warren et al., 1969). One item in both grades and one item in sixth grade did not meet these conditions. Again, these items assessed behaviors that are important to elementary students and would be retained.

The reliability calculated by the Pearson product moment correlation was .82 for the fifth grade and .83 for the sixth grade. The reliability refers to the consistency of the device and varies between 0.0 and 1.0. The numeric size of the reliability coefficient necessary depends on what is made of the results. A coefficient of .75 or above (Tinkleman, 1971) is considered acceptable for group measurement. Therefore, the needs assessment is acceptable for the purposes described.

Although it was hypothesized that the device contained three underlying constructs, it appears that this age group does not distinguish between the constructs. This finding is consistent with the theory of
Table 3. Factor loadings and discrimination indices by grade

<table>
<thead>
<tr>
<th>Item</th>
<th>Fifth grade</th>
<th>Sixth grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor loading</td>
<td>Discrimination index</td>
</tr>
<tr>
<td>1</td>
<td>.20</td>
<td>.21</td>
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<td>2</td>
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<td>3</td>
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<td>.19</td>
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<td>4</td>
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<td>.40</td>
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<tr>
<td>5</td>
<td>.30</td>
<td>.40</td>
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<tr>
<td>6</td>
<td>.22</td>
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<td>7</td>
<td>.21</td>
<td>.33</td>
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<td>8</td>
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<td>9</td>
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<td>10</td>
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<td>.45</td>
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<tr>
<td>11</td>
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<tr>
<td>12</td>
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<td>13</td>
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<td>24</td>
<td>.49</td>
<td>.57</td>
</tr>
<tr>
<td>25</td>
<td>.20</td>
<td>.32</td>
</tr>
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<td>26</td>
<td>.40</td>
<td>.47</td>
</tr>
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<td>27</td>
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<td>.58</td>
<td>.65</td>
</tr>
<tr>
<td>29</td>
<td>.43</td>
<td>.60</td>
</tr>
</tbody>
</table>
concept development (Klausmeier et al., 1974). Concept development progresses from a global understanding of the concept to being able to differentiate between the different parts of the concept as understanding increases. Interestingly, a previous study evaluating fixing and eating food behaviors of elementary students also showed that these students do not perceive the specifics within a broader theme (Fanslow et al., 1982).

Quality of Device Items

The criterion for assessing the quality of the needs assessment items was a discrimination index of .20 or above in conjunction with a difficulty index of 30-70%. The discrimination index shows the extent to which the item is discriminating between students with a high total score and those with a low total score. The difficulty index denotes the percentage of students who answered each item correctly. An ideal difficulty index is 30% to 70%. Below 30% indicates the item was too hard, and items having a difficulty index above 70% are considered too easy.

Seventeen items met the discrimination and difficulty criterion for both grades (see Table 4). In addition, two items (12 and 25) met the criterion in one grade and were very close to meeting the criterion in both grades. These 19 items would need no revision when used in a future needs assessment device.

Eight items were considered too easy for both grades (see Table 4). Of these items, seven items had acceptable discrimination indices. Item 1 did not meet the discrimination index for sixth grade. No revisions are suggested for these items because they are assessing
Table 4. Difficulty and discrimination arrays by grade

<table>
<thead>
<tr>
<th>Item</th>
<th>Difficulty index (%)</th>
<th>Discrimination index</th>
<th>Difficulty index (%)</th>
<th>Discrimination index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>97</td>
<td>.21</td>
<td>98</td>
<td>.09</td>
</tr>
<tr>
<td>2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>67</td>
<td>.31</td>
<td>60</td>
<td>.27</td>
</tr>
<tr>
<td>3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>84</td>
<td>.19</td>
<td>77</td>
<td>.31</td>
</tr>
<tr>
<td>4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>33</td>
<td>.40</td>
<td>30</td>
<td>.42</td>
</tr>
<tr>
<td>5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>65</td>
<td>.40</td>
<td>66</td>
<td>.31</td>
</tr>
<tr>
<td>6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>20</td>
<td>.31</td>
<td>18</td>
<td>.37</td>
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<tr>
<td>7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>65</td>
<td>.33</td>
<td>66</td>
<td>.36</td>
</tr>
<tr>
<td>8&lt;sup&gt;a&lt;/sup&gt;</td>
<td>75</td>
<td>.52</td>
<td>73</td>
<td>.64</td>
</tr>
<tr>
<td>9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>47</td>
<td>.39</td>
<td>56</td>
<td>.55</td>
</tr>
<tr>
<td>10&lt;sup&gt;b&lt;/sup&gt;</td>
<td>36</td>
<td>.45</td>
<td>46</td>
<td>.41</td>
</tr>
<tr>
<td>11&lt;sup&gt;b&lt;/sup&gt;</td>
<td>68</td>
<td>.41</td>
<td>67</td>
<td>.49</td>
</tr>
<tr>
<td>12&lt;sup&gt;c&lt;/sup&gt;</td>
<td>73</td>
<td>.49</td>
<td>66</td>
<td>.51</td>
</tr>
<tr>
<td>13&lt;sup&gt;a&lt;/sup&gt;</td>
<td>72</td>
<td>.49</td>
<td>77</td>
<td>.39</td>
</tr>
<tr>
<td>14&lt;sup&gt;a&lt;/sup&gt;</td>
<td>77</td>
<td>.48</td>
<td>75</td>
<td>.50</td>
</tr>
<tr>
<td>15&lt;sup&gt;a&lt;/sup&gt;</td>
<td>80</td>
<td>.39</td>
<td>85</td>
<td>.31</td>
</tr>
<tr>
<td>16&lt;sup&gt;a&lt;/sup&gt;</td>
<td>21</td>
<td>.16</td>
<td>31</td>
<td>.17</td>
</tr>
<tr>
<td>17&lt;sup&gt;b&lt;/sup&gt;</td>
<td>55</td>
<td>.40</td>
<td>57</td>
<td>.37</td>
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<td>18&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td>19&lt;sup&gt;b&lt;/sup&gt;</td>
<td>44</td>
<td>.42</td>
<td>45</td>
<td>.42</td>
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<tr>
<td>20&lt;sup&gt;b&lt;/sup&gt;</td>
<td>56</td>
<td>.30</td>
<td>47</td>
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<tr>
<td>21&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>.31</td>
<td>48</td>
<td>.44</td>
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<td>23&lt;sup&gt;b&lt;/sup&gt;</td>
<td>58</td>
<td>.55</td>
<td>56</td>
<td>.53</td>
</tr>
</tbody>
</table>

<sup>a</sup>Fails to meet criterion for either grade.

<sup>b</sup>Meets criterion for both grades.

<sup>c</sup>Meets criterion for sixth grade.
Table 4. Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Difficulty index (%)</th>
<th>Discrimination index</th>
<th>Difficulty index (%)</th>
<th>Discrimination index</th>
</tr>
</thead>
<tbody>
<tr>
<td>24^b</td>
<td>60</td>
<td>.57</td>
<td>64</td>
<td>.55</td>
</tr>
<tr>
<td>25^d</td>
<td>69</td>
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<td>71</td>
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</tr>
<tr>
<td>26^b</td>
<td>35</td>
<td>.47</td>
<td>37</td>
<td>.43</td>
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<td>27^b</td>
<td>35</td>
<td>.37</td>
<td>40</td>
<td>.36</td>
</tr>
<tr>
<td>28^b</td>
<td>59</td>
<td>.65</td>
<td>55</td>
<td>.56</td>
</tr>
<tr>
<td>29^a</td>
<td>80</td>
<td>.60</td>
<td>80</td>
<td>.56</td>
</tr>
</tbody>
</table>

^d Meets criterion for fifth grade.
important concepts. Further, the device was developed to include an easy item at the beginning, in the middle, and at the end (i.e., 1, 15, and 29) and these items serve that purpose.

Item 6 was too hard for both grades, and item 16 was too hard for fifth grade (see Table 4). Item 16 did not meet the discrimination index for both grades. Inspection of the content of these items shows that they require the student to use information from the label in addition to the price to determine the best buy (see Appendix B). These items seem to assess an important concept and for this reason it is recommended that they be retained.

A distracter is considered functioning when it is selected at least once in a group of 50 students (or at least 10 times in a group of 500 students). Inspection of the data from group two indicates that all items except item 1 met the criterion for the distracter analysis (see Table 5). However, the intent of the needs assessment was to begin with an easy item that most students would answer correctly. Therefore, no revision of the options would be necessary.

Comparison of Scoring Methods

The difficulty and discrimination indices for the hierarchical (group one) and traditional (group two) scoring methods are shown in Table 6 for fifth and Table 7 for sixth grade. A comparison of the difficulty indices of the two scoring methods showed that 27 items had lower numeric values with the hierarchical method indicating the items were more difficult. The average difficulty for the hierarchical method was .58 for both grades, and for the traditional method, the average
Table 5. Distracter analysis by grade

<table>
<thead>
<tr>
<th>Item</th>
<th>Fifth grade</th>
<th>Sixth grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1^a</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2^c</td>
<td>28</td>
<td>176^b</td>
</tr>
<tr>
<td>3^c</td>
<td>227^b</td>
<td>3</td>
</tr>
<tr>
<td>4^c</td>
<td>124^b</td>
<td>63</td>
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<tr>
<td>5^c</td>
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<td>42</td>
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<tr>
<td>6^c</td>
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<td>61^b</td>
</tr>
<tr>
<td>7^c</td>
<td>6</td>
<td>184^b</td>
</tr>
<tr>
<td>8^c</td>
<td>18</td>
<td>198^b</td>
</tr>
<tr>
<td>9^c</td>
<td>144^b</td>
<td>34</td>
</tr>
<tr>
<td>10^c</td>
<td>93^b</td>
<td>33</td>
</tr>
<tr>
<td>11^c</td>
<td>9</td>
<td>29</td>
</tr>
<tr>
<td>12^c</td>
<td>18</td>
<td>193^b</td>
</tr>
<tr>
<td>13^c</td>
<td>52</td>
<td>22</td>
</tr>
<tr>
<td>14^c</td>
<td>188^b</td>
<td>25</td>
</tr>
<tr>
<td>15^c</td>
<td>200^b</td>
<td>12</td>
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<tr>
<td>16^c</td>
<td>163^b</td>
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<td>11</td>
<td>95</td>
</tr>
<tr>
<td>24^c</td>
<td>197^b</td>
<td>16</td>
</tr>
</tbody>
</table>

^a Failed to meet criterion.
^b Correct response.
^c Met criterion.
Table 5. Continued

<p>| Item | Fifth grade | | | Sixth grade | | |
|------|-------------|-----------|-----------|-------------|-----------|
|      | A | B | C | A | B | C |
| 25&lt;sup&gt;c&lt;/sup&gt; | 185&lt;sup&gt;b&lt;/sup&gt; | 17 | 29 | 218&lt;sup&gt;b&lt;/sup&gt; | 11 | 39 |
| 26&lt;sup&gt;c&lt;/sup&gt; | 91 | 129&lt;sup&gt;b&lt;/sup&gt; | 7 | 119 | 134&lt;sup&gt;b&lt;/sup&gt; | 14 |
| 27&lt;sup&gt;c&lt;/sup&gt; | 49 | 126&lt;sup&gt;b&lt;/sup&gt; | 56 | 56 | 137&lt;sup&gt;b&lt;/sup&gt; | 75 |
| 28&lt;sup&gt;c&lt;/sup&gt; | 17 | 149&lt;sup&gt;b&lt;/sup&gt; | 62 | 19 | 179&lt;sup&gt;b&lt;/sup&gt; | 69 |
| 29&lt;sup&gt;c&lt;/sup&gt; | 18 | 6 | 205&lt;sup&gt;b&lt;/sup&gt; | 20 | 13 | 236&lt;sup&gt;b&lt;/sup&gt; |</p>
<table>
<thead>
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<th>Item</th>
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a Group one used hierarchical scoring method and group two used traditional scoring method.

b Failed to meet criterion with either scoring method.

c Discrimination index below .05.

d Met criterion with hierarchical scoring method.

e Met criterion with both scoring methods.
f Met criterion with traditional scoring method.
Table 6. Continued

<table>
<thead>
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Table 7. Difficulty and discrimination arrays for sixth grade using different scoring methods

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</table>

a Group one used hierarchical scoring method and group two used traditional scoring method.

b Failed to meet criterion with either scoring method.

c Discrimination index below .05.

d Met criterion with both scoring methods.

e Met criterion with hierarchical scoring method.

f Met criterion with traditional scoring method.
Table 7. Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Group one</th>
<th>Group two</th>
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<tr>
<td></td>
<td>Difficulty index (%)</td>
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<td>20^d</td>
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<td>Means</td>
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difficulty was .69 for the fifth and .70 for the sixth grade. These figures support that the hierarchical method makes the device slightly more difficult and hence, provides a greater opportunity for determining areas in which students need instruction.

A similar comparison with the discrimination indices showed that these values are numerically higher with the hierarchical method. The average discrimination index for the hierarchical method was .41 for both grades, the average discrimination index for the traditional method was .31 for the fifth and .32 for the sixth grade. These indices suggest that the device discriminates between high and low scorers better when using the hierarchical scoring method.

Inspection of the individual items showed that more items met the item analysis criterion with the hierarchical method. The criterion used was a discrimination index of .20 or above in conjunction with a difficulty index of 30-70%. Eighteen items in both fifth and sixth grades met the criterion with the hierarchical format, whereas nine items in fifth and 11 items in sixth grade met the criterion with the traditional method.

The average difficulty, average discrimination, and item analysis showed that the hierarchical scoring method was more acceptable than the traditional scoring method. Therefore, the hierarchical method is recommended for use with future assessments. In addition, this method provides information about the reason used for selecting each option and would be useful for developing nutrition education curriculum.
Summary

The one-factor solution for the needs assessment device was judged the best solution. This solution was further supported by the numeric values of the item-total score correlations as they demonstrated additivity of the items. The one factor assessed the general concept of food purchasing and included the concepts of food quality, food labeling, and shopping techniques.

The reliability of the needs assessment device was .82 for the fifth grade and .83 for the sixth grade. These values suggest that the device is a reliable instrument for group assessment.

The average difficulty was .58 and the average discrimination was .41 for both grades using the hierarchical scoring method. This method of scoring made the device slightly more difficult than scoring by the traditional method; in addition, discrimination between high and low scorers was better using the hierarchical method.
The purpose of this study was to develop a group-administered valid device to be used as a needs assessment in the area of food purchasing for upper elementary students. The needs assessment was used to define the discrepancy that exists between the behaviors a student needs to have and the student's present behaviors.

Three major food purchasing concepts were identified as the basis for developing the device; they were 1) product quality, 2) food labeling, and 3) shopping techniques. Specific food purchasing behaviors by concept were identified.

The behaviors were depicted in black and white pictorial items. Each item was presented with three options. The students were asked to select the option that was most like what they would do based on a specific criterion. The specificity of the stem was used to ensure only one correct answer. In addition, the students were asked to write their reason for the choice of option.

Ten items of the device were pretested with one fifth and one sixth grade to determine if the device was of interest to the students and was understood by them. The pretest showed that the students were able to choose from among the three options and give a reason for the choice. The device was also of interest to the students.

Nineteen additional items were drawn and the 29 black and white pictorial items were pilot tested with three fifth and three sixth grade classes. The item analysis showed that the content was appropriate
for the upper elementary students and that they could complete the device within a reasonable length of time.

The content validity and usability of the device were reviewed by four nutrition and education specialists. Slight revisions were necessary. Three stems were made more specific and three options were revised to keep them consistent with the other options. The device was named "Buying My Food" to appeal to students.

The data collection sites were arranged by National Dairy Council and represented low-, middle-, and high-socioeconomic levels as well as the major geographical areas. Materials for data collection were developed.

The field testing occurred in January and February, 1983. The data-producing sample consisted of 460 fifth grade and 538 sixth grade students from 21 different schools in nine states. The sample consisted of 50% male and 50% female from both grades; 78% were white, 15% were black, and 7% were other minorities.

The data from each grade were randomly divided into two groups. A hierarchical format was used to code the items in group one. A three was coded for a correct answer with a right reason, a two for a correct answer with a wrong reason, and a one for an incorrect answer. The data from group two were coded by the traditional method, that is, the alphabetical option selected was coded.

The data were analyzed using the norm-referenced technique. Data from group one were subjected to factor analysis using the iterated principal axis factor solution. The factor analysis results suggested
that there was one general factor but that two through four factors also should be explored. Because loadings of the one-factor solution were already determined, solutions with two through four factors were subjected to Varimax rotation. The one-factor solution was accepted. Reliability was calculated using the Kuder-Richardson formula #20. Item-total score correlations were calculated for evidence of additivity.

Item analysis was used to determine the quality of individual items. The first component was the item difficulty computed by determining the percentage of students answering the item correctly and the discrimination index determined by the Pearson product moment correlation coefficient. The second component was not applicable because of the hierarchical scoring method.

Data from group two were subjected to item analysis consisting of the difficulty and discrimination indices as well as the distracter analysis. The distracters were analyzed by determining the frequency with which each option was selected.

The two methods of scoring were compared on both average and individual difficulty and discrimination indices. The more optimum method of scoring was determined by the method that resulted in a device that was more difficult and that discriminated more effectively among students.

The factor loadings for the one-, two-, three-, and four-factor solutions were studied for each grade. The four-factor solution was rejected because four factors did not emerge from the inspection of the numerical values of the factor loadings. The two- and three-factor
solutions were rejected because underlying constructs could not clearly be defined. The factor solutions also differed between the fifth and sixth grades.

The one-factor solution was accepted because the solution was judgmentally acceptable and was supported empirically. All but three items had factor loadings above .20 in the one-factor solution. Further support for the additivity of the device was obtained from the item-total score correlations. Twenty-seven items met the criterion of additivity as the item-total score correlations were equal to or greater than $1/\sqrt{n}$ (.19) where n equals the number of items.

A reliability of .82 for fifth and .83 for sixth grade was obtained using Kuder-Richardson formula #20. These values indicate that the needs assessment is a reliable instrument for group assessment.

The discrimination and difficulty criterion was met by 17 items in both grades. This criterion is a discrimination index of .20 in conjunction with a difficulty index of 30-70%. Two additional items met the criterion in one grade. Eight items were too easy, and one item was too difficult for both grades. No revisions are suggested, however, because these items are assessing important content.

All items except item one met the criterion for the distracter analysis. That is, each distracter was selected at least once in a group of 50 students or at least 10 times in a group of 500 students. The intent of the device was to begin with an easy item; therefore, no revisions were suggested.
The average difficulty was .58 and the average discrimination was .41 for both grades using the hierarchical scoring method. This method of scoring made the device slightly more difficult than scoring by the traditional method. In addition, the discrimination between high and low scorers was better using the hierarchical method. Therefore, the hierarchical scoring method was judged to be the superior method of scoring.

Recommendations

This study demonstrates that the needs assessment device, "Buying My Food," can be used to assess the behaviors that upper elementary students have in the food purchasing area of nutrition education. The findings could be used in developing nutrition education curriculum.

This study also provides suggestions for future research. Such studies could include:

1. A needs assessment device in the area of food purchasing could be developed for students in grades one and two and grades three and four.

2. A needs assessment device that presents the food purchasing behaviors to the students using a written description rather than pictorial items could be developed. The results of the two devices could be compared to determine if there is a difference between the devices and would provide information as to whether more information is obtained from the pictorial format.

3. The students' reasons for the choice of options could be compiled and analyzed. Three multiple choice reasons could be selected
for each item. One reason would be correct and two reasons would be incorrect. The students would select the reason for their choice rather than writing the reason. The results of these two devices could be compared to determine if students obtain more correct answers when provided with written options.

4. Additional areas in nutrition education could be identified for which needs assessment devices could be developed.
REFERENCES


Willet, S. L. Consumer education or advocacy ... or both? School Policy, 1977, 8, 10-17.
ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to Dr. Alyce M. Fanslow, my major professor, for her patience and guidance throughout the development of the needs assessment device and the writing of the dissertation.

Appreciation is also expressed to Drs. Cheryl O. Hausafus, Sally K. Williams, Pilar Garcia, and J. Stanley Ahmann for their time and cooperation as members of my program of study committee.

Recognition is extended to the National Dairy Council for its support of the project.

Appreciation is expressed to The General Foods Fund and Bonnie Lee Parkinson Fund for their financial support.

A special thanks to my husband, John, and daughters, Sarah, Gretchen, and Rachel, for their never-ending patience, support, and encouragement. A special thanks is also extended to my parents, Harry and Evelyn Cline, who instilled in me the value of higher education.
APPENDIX A.

FOOD AND NUTRITION CURRICULUM GUIDES
FOR ELEMENTARY SCHOOL CHILDREN
Food and Nutrition Curriculum Guides
for Elementary School Children


APPENDIX B.

BUYING MY FOOD NEEDS ASSESSMENT DEVICE
FOR UPPER ELEMENTARY STUDENTS
PLEASE NOTE:

Copyrighted materials in this document have not been filmed at the request of the author. They are available for consultation, however, in the author's university library.

These consist of pages:

54-71
APPENDIX C.

HUMAN SUBJECTS APPROVAL
Title of project (please type): Nutrition Education for Elementary Students: Instruction and Evaluation

I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are properly protected. Additions to or changes in procedures affecting the subjects after the project has been approved will be submitted to the committee for review.

Alyce M. Fanselow 8/9/82
Typed Name of Principal Investigator Date Signature of Principal Investigator

219 MacKay Hall 4-3991
Campus Address Campus Telephone

Signatures of others (if any) Date Relationship to Principal Investigator

ATTACH an additional page(s) (A) describing your proposed research and (B) the subjects to be used, (C) indicating any risks or discomforts to the subjects, and (D) covering any topics checked below. CHECK all boxes applicable.

☐ Medical clearance necessary before subjects can participate
☐ Samples (blood, tissue, etc.) from subjects
☐ Administration of substances (foods, drugs, etc.) to subjects
☐ Physical exercise or conditioning for subjects
☐ Deception of subjects
☐ Subjects under 14 years of age and/or ☐ Subjects 14-17 years of age
☐ Subjects in institutions
☐ Research must be approved by another institution or agency

ATTACH an example of the material to be used to obtain informed consent and CHECK which type will be used.

☐ Signed informed consent will be obtained.
☐ Modified informed consent will be obtained.

Anticipated date on which subjects will be first contacted: 10 15 82
Anticipated date for last contact with subjects: 12 31 83
If Applicable: Anticipated date on which audio or visual tapes will be erased and/or identifiers will be removed from completed survey instruments:

Signature of Head or Chairperson Date Department or Administrative Unit

Decision of the University Committee on the Use of Human Subjects in Research:
☐ Project Approved ☐ Project not approved ☐ No action required
George G. Karas
Signature of Committee Chairperson
APPENDIX D.

RESPONSIBILITIES OF DAIRY COUNCIL COORDINATORS
Classroom Materials for Field Test

The devices are boxed by grade; that is, the boxes are labeled fifth grade and sixth grade. Each box is labeled by school, teacher’s name, and grade. In each box are all of the materials necessary for the teacher.

Materials included are:

- Letter to teacher
- Confidentiality Statement
- Directions for Administering Buying My Food
- Buying My Food Needs Assessment device (one for each student)
- Classroom Data form.

Security of Buying My Food

Security of the device, Buying My Food, is a critical issue in field testing. The devices should be delivered and picked up within 1-2 days of the administration time. The devices should be delivered and returned in the mailing boxes.

Distribution of Buying My Food

1. Deliver the boxes containing the materials to the teacher 1-2 days before the device is to be administered.

2. Reaffirm the dates that the device will be administered.

3. Alert the teachers that they are to return all the field test materials to you in the original box.

Return of Materials

1. Collect all boxes from the school within 1-2 days after both classes have completed the device.

2. Prior to shipping the boxes to Iowa State University please do the following:
   a. Compare the number of devices to the number of students indicated on the Classroom Data form. If there is a discrepancy, please note on the Classroom Data form.
   b. Remove unanswered devices and destroy.
   c. Place the devices and Classroom Data form in the shipping box.
   d. Seal the individual boxes.

3. Tape the two (2) boxes together.

4. Within three (3) days of the completion of the field test in a school, ship the boxes via United Parcel Service to:

   Dr. Alyce M. Fanslow
   219 MacKay Hall
   Iowa State University
   Ames, IA 50011
APPENDIX E.

BASIS FOR SELECTION OF SCHOOLS FOR DATA COLLECTION
General Criteria: (Mandatory)

1. Schools should have at least 20 children enrolled in each of two elementary classes, 5 and 6.
2. Select neighborhood elementary schools in which enrollment of children is not altered by busing.
3. Select schools that are clearly serving the clientele described in the group descriptions below. Omit schools that are difficult to classify because they have some traits of one group and some traits of a second.
4. Schools selected should meet at least 3 of the 5 criteria given for any group. The selected schools should not meet any of the criteria described for the other two groups.
5. Select schools in which children of racial and ethnic groups other than white are enrolled.

Specific Criteria: (Schools should meet 3 of 5 criterion statements in each group)

Group 1: Low-Socioeconomic Class

1. School is a Chapter 1 school.
2. Majority of school lunches for children are completely or partially federally subsidized.
3. Total family income is less than $14,000. Families are more likely to receive federal subsidies such as food stamps and ADC.
4. Families are more likely to live in rental property than in privately owned homes. Housing is likely to be close together and may not be well-kept-up. Federally subsidized housing is common.
5. Parents' occupations are likely to be semi-skilled or unskilled. Some parents may have been unemployed on a long-term basis (greater than 4 months).

Group 2: Middle-Socioeconomic Class

1. School is not likely to be a Chapter 1 school.
2. Some school lunches for children are completely or partially federally subsidized.
3. Total family income ranges between $14,000 and $30,000.
4. Families are divided between ownership and rental of housing with rental property being more prevalent. More land surrounds housing and housing units are well-kept-up. Some housing units are federally subsidized.
5. Parents are likely to be employed in skilled or middle management occupations or as small business owners. Some parents may have been affected by short-term unemployment (less than 4 months).
Group 3: High-Socioeconomic Class

1. School is not a Chapter 1 school.
2. No school lunches for children are federally subsidized.
3. Total family income is $30,000 or greater.
4. Families are more likely to live in well-kept privately-owned housing or rental property.
5. Parents are likely to be self-employed professionals employed in upper management occupations or as small business owners.
APPENDIX F.

DIRECTIONS FOR ADMINISTERING NEEDS ASSESSMENT TO UPPER ELEMENTARY STUDENTS
BUYING MY FOOD
Fifth and Sixth Grades

Buying My Food is a needs assessment device of food purchasing behaviors. The purpose of the device is to examine what elementary school students actually do when purchasing food and reasons for those choices.

Group size

Buying My Food is administered to the entire class at the same time.

Materials needed for each student

One Buying My Food needs assessment device
One pencil

Schedule

Approximately 35-45 minutes will be needed to administer the device. Ten minutes will be needed to give directions, and most students should complete the device in 25-35 minutes. Because this is not a timed device, please allow each student enough time to complete all the items.

Special field test instructions

1. Before administering the device, become familiar with all the directions.

2. Notice that this device is different from most devices used with elementary students. It is designed to measure what the student usually does. Therefore, please follow the directions to the students carefully. The students are to select the answer that is most like what they would do and not the "best" answer.

3. Read the directions to the students as they read them to themselves.

4. Allow the students to proceed with the device at their own rates.

5. If students do not understand a word in the questions or answers, please do not explain the word.

6. Each student should be given time to complete all the items.

7. As the students are responding to the device, check to see that they are circling an answer for each item and giving a reason for why they chose that answer.

8. Direct the students who finish early to proceed with other work so that they will not disturb those who are still working.
9. If a student is absent the day the device is administered, do not have him/her take the device at a later date.

10. As each student is finished with the device, check to see that each item is answered. If there are any items a student has not answered, have that student answer them.

NOTE: If you have a few nonreaders in class, arrange for a time to have someone read the items to these students. The person reading the items can be the teacher, another responsible adult, or a responsible classmate. The students will mark their answers in the booklet. It may be necessary to administer items 1 through 14 on one day and items 15 through 29 the following day.

If most class members are nonreaders, read the questions and the answers to the entire class. In this case you may want to administer the device over a two-day period. If the device is administered at two different times, review the directions with the students.
Directions for the day of the field test

(Statements to be read to the class are typed in the italics type; general directions are typed in regular type.)

1. Today you are going to look at questions about buying food. You will be marking answers to show what you would do in each of the situations.

2. Distribute the booklet. Do not start until we have read all the directions.

3. Please turn the page and look at the directions. Write your name in the space provided. Circle whether you are female or male. Circle your grade. In this booklet are questions about buying food. Each question has three possible answers. Choose the answer that is most like what you would do. Circle the letter of that answer in your booklet.

CAUTION: Do NOT tell the students to look for the "best" answer.

4. Look at the practice question. Read the question. Decide which answer is most like what you would do. Circle the letter of your answer to the practice question. After you have circled a letter, answer the question "Why?". Write (or print) why you selected that answer. Check to see that all students understand how to mark their answers and that they complete the answer to the question "Why".

5. Do you understand what you are to do? If you are having trouble, raise your hand.

If you change your mind about an answer, erase the first circle COMPLETELY. Circle only one answer for each item.

When you are told to begin, turn the page and start with question 1. Circle the answer that is most like what you would buy. Be sure to circle an answer for each question. After you have circled an answer, write the reason why you chose that answer.

6. You will have enough time to respond to all of the questions. Read all the questions and possible answers carefully. As you are answering the questions, I'll be checking that you are circling an answer for each question. Be sure to write why you chose the answer you did.

7. When you have finished, turn your booklet over, and raise your hand.

8. Please turn the page and begin.

9. As each student finishes, check to see that each question is answered. If there are any questions a student has not answered, have that student answer them. Check to see that each student has responded to each question "Why".

10. Fill out the Classroom Data form.
11. Place the booklet along with the completed Classroom Data form in the original box.

12. Return the box of field test materials to the Dairy Council Coordinator.
APPENDIX G.

SUPPORTING MATERIALS FOR DATA COLLECTION
BUYING MY FOOD

CLASSROOM DATA
Fifth and Sixth Grade

SCHOOL ____________________________________________

ADDRESS _________________________________________

(city) (state) zip)

TEACHER _________________________________________ PHONE NUMBER ( )

Grade level: _______ Number of students enrolled: __________

Number of students completing Buying My Food: __________
Explain if different from total students enrolled.

Has your class studied food purchasing during the 1982-83 school year?
Circle one: Yes No

If yes, indicate approximate number of hours of instruction: ________

Date(s) Buying My Food was used with your class: ________________

Number of students in each racial or ethnic group who completed Buying My Food:

  Alaskan Native ______
  American Indian ______
  Asian or Pacific Islander ______
  Black ______
  Spanish or Mexican heritage ______
  White (other than Spanish heritage) ______

Time in minutes for individual students to complete Buying My Food:

Shortest ______ Average ______ Longest ______

(Return to the Dairy Council Coordinator)
Dear Teacher,

Thank you for your willingness to participate in the field test of "Buying My Food." This needs assessment device was designed to examine what elementary students do when making food purchases and reasons for those choices. It is anticipated that "Buying My Food" will make a significant contribution to the curriculum development of nutrition education programs in elementary schools in the United States.

The field test materials include one (1) "Buying My Food" device for each student. Enclosed in your box of materials are the "Buying My Food" devices needed for your class, Directions for Administering the device, the Classroom Data form, and the Confidentiality Statement.

The device will be administered to the entire class at the same time. When the students have completed the device, enter the information requested on the Classroom Data form. Place all of the devices (including the unused ones) in the original box along with the completed Classroom Data form. Return all the field test materials to the Dairy Council Coordinator.

"Buying My Food" has been developed and pretested for the National Dairy Council by the Home Economics Education Department of Iowa State University. Dr. Alyce Fanslow, Distinguished Professor of Home Economics, is the director and Mrs. Shirley Gilmore is the research assistant for the project.

If you have any questions about the field test, please call your local affiliated Dairy Council unit coordinator who is working with you on the project. She will answer any questions you may have or will contact Dr. Fanslow, Mrs. Gilmore, or myself on your behalf.

Sincerely,

Judy K. Brun, Ph.D.
Evaluation Research Associate
BUYING MY FOOD

CONFIDENTIALITY STATEMENT

Confidentiality of all data is guaranteed. In reports on results, schools and students will not be identified as participants in the field test.

Schools and students will be assigned code numbers. Thereafter, neither the names of schools nor students will be associated with the data. When the evaluation of the device, "Buying My Food," is completed, raw data will be destroyed.

The field testing is designed to examine what students do as they make food purchases and reasons for these choices.

All data will be sent to Dr. Alyce M. Fanslow, 219 MacKay Hall, Iowa State University, Ames, Iowa 50011. All data will be analyzed at Iowa State University.

M.F. Brink, Ph.D.
President
National Dairy Council

Judy K. Brun, Ph.D.
Evaluation Research Associate
National Dairy Council

Alyce M. Fanslow, Ph.D.
Distinguished Professor
Home Economics Education
Iowa State University
September 26, 1983

TO: Ms. Diane Grawey
    Manuscripts Publishing
    University Microfilms International
    300 North Zeeb Road
    Ann Arbor, MI 48106

FROM: Shirley Gilmore, Ph.D.

    From: Iowa State University

I have discussed the problem of copyrighted material in my dissertation (pages 54-71) with National Dairy Council. It is our decision to remove this material and include a note indicating the material is available from National Dairy Council, 6300 North River Road, Rosemont, IL 60018.

Thank you for notifying me of this problem. If I can be of further help, please contact me.

SG: da