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A LONGITUDINAL STUDY OF THE RETENTION OF FOODS AND NUTRITION KNOWLEDGE AND PRACTICES OF PARTICIPANTS FROM THE MICHIGAN EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM

Michigan State University PH.D. 1986

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A LONGITUDINAL STUDY OF THE RETENTION OF FOODS AND NUTRITION KNOWLEDGE AND PRACTICE OF PARTICIPANTS FROM THE MICHIGAN EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM

By

Linda Gould Nierman

A DISSERTATION

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ABSTRACT

A LONGITUDINAL STUDY OF THE RETENTION OF FOODS & NUTRITION KNOWLEDGE AND PRACTICES OF PARTICIPANTS FROM THE MICHIGAN EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM

by

Linda Gould Nierman

The purpose of this longitudinal study was to determine if participants of the Michigan Expanded Food and Nutrition Education Program retain their improved food and nutrition knowledge and practice five years after nine months of EFNEP program instruction. The Michigan Family Fare Survey, the 24-Hour Dietary Food Recall (USDA score), and EFNEP Famiy Record are the data collection instruments used for this study.

Participants included all homemakers (n = 444) who enrolled in EFNEP, October through November 1979 (pre-instruction). Post-instruction (Time 2) data collection occurred July through October 1980. Forty-five participants were interviewed July through August 1985 for the follow-up (Time 3) data collection.

The Michigan Family Fare Survey (128 points) is a pictorial assessment that measures participants' foods and nutrition knowledge and food practices in the categories of nutrition, food preparation, food shopping, sources of

food and nutrition information, and food preparation tasks liked or disliked. The 24-Hour Dietary Food Recall (USDA score) analyzes the participants' diet by number of servings of food in each of the four food groups. The maximum score is 100 points. The EFNEP Family Record obtains the demographic information on the participants.

The major findings from this study show that EFNEP participants' USDA scores and Family Fare Survey scores are increased significantly due to EFNEP participation. Retention of these change scores for five years is also significant.

In summary, this retention study showed:

- EFNEP participants had significant change on their Family Fare and USDA scores and retained this change over time.
- EFNEP participants who entered with a USDA score of 0 to 50 points had the most significant change, over time, and they were able to maintain this change.
- Minority participants who entered with low USDA scores (0 to 50 points) had the most significant change in scores. These participants retained their improved scores for five years.
- A shortened EFNEP instruction period of nine months or less is effective in changing participants' food behavior and practice.

For Wayne Who
Persevered

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I would like to thank committee members, Dr. Maxine Ferris, Dr. Howard Hickey, Dr. Lawrence Lezotte, and Dr. Raymond Vlasin for their guidance, encouragement, patience, confidence, friendship, and positive contributions. They were always willing to assist and had a friendly, most helpful approach.

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The impetus for this study evolved from the many hours of intense work with the Expanded Food and Nutrition Education Program (EFNEP) and the pleasure of observing by firsthand experience the impact the program has on developing self-confidence in EFNEP personnel and the program's graduated families.

Special thanks must be given to the many EFNEP program participants and to the outstanding Michigan EFNEP Staff of Home Economists, Nutrition Aides, and Supervisory Aides who were most cooperative and supportive.

Accolades are also due Michigan State University co-workers who supported my work on this study; to Bethany Ledford for typing; to Micki Horst and Don Gregg, for editing; to Win-Jing Chung, for statistical and computer assistance; to Henrietta Harmon, former EFNEP Supervisory Aide, who conducted the follow-up interviews; and to Kendra Anderson, Kim Johns, and Victoria Brady who carried forth in my absence and gave many words of encouragement.

Special gratitude is also due my father, Francis Gould; and to Dr. Ernest Snodgrass, Dr. Ester Taskerud, Dr. Eva Goble, Beatrice Paolucci, Mary Frances Smith, Kathryn Doughtery, Beatrice Robertson, Dona Baxter Hall, Dr. John Banning, Dr. Joel Soobitsky, Eloise Caldwell, Hank Harmon, Kendra Anderson, Les Nichols, and Dr. Doris Wetters who have made many contributions to my life and career.

A special thanks to Gerald and Beulah Kellogg, who watched the dog on many occasions and offered encouragement; and to Virginia and Jo of the College of Education, who always knew the answers and had pleasant smiles. A warm thank you is also due Lois, Jeannie, Gene, and Sandy for all the strokes and vote of confidence.

Finally, my deepest appreciation and gratitude to my friend and husband, Wayne, who provided constant support, patience, and encouragement to complete the degree.

Last but not least to the United States Congress and the Michigan Legislature who believe enough in EFNEP to continue its support.

Flint, Michigan
1986

Linda Nierman

FORWARD

Former evaluations of EFNEP have provided increased evidence regarding the program's influence on program participants and program staff; however, very few long-term longitudinal studies have been completed. This study addresses the retention of foods and nutrition knowledge and practice five years after program participation and provides the beginning framework for future retention studies as program operation, program management and program instruction change.

The completion of this study was made possible by the cooperation, support, and encouragement of the EFNEP Extension Home Economists, the EFNEP Nutrition Aides, and the EFNEP Supervisory Aides.

TABLE OF CONTENTS

DEDICATION..... ii

ACKNOWLEDGEMENTS.....iii

FORWARD..... vi

LIST OF TABLES..... ix

LIST OF APPENDICES.....xii

CHAPTER

I. INTRODUCTION..... 1

Statement of the Problem
Objectives of the Study
Hypotheses
Rationale for the Study
Footnotes

II. SELECTED REVIEW OF LITERATURE.....19

Introduction
Related Literature and Theories of Adult Learning
Methodology for Adult Education
Concepts for Adult Learning
Expanded Food and Nutrition Education Program Studies
Summary
Footnotes

III. METHODOLOGY.....52

The Setting
Population
Research Design
Procedures
Population and Sample
Instrumentation
Collection of Data
Treatment of Data
Assumptions
Limitations of the Study
Summary
Footnotes

IV. FINDINGS..... 73

Overview
Characteristics of the Population Sample
Hypotheses
Presentation of the Findings

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS....128

Purpose of the Study
Objectives of the Study
Summary of Procedure
Summary of Major Findings
Conclusions and Implications
Implications for Future Research
Reflections

BIBLIOGRAPHY.....140

APPENDICES.....145

A. Family Record
B. 24-Hour Dietary Food Recall
C. Michigan EFNEP Family Fare Survey Questions
D. Michigan EFNEP Family Fare Survey Questionnaire Pictures
E. Scoring Table for 24-Hour Dietary Food Recall

LIST OF TABLES

1. Characteristics of the Population Sample 58

2. Characteristics of Participants Total Sample.....77

3. Mean and Percentage Change of Family Fare Survey Scores (n = 399).....80

4. Mean and Percentage Change of USDA Scores (n = 399).....81

5. Mean Change of Family Fare Survey Scores (n = 45).....82

6. Mean Scores of USDA Survey (n = 45).....83

7. Percentage Change of Family Fare Survey Scores (n = 45).....84

8. Percentage Change of USDA Survey Scores (n = 45).....85

9. t-test on the Family Fare Score between High USDA Score Group and Low USDA Score Group Measured at T_1, and T_2 (n = 399).....87

10. t -test on the USDA Score between High USDA Score Group and Low USDA Score Group Measured at T_1, and T_2 (n = 399).....88

11. t-test on the Family Fare Score between High USDA Score Group and Low USDA Score Group Measured at T_1, T_2, and T_3 (n = 45).....90

12. t-test on the USDA Score between High USDA Score Group and Low USDA Score Group Measured at T_1, T_2, and T_3 (n = 45).....91

13. ANOVA Test on the Average Family Fare Scores Measured at T_1 and T_2 (n = 399).....93

14. ANOVA Test on the Average USDA Score Measured at T_1 and T_2 (n = 399).....94

15. ANOVA Test on the Average Family Fare Scores Measured at T_1, T_2, and T_3 (n = 45).....95

16. ANOVA Test on the Average USDA Scores T_1, Measured at T_2, and T_3 (n = 45)..... 96

17. Percentage Change of USDA and Family Fare Scores between T_1 and T_2 (n = 399).....102

18. Percentage Change of USDA and Family Fare Scores between T_1 and T_2 by Selected Demographics (n = 45).....104

19. Percentage Change of USDA and Family Fare Scores between T_2 and T_3 by Selected Demographics (n = 45).....105

20. Percentage Change of USDA and Family Fare Between T_1 and T_3 (n = 45).....106

21. Correlation between USDA Score and Family Fare Score.....108

22. Grand Mean of Composite USDA Score and Family Fare Score by T_1, T_2, and T_3 (n = 399 and n = 45).....109

23. Percentage Change of Composite USDA Score and Family Fare Score by T_1, T_2, and T_3 (n = 399 and n = 45).....110

24. MANOVA Test on the USDA and Family Fare Score Difference by Majority and Minority Ethnic Group Measured at T_1 and T_2 (n = 399).....112

25. MANOVA Test on the USDA and Family Fare Score Difference between Food Stamp and Non-Food Stamp Group at T_1 and T_2 (n = 399).....113

26. MANOVA Test on USDA and Family Fare Score Difference Between WIC and non-WIC Group at T_1 and T_2 (n = 399).....114

27. MANOVA Test on the USDA and Family Fare Score Difference Between Different Age Groups at T_1 and T_2 (n = 399).....115

28. MANOVA Test on the USDA and Family Fare Score Difference between Different Educational Levels at T_1 and T_2 (n = 399).....117

29. MANOVA Test on the USDA and Family Fare Score Difference Between Number of Children at T_1, T_1, and T_3 (n = 399).....118

30. MANOVA Test on the USDA and Family Fare Score Difference Between Number of Instructional Visits at T_1 and T_2 (n = 399).....119

31. MANOVA Test on the USDA Family Fare Score Difference by Majority and Minority Ethnic Group Measured at T_1, T_2, and T_3 (n = 45).....120

32. MANOVA Test on the USDA and Family Fare Score Difference Between Food Stamp and Non-Food Stamp Group at T_1, T_2, and T_3 (n = 45).....121

33. MANOVA Test on the USDA and Family Fare Score Difference Between WIC and Non-WIC Group T_1, T_2, and T_3 (n = 45).....122

34. MANOVA Test on the USDA and Family Fare Score Difference Between Different Age Groups at T_1, T_2, and T_3 (n = 45).....124

35. MANOVA Test on the USDA and Family Fare Score Difference Between Educational Levels T_1, T_2, and T_3 (n = 45).....125

36. MANOVA Test on the USDA and Family Fare Score Difference Between Number of Children at T_1, T_2, T_3 (n = 45).....126

37. MANOVA Test on the USDA and Family Fare Score Difference Between Different Number of Visits at T_1, T_2, and T_3 (n = 45).....127

LIST OF APPENDICES

A. Family Record, ES #255.....145

B. 24 Hour Dietary Food Recall Form.....146

C. Michigan Family Fare Survey Questionnaire.....147

D. Michigan Family Fare Survey Pictures.....155

E. Scoring System for 24 Hour Food Recall.....197

CHAPTER 1

INTRODUCTION

America was shaken with a new revelation in the 1960s. This revelation was poverty and malnutrition. A booming postwar economy had lulled Americans into assuming that abject poverty and hunger died with the depression of the 1930s. The reality was that hunger and poverty did in fact exist in these United States.

For the first time in this nation's history, attempts were made to define and measure economic hardship. "The official poverty measure... judged each member of a family to be poor if the family had pretax cash income less than three times the cost of a nutritionally adequate but minimum diet."[1]

During the early 1960s this nation's Cooperative Extension Service (CES) initiated pilot projects to provide specially designed education for low-income homemakers. The original pilot occurred in Alabama. Other later pilot projects were conducted in Rhode Island, Texas, Massachusetts, and Missouri. These pilot projects demonstrated that low-income participants could change their food behavior patterns and that paraprofessionals could be trained to teach low-income homemakers

effectively. It appeared that the low-income homemakers had to be taught with nontraditional approaches since they did not attend meetings, did not regularly read newspapers or publications, and were not in contact with community resources. In addition, some of the homemakers could not speak or write English. Work with low-income homemakers required special and intensive educational approaches. These approaches included visits to the home, simple but practical ideas for food preparation and food safety, as well as practical ideas for clothing construction, repair, and practical ideas on how to meet other basic family needs.[2]

During the 1960s the nation's media reported examples of poverty and hunger everywhere. It became evident that hunger, malnutrition, and starvation were not reserved for specific regions of the country. It affected whites, blacks, Hispanics, and American Indians; it occurred in the cities and the rural areas. It affected people of all ages. It was everywhere.

While the existence of poverty and hunger was pervasive, two general conclusions were inescapable:

- Several million Americans were living at or below the poverty level
- Children and adults in low-income families were suffering from inadequate nutrition and sometimes severe malnutrition[3]

It is in this context that the Extension Home Economics, Expanded Food and Nutrition Education Program (EFNEP) was designed, proposed, and funded by the U.S. Congress. EFNEP was created to address the following situation:

> It was undeniably true that many low-income families were malnourished simply because there was insufficient food. In addition, many of the families lacked a knowledge about the importance of nutrition and its relation to health. Thus, even with access to food, malnutrition often occurred because of a poorly balanced diet.
>
> Those families most likely to be malnourished were also likely to be isolated from sources of information and assistance in foods and nutrition. In rural areas, the isolation was mainly geographic. In cities, low-income families were cut off from educational opportunities by the high-crime areas ringing the urban slums.
>
> Existing educational institutions were largely a product of mainstream American society. While possessing great technical skills and resources, they maintained no explicit lines of communication with poverty families. Their educational capabilities could not, therefore, be focused directly on the nutritional needs of the poor.[4]

These conditions suggested some important objectives for the designers of the new CES, Extension Home Economics, Expanded Food and Nutrition Education Program thrust. These objectives were:

1. To develop and implement a food and nutrition education program tailored specifically to the needs of the poor.

2. To help low-income families, especially those with young children, to acquire the knowledge, skills, attitudes, and changed behaviors necessary to improve their diets.

3. To deliver the food and nutrition education directly to the low-income audience by employing, training, and supervising paraprofessional Nutrition Aides. These Aides would be indigenous to the communities in which they would be working, and would work with families in a one-to-one setting or in small groups.[5]

The Cooperative Extension Service presented a good organizational situation for the new Expanded Food and Nutrition Education Program (EFNEP). The existing educational, technical, and administrative capabilities networking the U.S. Department of Agriculture, through the nation's land grant universities and U.S. counties, was a ready-made organization which could allow the program to function. Hence EFNEP was organized and initiated in November 1968 within the national, state, and county Cooperative Extension Service framework. Operations to implement a nutrition education program designed to reach low-income families began in early 1969.

EFNEP program management responsibility is shared at these levels:

> EFNEP leadership at the national level has overall responsibilities for monitoring and evaluating the nationwide program. It also provides administrative and technical support to coordinate interstate program activities and to implement federally mandated procedures.

> State Cooperative Extension Services (CES) provide second-line administrative control for EFNEP. CES Program Coordinators provide overall and/or delegated leadership for coordination and management of EFNEP within the States. CES Food and Nutrition Specialists prepare training and resource materials in nutrition and nutrition-related subject matter which serve the needs of unit-level program professionals, paraprofessionals, volunteers and participants.
>
> County Cooperative Extension Service EFNEP personnel are the backbone of EFNEP, since it is at the county level that contact with the low-income clientele occurs. Professional Home Economists have direct responsibility for the successful operation of local/county EFNEP units. Home Economists train and supervise the paraprofessional staff who are generally indigenous to the geographic area in which they work and who teach low-income homemakers and youth directly. In addition, volunteers are recruited to work with both adults and 4-H youth.[6]

The program structure and program operations are well documented.[7] Of greater importance are the studies that have been conducted to address program impact or effects of the program with the target audience. These early studies are preliminary to this study.

In the 1979 U.S. Department of Agriculture "Historical and Statistical Profile of the EFNEP Program," it is reported that:

> The impact of EFNEP is demonstrated in a variety of ways. Throughout the course of the Program, EFNEP management has sponsored a number of national studies to assess the impact of EFNEP on its audience. There have also been

> a number of State and local studies performed by local CES groups, candidates for advanced degrees, and by other agencies and organizations with an interest in the aims and goals of EFNEP. Lastly, there is the EFNEP Reporting System which provides National, State, and County EFNEP administrative personnel with a continuing source of data on the status and trends in the Program.[8]

Historically the program has been evaluated by analyzing changes in food consumption practices of the enrolled homemaker, via 24-Hour Dietary Food Recalls taken at entry and every six months thereafter until graduation from the program. The progression rate of homemakers enrolled in the program may be influenced by factors such as initial nutritional knowledge, interest in food preparation, food shopping and food safety practices, socio-economic conditions of the family, and recent family events.

Past research has evaluated the impact of the EFNEP by interviewing homemakers and repeating the dietary assessment twelve to twenty-four months after participation in the program.[9] Other studies, (a) have compared the cost-benefit of the program based on the required length of homemakers' program participation to achieve dietary changes;[10] (b) have examined the impact of a basic nutrition education curriculum on length of enrollment[11] and on dietary change scores; and (c) have analyzed various teaching methods so that the enrollment

period could be shortened and more participants could be reached.[12]

No studies have been undertaken to determine whether participants retain their improved nutrition status for longer (more than 38 months) periods of time. It is the longer term longitudinal consequence that this study addresses along with the nature of the curriculum; the method of instruction; and the future potential of the program.

Statement of the Problem

The purpose of the study was to determine if participants of the Michigan Expanded Food and Nutrition Education Program retain their improved food and nutrition knowledge and practice change scores five years after program participation.

Objectives of the Study

This study is a report of an analysis of the retention of food and nutrition knowledge and practices of participants from the Michigan Expanded Food and Nutrition Education Program. Program participants were tested at three times: (1) Time 1: upon entry into the program (pre-instruction); (2) Time 2: upon leaving the program;

and (3) Time 3: five years after completion of the instructional program (follow-up). The study objectives were:

1. To compare participants' 24-Hour Dietary Food Recall scores at Time 1, Time 2, and Time 3 and to analyze the effect of selected demographic characteristics.
2. To compare participants' Michigan Family Fare Survey scores at Time 1, Time 2, and Time 3 and to analyze the effect of selected demographic characteristics.
3. To interpet analyses of results and make recommendations to USDA Cooperative Extension Service leadership, State Legislators and the U.S. Congress regarding the long-term impact of the Michigan Expanded Food and Nutrition Education Program on participants' retention of improved food knowledge and practices.

Hypothesis

The research hypotheses for this study were:

1. Participants will exhibit improved scores from pre-instruction to post-instruction as measured by the 24-Hour Dietary Food Recall (USDA Score) and Michigan Family Fare Survey.

2. Participants who exhibit improved scores from pre-instruction to post-instruction will retain their post-instruction score at follow-up five years later.
3. Participant scores over time from post-instruction to the follow-up survey will be retained and not influenced by selected demographics.

Need for the Study

Federally-funded and state-funded programs that provide nutrition information and education to the poor are being subjected to both increased scrutiny and fiscal constraints. Therefore it becomes increasingly important to provide solid research data to increase the public's understanding of successful programs that serve this clientele and to demonstrate how these successful programs influence low-income families to change. From its beginning in 1969, the Expanded Food and Nutrition Education Program has focused on nontraditional methods of reaching and educating the low income homemakers.

In 1978 the Comptroller General of the U.S. reported to the U.S. Congress that the Federal Government was spending $73 to $117 million annually on human nutrition research. The report indicated that "Comprehensive, consolidated information on Federal Human Nutrition

Research activity is lacking; no department or agency has human nutrition as its primary mission."[13] The report also noted that advancement in nutrition was fundamental in improving human health, examined the gaps in nutrition knowledge, and discussed changes needed to facilitate progress.[14]

From the list of many recommendations made by the General Accounting Office of the United States, the first recommendations emphasized research needs for responding to human nutrition knowledge gaps. These recommendations included the need for:

- Long-term studies of human subjects across the full range of both health and disease;
- Comparative studies in populations of different geographic, cultural, and genetic backgrounds.[15]

The report went on to state that human nutrition research has traditionally concerned itself with identifying essential nutrients, defining the role of nutrients in the body, and preventing diseases. It stated that "good nutrition" is assumed and that studies are needed to reflect relationships between nutritional status at one period of life to nutritional status and health in later periods of life.[16]

This longitudinal five-year study is an attempt to respond to some of the General Accounting Office's recommendations about needed research, especially focusing on participant's change scores as the unit of analysis.

Rationale for the Study

The United States Congress funds several nutrition programs to provide food for low-income famlies; however, EFNEP is the only federally funded nutrition program that provides education to low-income families with young children. Participation in the EFNEP is expected to result in:

- Improved diets and nutritional welfare for the total family
- Increased knowledge of the essentials of human nutrition
- Increased ability to select and buy food that satisfies nutritional needs
- Improved practices in food production, preparation, storage, safety, and sanitation
- Increased ability to manage food budgets and related resources such as food stamps

EFNEP targets food and nutrition programming to reach two primary low-income audience segments: adult and youth.

Adult: Low-income homemakers or individuals with young children who are responsible for planning and preparing food for their families.

Youth: Low-income youth, from enrolled EFNEP families, who are eligible for 4-H Youth programs.

Traditionally, Cooperative Extension Service programs in Home Economics, Agriculture, and 4-H Youth Education have helped rural families "to help themselves" by providing the most recent "how to" information to improve the families' economic and social well being.

In the beginning, families served by the Cooperative Extension Service were primarily rural. Over time, CES has expanded its audience to include rural, urban, and suburban families. The Cooperative Extension Service as an agency of the United States Department of Agriculture and the State Land Grant Institutions in cooperation with local units of government, has assisted many families with information, demonstrations, educational seminars, and research in solving many of the social and economic problems facing families. EFNEP was created because of the intense interest of the U.S. Congress and the American public in the plight of the low-income family without food.

Although the U.S. diet is generally good, nutritional problems still exist within various segments of the population. Malnutrition is fast becoming a primary health problem.[17] At the same time, federal and state

programs that provide information and assistance to the poor are being subjected to both increased scrutiny and fiscal constraints. Therefore, it becomes increasingly important to provide information: (a) to increase the public's understanding of programs that serve this clientele and (b) to help researchers and other Extension Staff to understand how these programs influence families to change.

Federal food programs such as Food Stamps, commodity foods, supplemental feeding programs (WIC/Focus Hope), school lunch, and school breakfast, are in operation. However, the programs may not have primary nutrition education as their primary focus. Feaster (1972) conducted a study for the USDA that showed that individuals receiving food stamps still had nutrition problems even though they had used food stamp vouchers.[18] The question became: Do families know how to select, use and serve nutritional food? Could part of the malnutrition problem be a reflection of the need for nutrition education?

The role of the Federal government in nutrition education is limited and without formal coordination since major food and nutrition programs are administered by the United States Department of Agriculture, the Department of Health, and the Department of Education. A very limited number of these programs include an evaluation component

to assess their impact on modifying food consumption and food behavior practices of participants over time. (An exception to this is the USDA, Expanded Food and Nutrition Education Program. EFNEP does have evaluation data on the program's effectiveness in modifying low income participants food consumption and food behavior practices.)

This limited evaluation of the impact of nutrition education has resulted in a lack of understanding of nutrition education's potential worth. However, assessment of the impact of any program's effectiveness requires recognized and acceptable measures.

One nutrition education effectiveness measure used frequently is the 24-Hour Dietary Food Recall, which is a record of an individual's food consumption within one twenty-four hour period. The 24-Hour Dietary Food Recall originated in dietary research when aggegated data were needed to represent community or subpopulations.

Current dietary standards are called the Recommended Dietary Allowance (RDA), established by the National Academy of Science of the National Research Council. The RDAs are used as a guide for the best estimates of the nutrients needed by a person on a daily basis. Twenty-four Hour Dietary Food Recall results may be converted to nutrients and compared to this standard.

Abbott and Levinson provided a summary of criteria that should be considered in assessing the relevance and relative effectiveness of a nutrition education program.[19]

1. Maintenance...a successful program should be defined as one capable of maintaining its effect. A massive "one-shot" nutrition education program resulting in significant short term change, for example, but having no lasting benefit would not be considered successful.

2. Coverage and Replicability...the ultimate need is for programs with larger scale impact and activities that lend themselves to broad coverage, and to replicability beyond pilot stage.

3. Speed of Implementation...the problems are usually immediate and "time lost means opportunities foregone to reach clientele who otherwise would not be reached."

4. Feasibility Constraints...many interventions require resources (such as skilled manpower) that are in short supply, such constraints must be addressed in the design and selection of programs and activities.

5. Political Acceptability...the final acceptance of any program must be made in the context of conflicting interests and varying evaluations of the outcome of any approach. Many times political considerations outweigh economic efficiency. Visability of a program may be more important than the long run impact of the intervention.

Information gained from this study may be applied to other adult education programs that reach similar clientele. The study is organized and presented so that Chapter II provides a selected review of the literature related to adult learning and a summary of some of the long term EFNEP studies. Chapter II highlights the methodology for the study and Chapter IV presents the findings of the study; Chapter V provides the results of the Study and the implications for future research.

Footnotes

[1]Congressional Budget Office, "Reducing Poverty Among Children" (The Congress of the United States, May 1985) p. xii.

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[3]USDA Science and Education Administration, "The Expanded Food and Nutrition Education Program - A Historical and Statistical Profile," (Program Aid No. 20), pp. 2-3.

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[6]Ibid. p. 9.

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[9]M. Kerr, L. Nierman, M. Andrews, "Evaluation of the Long Term Effects of the Expanded Food and Nutrition Education Program in Michigan" (Final Report, Michgan State University), June 1979.

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[13]Comptroller General, Government Accounting Office, "Federal Human Nutrition Research Needs a Coordinated Approach to Advance Nutrition Knowledge," Report to the Congress of the United States. (Volume I, PSAD - 77-156, March 28, 1978), p. i.

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[16]Ibid., pp. 30-33.

[17]Physician Task Force on Hunger in America, "Hunger Counties 1986 - The Distribution of America's High Rise Areas, (Harold University School of Public Health, January 1986), pp. 3-6.

[18]G. Feaster, "Impact of the Expanded Food and Nutrition Education Program on Low Income Families: An Indepth Analysis," (USDA Agriculture Research Service Report #220), 1972.

[19]P.C. Abbott and F.J. Levinson, "Assessing Alternatives Nutrition Strategies: An Application of Cost-Effectiveness Analysis," Cambridge, MA; Massachusetts Institute of Technology; International Nutrition Planning Program, 1974.

CHAPTER II

SELECTED REVIEW OF LITERATURE

Introduction

Beginning with its inception in 1969, the Cooperative Extension Service's Expanded Food and Nutrition Education Program (EFNEP) mandate was to focus on the low-income population. Unlike other poverty relief programs that place money or physical goods in the hands of the poor, EFNEP's intervention was nutrition education. Given that malnutrition was a severe problem in the poverty population, the U.S. Congress decided that new modes of educational delivery should be devised. First, the education would have to be taken to the participant since the participant would not seek out information from traditional Cooperative Extension Service programs. Second, low-income participants would not seek out information from trained professionals and in most cases the professional could not relate well to the participants' economic, social, and environmental conditions. A new paraprofessional position, the Nutrition Aide, was created by the CES to carry basic nutrition instruction into the homes of low-income families.

The value of paraprofessionals has been conclusively

proven in the last twenty years.[1] According to Reissman, "indigenous people have the same social background, the same attitudes and values as well as a familiar pattern of language to facilitate their communication with people needing professional services."[2]

Since EFNEP's inception, national, state, and local studies have evaluated the effectiveness of the programs'delivery methods and impact on participants dietary adequacy. Since this study looks at the retention of foods and nutrition knowledge and practice it was necessary to review adult learning theory, educational work with the disadvantaged and studies that have focused on the effectiveness of EFNEP.

This review will relate to the teaching of EFNEP participants in their home learning environment. The focus will be on how adults learn, the setting necessary for the diffusion and adoption of new practices, and finally the teaching framework that must be remembered by the instructor or Nutrition Aide as they teach this audience.

EFNEP evaluation studies reviewed for ths study primarily will focus on measuring the long term impact of participation in EFNEP. The 24-Hour Dietary Food Recall was the major instrument used in these studies to measure the program's effectiveness. The studies were selected

since they provide historical information on EFNEP program evaluation, over time, and describe length of program participation before the evaluation was completed.

Related Literature and Theories of Adult Learning

In undertaking a study of knowledge and skill retention it is appropriate to review perspectives that relate to adult learning and also the methodology for adult education. In working with the disadvantaged it is apparent that the greatest learning comes from "learning by doing" with others like oneself. EFNEP provides that special learning environment.

Human development depends upon the dual factors of physical growth and learning. The factors influencing growth are basically genetically determined. The factors influencing learning are chiefly determined by the events in the person's living environment, including family environment, community environment, school environment, and the various social environments.[3]

Learning is often defined as "changed behavior." If a change is to take place in a learner's behavior the learner must be able to do more than know some new information. The learner must be able to understand and use it.[4] "Learning by doing" becomes a cornerstone.

According to Gagne, learning is defined as, a change

in human disposition or capability, which can be retained, and which is simply ascribable to the process of growth. He further maintains that "...learning exhibits itself as a change in behavior and the influence of learning is made by comparing what behavior was possible before the individual was placed in a 'learning situation' and what behavior can be exhibited after such treatment."[5]

Acquisition of skills and knowledge are the typical form of content for the "learning situation;" however, other varieties of interaction, which include motivation, persuasion, and the development of attitudes and values, are of tremendous importance to learning. It is not clear how to continue the process of learning to its maximum.[6]

Motivation for adult learning begins with what people feel they want. Houle defines need as: "...a condition or situation in which something necessary or desirable is required or wanted. A need may be perceived by a person or persons possessing it (when it may be called a felt need) or by some observer (when it may be called an ascribed need)."[7]

Many classifications of need can be found in the literature. Maslow maintains that people are motivated within a hierarchy of needs, and once their basic needs are satisfied, people begin to seek the next higher level of need. In ascending order, Maslow states that these

needs are: physiological needs, safety needs, love and affection, esteem, and self-actualization.[8] According to Maslow, with the gratification or fulfillment of a basic need, people set new goals. Objectives are developed in a hierarchy and represent fundamental knowledge within which the educator must select suitable information to design learning experiences.

Harry Miller explains why socioeconomic status and participation in adult education are related. Miller's Social Class Theory builds on Maslow's Hierarchy of Needs Theory to explain why people participate in education programs and why there are large differences in what people hope to attain from participation. Maslow's theory explains why low-income people are primarily interested in education to meet basic survival needs, while persons of higher economic levels seek education to fulfill achievement needs and self- actualization.[9]

Roger Boshier's conclusion of non-participation is that, "both adult education participation and non-participation occur due to the discrepancy between the participant's self-concept and the key aspects of the educational environment. Non-participants manifest self-institutional incongruence and do not enroll."[10] Boshier suggests that incongruencies between self and ideal self, self and other students, self and teacher, and self and the institutional environment may lead to non-participation.

Methodology for Adult Education

Patricia Cross suggests that educators designing adult learning opportunities for people with low self-confidence should create learning opportunities that have low levels of risk. Cross believes that self-directed learning projects can be most effective since learners have complete control over the situation. Cross states, "...they can gauge the learning tasks to levels of achievement with which they feel comfortable; they can expose themselves to the queries of others on topics of their own choosing; and they can retreat or withdraw from any task at any time."[11]

Cross submits that there are pessimists and optimists regarding current theories of adult learning. She contends that Knowles is being optimistic regarding the elements of adult learning-theory since most of the elements have been discovered. Furthermore, she asserts that "androgogy" is the "unifying theory" that can provide the "glue to bind the diverse institutions, clients, and activities into some sense of unity"[12] Cross thinks Miller is more pessimistic since Miller believes that we are not ready for any advanced activity in adult education theory.[13]

Houle was probably the most realistic when he made the following observation:

> It cannot be said that most of the work in the field is guided by any...system or even by the desire to follow a systematic theory. The typical career worker in adult education is still concerned with an institutional pattern of service or a methodology, seldom or never catching a glimpse of the total terrain of which he is cultivating one corner, and content to be, for example, a farm or home advisor, museum curator, public librarian, or institutional trainer.[14]

Androgogy is an old word popularized by Malcom Knowles. Knowles defines androgogy as "the art and science of helping adults learn" and contrasts it with pedagogy, which is concerned with helping children to learn.[15] According to Knowles, androgogy is based on four assumptions about characteristics of adults that are different from characteristics of child learners.

> These assumptions are that as a person matures, (1) his self-concept moves to one of being a self-directed human being, (2) he accumulates a growing reservoir of experience that becomes an increasing resource for learning, (3) his readiness to learn becomes oriented increasingly to the developmental tasks of his social roles, and (4) his time perspective changes from one of postponed application of knowledge to immediacy of application, and accordingly his orientation toward learning shifts from one of subject centeredness to one of problem centeredness.[16]

While there are additional humanistic, developmental, and behavioral theories that undoubtedly contribute to understanding the conditions for learning, those presented are pertinent to the population of this study. In applying the theories of this chapter to the low-income population in the study it appears that the readiness for

learning of the population members is problem-centered. Very few low-income families call to enroll in the EFNEP program. Most are referred to the program by a friend, social worker, minister, or food bank volunteer. Prospective participants are attempting to resolve their immediate dilemma of how to feed their families with limited resources.

Concepts of Adult Learning

Behavioral change is facilitated by providing information to people. Individuals must be aware that existing behavioral patterns may be disfunctional if they are to consider adopting new modes of behavior. Bohlen argues that in the diffusion and adoption process, people must be aware of the need for change and be provided information about the proposed change before consideration can be given to adoption.[17] EFNEP provides an opportunity for families to become aware of alternative food and nutrition choices. These choices assist the family to meet a felt need thus encouraging adoption of the new practices.

Diffusion and adoption research (Rogers and Shoemaker) has demonstrated that awareness often takes place far in advance of adoption. The theory of cognitive dissonance states that, when a person is introduced to new

information that is inconsistent with internalized behavior patterns presently held, a conflict situation emerges.[18] Festinger submits that a person will strive to reduce the dissonance by reconciling one belief with the opposing one; however, the method of reducing cognitive dissonance varies with individuals.[19] Enrollment in EFNEP could easily foster cognitive dissonance. Participants may respond by rationalizing why their families can't change a food practice, or they may adopt the new standard as the norm to reduce the cognitive dissonance.

An important question for the adult educator is: What in the contact with the audience brings about learning? Is it the material, the presentation, the motivation of the participant, or the conditions under which the learning takes place? According to Bugental, the learner's own responsible involvement in the change process is essential to the educational process.[20] This view stresses the importance of the educator-learner relationship and especially the involvement of the learner.

Education has been defined as any learning process resulting in a change of behavior on the part of the learner.[21] "Process" in this context, is defined as the interaction between the educator and the learner. The EFNEP has constantly sought to examine the needs of its low-income audience in the design of its educational program.

Educators generally agree that information cannot be "poured" into the heads of adults. Studies of retention indicate that persons retain 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they say, and 90% of what they do and say.[22] Hence, the educator whose methods stimulate the wide variety of a person's senses will generally have the largest retention rate among participants.

Adult learners have special characteristics that need to be considered when planning educational experiences. These characteristics are that adult learners:

1. Like a failure free (safe) learning environment.
2. Need to know the relevance of what they are learning.
3. Need relevant, practical educational materials.
4. Bring a "life of experience" to the learning scene.
5. Are self-directed rather than dependent learners.
6. Need immediate feedback on progress.
7. Have many outside demands on their time; hence, learning must be participative to keep their attention.
8. Have a variety of internal and external motivations for participating; consequently, they want learning in manageable pieces.
9. Need a social environment.[23]

Adults participate in learning experiences for a variety of reasons but the most common reason is a "sense of expectation" that something pleasant will happen to them. In working with the low-income EFNEP audience, the educator's personal interest and concrete help with immediate matters is most important. There are five basic laws of learning that have implications for the success or failure of the adult educator and EFNEP Nutrition Aides in planning the learning environment. These are:

1. Law of Effect: Success breeds success.
2. Law of Primary: First impressions are vital and lasting.
3. Law of Exercise: The more something is practiced or repeated the quicker the habit will become established.
4. Law of Disuse: Indicates that skills not practiced and knowledge not used are largely forgotten. Repetition does in fact reinforce learning.
5. Law of Intensity: A vivid, dramatic learning experience is more likely to be remembered than a dull, routine, or boring experience.[24]

Adults may understand a concept, but interfering with retention and use is the "curve of forgetting." This implies that, if the educational activity is listening, 50% will be forgotten almost immediately and 25% a short

time later. Hence 50% will be forgotten.

To combat the "curve of forgetting" the following activities may be used:

1. Utilize short periods of review (evaluation after instruction).
2. Review goals at the beginning of each session.
3. Encourage oral expression of the learning activities.
4. Encourage recording of the information for future use.
5. Apply basic principles of effective instruction.[25]

There are a number of other learning blocks, some are controllable and some are not. The learning blocks are boredom, irritation, confusion, and fear. The three paths to learning that should be incorporated and recognized when teaching adults are instructor to participant, participant to instructor, and participant to participant.[26]

Learning goals need to be established by both the instructor and the participant. The goals should be clearly defined, attainable, and shared. Roger Mager suggests that learning goals should include identifying the terminal behavior, identifying the conditions upon which the behavior will occur, and identifying the "standards for success" for performing the described behavior.[27]

Underwood provides considerable evidence that the variable that outweighs all others in importance, for long-term retention, is the amount of practice during initial learning.[28] Ausubel suggests that one can predict retention on the basis of availability of anchoring ideas, stability and clarity of these ideas, and the distinguishability of new material from its anchoring ideas. Thus, new material must be readily subsumable under previously learned ideas and at the same time distinguishable from them.[29]

Caplovitz's (1969) work confirmed the fact that low-income families face three major problems: Lack of cash, lack of credit, and lack of information.[30] Silverman emphasized the need for tempering knowledge with tenderness.[31] A climate of realness and tenderness is necessary for carrying out a helping program for the EFNEP audience of low-income families with limited resources.

In summary there are three basic challenges that are of concern in the educational process when working with low-income famiies. These challenges are:

1. To instill in the participant a greater desire to change;
2. To help the participant to show greater courage to change;
3. To have available more resources to help with the change.

Expanded Food and Nutrition Program Studies

Historically, the effectiveness of EFNEP has been measured by the 24-Hour Dietary Food Recall. The 24-Hour Dietary Food Recall has been used to document eating habits for large population groups since it provides a quick economical means of monitoring food intake. In the Framingham study the correlation of the 24-Hour Dietary Food Recall with actual nutrient intake was 0.52 to 0.92.[32] Young reported comparable results with food diaries and the food recall method.[33] Burke and Pao, in a report to the U.S. Department of Agriculture (USDA), discussed the advantages, disadvantages and applications of the 24-Hour Dietary Food Recall. Their evaluation was that it is a useful, valid method of obtaining diet information from large population groups.[34] It is cost-effective and the results obtained from it are well correlated with those of other, more time-consuming methods. Alternatives to the 24-Hour Dietary Food Recall must meet the requirement of being a useful research tool.

This review of EFNEP studies will report primarily those studies that have looked at the cost-effectiveness of EFNEP program delivery; the long term impact of the program on participants dietary adequacy in relation to length of instruction or enrollment before the program evaluation was completed.

Many evaluations of EFNEP have shown that the program

has had an impact on the dietary adequacy level of its participants. In 1973, Michigan State University examined changes in the nutritional attitudes and food shopping behavior of 163 low-income homemakers from randomly selected counties. Only 3.5 percent of the homemakers had an adequate diet at the time they entered the EFNEP program. Most of the homemakers had food recall scores that showed one serving from each food group. When the entry dietary adequacy scores of these homemakers were compared with scores taken nine months later, there was an overall increase in the percentage of homemakers who ate the recommended number of servings in each food group. The 24-Hour Food Recall mean scores of the study and control group showed that those in the study group tended to increase the number of adequate servings in the four food groups and improve the adequacy of their dietary intake during EFNEP program instruction.[35]

Feaster studied EFNEP's impact on 10,500 homemakers and found that about 4 percent of the homemakers had adequate diets when they enrolled in the program. After six months, the percentage of homemakers who had adequate diets increased to almost 11 percent. Homemakers who had the poorest initial diets showed more improvement than those who had better food consumption practices initially.[36]

Feaster and Perkins reported similar findings in their

study of dietary changes among EFNEP program families in selected Florida and Georgia counties. Improvement occurred in the consumption of the four basic food groups of meat, milk, vegetables and fruits, and breads and cereals. More improvement was noted in the fruits and vegetable group and the milk group, groups that had the lowest inital scores.[37]

To determine the cost-effectiveness of EFNEP, Tate analyzed the program's impact in Georgia, Maryland, Ohio, and Oregon. He divided participants into four groups according to their entry dietary food recall scores (0-25, 26-50, 51-75, and 76-100). Tate used a chi-square test of association to examine the relationship between improvement during the program, length of time in the program, and entry dietary adequacy level. He found that significant dietary changes ceased after the two lowest groups (0-25, 26-50) had participated in the program for 12 to 18 months, and that the two highest groups (50-75 and 76-100) showed no significant changes in dietary scores at any time during the program. Tate concluded that the program was effective for those homemakers whose dietary adequacy level was below 50 at the time they entered the program.[38]

A few follow-up studies have been conducted to determine if participants sustain the dietary changes that occur during EFNEP participation. Gassie reported a study

of 258 homemakers in six parishes of Louisiana noting that only 5 percent had adequate diets at enrollment. However, after only eight lessons, the percentage of homemakers with adequate diets increased to 23 percent.[39]

Patterson, Workman, and Jones studied 30 homemakers in Barry County, Missouri to determine whether or not these homemakers maintained their improved dietary adequacy level after they left EFNEP and whether or not periodic educational contacts would help these families to maintain or improve their dietary adequacy levels. They found that homemakers maintained some of the improvements achieved while enrolled in EFNEP. However, periodic educational contacts after graduation did not improve the homemakers diets beyond the levels initially attained during enrollment.[40]

Rountree in a study of 31 homemakers in Franklin County, Ohio found that homemakers did not significantly improve the adequacy of their diets during EFNEP participation and that the improvements made were not sustained eight months after the program had terminated.[41] In another study, Duff reported that it was not possible to find food consumption behavior differences after families had been enrolled in EFNEP.[42]

Many studies have also been conducted to determine the most effective length of time for enrollment in EFNEP.

During the first external evaluation of EFNEP nationally the records of 2,189 families were examined and 438 homemaker interviews were conducted. Researchers found that homemakers who had inadequate diets at the time they entered the program started improving their diets after six months of EFNEP participation.[43]

Over 3,120 records and 698 interviews were conducted in a second major external evaluation of EFNEP. The researchers found that the participants' Food Recall scores tended to increase with up to 18 months of EFNEP program participation. The study also found that participants with the lowest entry dietary scores tended to participate in EFNEP longer and that this group also showed the most improvement. The researchers recommended that homemakers with average food and nutrition scores and increased learning capabilities complete EFNEP between the 6th and 12th month.[44]

Jones and Verman studied the nutrition change phenomena at selected intervals over a period of one year with 822 homemakers in Lousiana. They found that the group as a whole increased their consumption of foods in all four food groups. However, the most significant changes in food consumption occurred during the homemakers' first two months of enrollment. During the second two-month period there was another significant

change, but this was followed by a definite leveling off of dietary improvement.[45]

Green, Wang, and Ephross, in a three-year longitudinal study, compared changes in the knowledge, attitudes, and practices of 98 rural homemakers with a matched group of 58 urban homemakers. One of their research questions concerned the effectiveness of home visits and the point of diminishing returns. They found that while the impact of the Nutrition Aide's visit diminished after the first year of contact, food and nutrition improvements made during enrollment were not lost. However, by the third year, continued home visits with the same homemaker were of minimal value.[46]

Morris (1975), found that EFNEP participants improved their food recall scores during EFNEP participation and that these changes were positively correlated with the number of contacts the homemaker had with the Nutrition Aide.[47]

Even though participation in EFNEP is determined by level of family income, the findings about the relationship between income and dietary adequacy level are mixed.

Pielemier, Jones, and Munger emphasized that studies of malnutrition over the past 20 years have made it abundantly clear that the educational backgrounds and

economic and cultural characteristics of a society have an impact on its nutritional status. They added that malnutrition may be the most dramatic indicator of poverty since food intake is highly correlated with income.[48] However, studies such as those conducted by the U.S. Department of Health, Education, and Welfare (1972) and U.S. Department of Agriculture (1978) have shown that income alone does not guarantee an adequate diet.[49]

The 1969 National EFNEP evaluation study found that homemakers who had the poorest diets at the time they entered the program tended to be from urban areas, were poorly educated, were on welfare, and were poor. Although the homemakers did show substantial improvements in their food consumption practices after six months in the program, there was no consistent difference in overall dietary adequacy changes that could be attributed to socio-economic characteristics.[50]

Morris examined the relationship between personal and family characteristics of EFNEP participants and their changes in food consumption. With a correlation matrix, the relationships between nine variables: food recall, thiamine excretion level, riboflavin excretion level, nutrition attitude score, nutrition knowledge score, age, educational level, and family income. Morris found that age is negatively related to food consumption practices,

but the homemaker's educational level and per capita family income were positively related to food consumption. Although these correlations indicate that there is a tendency for age, education, and per capita family income to be related to food consumption behavior, the relationships are not signifcant or meaningful for practical purposes.[51]

In evaluating the long-term effects of participation in EFNEP, Rountree studied the relationship between improvements in dietary adequacy scores and five variables: Income, participation in the food stamp program, education, number of children and area of residence. Family size and the number of children, under 18 years of age were significantly related to sustained improvements in dietary adequacy level.[52]

In 1983, researchers did a follow-up study of 73 former EFNEP homemakers who had participated 2-3 years earlier in a California EFNEP evaluation study. This follow-up showed that the improvements in 24-Hour Dietary Food Recall score, shown in the earlier evaluation study (1979-1981), were still present in the follow-up population. The total food recall score (0-100 points) did not significantly change from the evaluation study, post-test score of 72 points, to the follow-up study score of 80 points.

In Muskogee, Oklahoma, the 24-Hour Dietary Food Recall and the Food Behavior Checklist were used to assess sustained change in a group of 121 EFNEP homemakers. Results showed that significant improvements in intake and food behavior practices were sustained three years after participants completed the program.[54]

A study was completed by Maryland researchers to determine the programs' effectiveness in improving participants diets. The sample consisted of 129 graduated participants, who had been enrolled in EFNEP an average of 31.2 months and had been out of the program an average of 20.8 months. Findings showed that graduated participants had final diet scores that were significantly higher than initial enrollment scores. Although some regression occurred after participants left the program, follow-up scores did remain significantly higher than initial enrollment scores.[55]

Researchers investigated the long-term effects of EFNEP in Georgia by determining differences between participants' total diet scores and food behavior practice scores at program entry, at graduation, and twelve months after graduation. The population for the study was homemakers who had graduated between June and September 1977. Follow-up data were collected in October 1978. Results showed that the majority of the homemakers maintained improvement in food behavior practices 12

months after graduation.[56]

An evaluation of EFNEP in Orleans Parish, Louisiana, (1983-86) showed the EFNEP was effective in improving the dietary practices of low-income homemakers enrolled in the program. Comparison of post-enrollment scores, 6-12 months after graduation, to program entry scores, showed that homemakers sustained statistically significant improvement scores.[57]

A follow-up study of Pennsylvania EFNEP participants who participated in the 1981-82 EFNEP Food Stamp pilot project. The pilot project had provided relatively short but intense food and nutrition instruction with a set of standardized lessons. The findings showed that project homemakers were able to retain and even improve their nutritional knowledge six months after project completion. Homemaker age and family size were factors in successful maintenance of homemakers' increase in knowledge. Older homemakers (28 years and over) with four family members out-performed those with smaller families. Food Stamp program participation had no effect.[58]

Fox interviewed 57 homemakers who had graduated from the Grand Island, Nebraska EFNEP unit October 1982 through March 1984. The Food Behavior Checklist and 24-Hour Dietary Food Recall were used for the comparison measures. The findings revealed that graduated homemakers had a signifcantly higher score (78.9) at graduation than

at entry (61.6). The consumption of foods from each of the four food groups was also compared. Homemakers maintained their graduation intake of the fruits and vegetables group. In the milk group, and bread and cereal group, the homemakers did not maintain graduation level scores, but intake was still higher than at entry. Homemakers did not maintian either the graduation level or the entry level for the meat group.[59]

Summary

The selected review of literature has focused on how adults learn and the special characteristics to be considered when teaching disadvantaged low-income families. This review has substantiated that the design of the EFNEP learning experience is not only practical but that the methods used in EFNEP are also supported by research that has been conducted on adult learning.

The conditions for learning were reviewed since EFNEP paraprofessionals have a crucial role in providing the food and nutrition information to participants in a tender and practical manner. The success of the EFNEP program over time, rests with the Nutrition Aide's skills in teaching and communicating with the participants...the learners.

The following conclusions may be drawn from the previous Expanded Food and Nutrition Education Program studies, which have assessed the long-term effects of EFNEP participation:

1. The 24-Hour Dietary Food Recall adequacy improvements that occur during program participation appear to be sustained from 6 months to 38 months after program completion. In reviewing the research, 38 months is the longest period of time dietary adequacy has been measured on former EFNEP participants.
2. Participants who have the lower 24-Hour Dietary Food Recall scores at program enrollment appear to benefit more from program participation than participants who enter with higher 24-Hour Dietary Food Recall scores.
3. Overall, participant 24-Hour Dietary Food Recall changes do not appear to be related to selected participant demographic variables of age, income, family size, of participation in food assistance programs. However, based on particular studies with specific areas of interest:
    a. Dietary food behavior is maintained regardless of family composition.

b. Participants receiving food assistance tend to improve their dietary adequacy more than those not on food assistance.
c. Some regression in dietary adequacy occurs after leaving the program but scores still remain significantly higher than enrollment scores.

The EFNEP Food Stamp Project used the 24-Hour Dietary Food Recall and a participant knowledge questionnaire to evaluate the effect of the project; however, most of the EFNEP evaluations have only used the 24-Hour Dietary Food Recall as a measure of the program effectiveness. A few studies have also used the USDA Food Behavior Checklist, which is a form, completed by the Nutrition Aide, that measures observable food and nutrition practices exhibited by the enrolled family.

Most of the long-term effects studies have utilized interviews with graduated EFNEP participants anywhere from 6 to 38 months after EFNEP completion. However, program enrollment has varied from 12 months to over 36 months.

This study will analyze retention of foods and nutrition knowledge and practice five years after completion of nine months of EFNEP instruction. Both the 24-Hour Dietary Food Recall change scores and the Michigan Family Fare Survey scores have been used in this study. The Michigan Family Fare Survey provides an assessment of

the EFNEP participant's food and nutrition knowledge and food practices. It appears this is the longest period of time after EFNEP participation that has been used to assess the retention of foods and nutrition information with this audience.

Footnotes

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CHAPTER III

METHODOLOGY

This chapter provides a description of the survey procedures and research materials used in conducting the study. Specific components of the chapter include the setting, population, research design, procedures (sampling, instrumentation, collection of data, treatment of data) assumptions and limitations of the study.

The Setting

State land grant universities seek and receive annual appropriations from state and federal sources to conduct nonformal information and educational activities through the institution formally known nationally as the "Cooperative Extension Service" or "Agriculture Extension Service."

Since its Congressional creation, through the 1914 Smith Lever Act, the Cooperative Extension Service has imparted information and conducted demonstrations, to encourage trial and adoption of new innovations, practices, and skills, to a variety of clientele.

In November 1968 the U.S. Congress, through the Department of Agriculture, designated ten million dollars of USDA, Section 32 funds, for establishment of the Expanded Food and Nutrition Education Program (EFNEP).[1] This initial funding to state land grant universities via the Cooperative Extension Service provided an opportunity for each state to operationalize the EFNEP concept tested by the earlier pilot projects. While the Cooperative Extension Service traditionally has focused on rural areas and families of all economic levels, EFNEP was designed to include poor families in both urban and rural settings. Michigan has participated in the EFNEP program since its inception.

The review of literature has set forth some of the basic conditions for adult learning and noted many of the longitudinal studies conducted to evaluate EFNEP's effectiveness. Criticisms regarding EFNEP program effectiveness and educational methods were also presented. It is these challenges that provided the motivation to examine the retention, five years after program participation, of foods and nutrition knowledge and practices of participants in the Michigan EFNEP.

Population

During the initiation of this study the Michigan EFNEP operated in sixteen Michigan counties; Bay, Berrien,

Calhoun, Dickinson, Genesee, Ingham, Kalamazoo, Kent, Lenawee, Monroe, Macomb, Muskegon, Oakland, Saginaw, St. Clair, and Wayne. All newly-enrolled, low-income participants in the EFNEP program during October through November 1979 were considered candidates for this study. The target audience for EFNEP is low-income families with children. Priority attention is given to those families with young children. Many program participants receive public assistance.

Research Design

Given the interest in providing information about the retention of food and nutrition knowledge and practices of EFNEP particiants five years after program instruction, a longitudinal follow-up research approach was chosen for the study. This single group, longitudinal, quasi-experimental, time-series design model was considered appropriate since the same data collection instruments may be administered at enrollment, (pre-instruction, Time 1); at program completion (post-instruction, Time 2); and at follow-up (five years later, Time 3). The administration of these same instruments five years after program completion provided a means of assessing participants' retention of food and nutrition knowledge and practices over time. This design also examined selected

demographics of participants and the number of instructional visits they received to assess the effect of these variables on retention and change scores.

The major research question to be answered by this study was: Will EFNEP program participants retain improvement of their food and nutrition knowledge and practices five years after program participation? Specific research questions to be answered were:

1. Do participants exhibit change from pre-instruction (time 1) to post-instruction (time 3) as measured by the 24-Hour Dietary Food Recall and the Michigan Family Fare Survey?
2. Do participants who exhibit change from pre-instruction (time 1) to post-instruction (time 2) retain post-instruction scores for five years?
3. Do participant 24-Hour Dietary Food Recall and Michigan Family Fare Survey scores change when analyzed by selected demographics?

Stated in the null form the statistical hypotheses for this study were:

1. No significant difference will result in pre-instruction (time 1) and post-instruction (time 2) scores as measured by the 24-Hour Dietary Food Recall and the Michigan Family Fare Survey.

2. No significant difference will occur among participants' post-instruction (time 2) and follow-up (time 3) scores.
3. No significant difference will exist among participants' post-instruction (time 2) scores and their follow-up (time 3) scores based on the selected demographics.

To examine participants' retention of changes in foods and nutrition knowledge and practice, participants' 24-Hour Dietary Food Recall scores (USDA scores) were compared to participants' Michigan Family Fare Survey scores before instruction (at enrollment) Time 1, post-instruction (at program completion) Time 2, and at follow-up (five years later) Time 3. The 24-Hour Dietary Food Recall instrument looks at participants' food consumption in a 24 hour period while the Michigan Family Fare Survey measures the participants' foods and nutrition knowledge, skills and practices in the following categories:

1. Nutrition (sources of nutrients)
2. Food groups (classification of foods)
3. Food storage, sanitation and safety practices
4. Food preparation practices
5. Food shopping or preparation skills
6. Food shopping practices
7. Source of food and nutrition information
8. Food preparation tasks (liked and disliked)

Procedures

Population and Sample

The data collection instruments are administered to all low-income participants upon enrollment in the Michigan EFNEP. A total of 699 participants enrolled October through November 1979 (time 1) in the sixteen counties. Of the original (n = 699) participants 449 participated in the post-instruction data collection July through October 1980 (time 2). Fifty participants of the Time 2 sample (n = 449) were located five years after instruction and participated in the Time 3 data collection July through August, 1985. Data collection instruments were complete for 45 of the 50 subjects in the follow-up sample, and were used for comparing Time 1, Time 2 and Time 3 scores.

The final sample (n = 399) used for Time 1 and Time 2 data in this study has the 45 participants of Time 3 removed. Consequently, the population sample for this study is 444 participants. Demographic characteristics of the Time 1 and Time 2 sample are shown in Table 1. All demographic variables used in this study were obtained at Time 1, with the exception of the number of instructional visits, which was recorded by the Nutrition Aides during a post-instruction (Time 2) interview.

TABLE 1

CHARACTERISTICS OF THE POPULATION SAMPLE
(n = 444)

Demographics	Participants	Percentage
Race:		
Caucasian	283	64%
Black	124	28%
Hispanic	33	7%
Asian	4	1%
Age of Participants:		
21 years or less	86	19%
22-33 years	248	56%
33-44 years	70	16%
45 years and older	40	9%
Education:		
8th grade or less	50	11%
9-12th grade	358	80%
Over 12th grade	39	9%
No. on Food Stamps	304	68%
No. on WIC	194	44%
No. of Children	993	
Average No. Children/Family	2.24	---

Instrumentation

The data collection instruments used for this study are:

1. Family Record, ES #255 (Appendix A)
2. 24-Hour Dietary Food Recall, ES #256 (Appendix B)
3. Michigan Family Fare Survey (Appendix C and D)

These instruments are normally completed by the Nutrition Aide during the first or second enrollment visit with the family.

The Family Record (Appendix A) provides demographic data on participants and their families. Information obtained from this record for the study was:

1. Participant age, sex, and race
2. Number of chidren in the family
3. Highest grade in school completed by participant
4. Participation in food assistance programs (WIC or Food Stamps)
5. Income level and dollar resources spent for food.

The total number of instruction visits with the participant is recorded at graduation.

The 24-Hour Dietary Food Recall (Appendix B) is a record of food eaten by the enrolled participant in a 24-hour time period before the interview. Respondents report, as accurately as possible, the food and drink they have consumed in the 24-hour time period before the visit. Using household measures such as glasses, cups, spoons, bowls, and plates, the Nutrition Aide with the

participant's help, estimates the amount of food that has been consumed.

The foods recorded are then classified into four major food groups and the number of servings consumed in each group is recorded. The dietary adequacy score (USDA score) is computed using a progression scale (Appendix E) developed by Synetics Scoring System for the USDA Extension Service. This scale, which ranges from 0 to 100 points, is based on the recommended number of servings for each of the four food groups. These recommended servings, based on the number of servings suggested in the USDA leaflet, No. 424, titled "Food For Fitness, A Daily Food Guide," are: two or more servings from the milk group; two or more servings from the meat, poultry, fish, eggs, dried beans or peas group; four or more servings from the fruit and vegetable group and four or more servings from the bread and cereal group. Food and beverages that do not belong to one of the four food groups are classified as "other".

These recommended servings have been used as a simple guide for food classification since the recommendations are considered to comprise an adequate diet. Servings in excess of the recommended amounts are not scored. Thus a USDA score of 0 indicates that the participant did not eat the recommended number of servings in any food group that day, while a score of 100 indicates that the participant

had the recommended number of servings for each food group. One serving from each of the food groups is considered minimum adequacy and yields a dietary score of 42. The three categories for analysis of the USDA score for this study are: 0-50 points, 51-100 points, and 0-100 points. See Synetics Scoring System (Appendix E and F).

The 24 Hour Dietary Food Recall is simple to use, costs less than other measures of dietary adequacy, and is considered a useful teaching tool. It requires minimum time to administer and is widely used as a measurement instrument by the nutrition community. However, the instrument does have limitations. The major limitation is that only one day's food consumption is measured; consequently, the instrument does not account for the great variation in an individual's diet, food habits, food resources, available food supply, day of week, or appetite changes over time. Furthermore, some individuals may not remember what they actually ate in the preceding 24 hours. In some cases, the respondent may not be motivated to participate in the Food Recall or rapport with the interviewer may be poor. Consequently the 24-Hour Dietary Food Recall may be a better estimate for assessing group dietary adequacy than individual dietary adequacy since under or over estimation of food consumption by individuals may be balanced by the larger number of respondents.

Though it has some limitations, the 24-Hour Dietary Food Recall has traditionally been considered as the most suitable instrument for measuring change in the food consumption behavior of EFNEP participants and was therefore used in this study. The Expanded Food and Nutrition Education Program "Historical and Statistical Profile of EFNEP"[2] provides the following justification for its use in EFNEP:

> The diet assessment method used by EFNEP must be simple and brief. Program homemakers will not likely tolerate lengthy and involved questioning about their nutrition habits, nor will they submit to complicated biochemical and medical tests. Furthermore, the procedure has to be accurately applied by paraprofessional aides, who may not have the background to collect and interpret detailed information on nutrients in food consumed. The method has to serve as a measure of assessing progress during the homemaker's participation in the program. This implies repeated diet assessments, which would not be feasible with complex assessment procedures. Hence, the use of the 24 hour Dietary Food Recall.

Supervisory Nutrition Aides and Nutrition Aides conducting 24-Hour Dietary Food Recalls in Michigan have been trained to maximize accuracy of the recall by establishing rapport at the beginning of the program; soliciting cooperation and confidence by explaining the purpose of the food recall, asking follow-up questions about the food consumed, and verifying the reported food consumed by repeating the information and asking if everything has been included.

The third data collection instrument is the Michigan Family Fare Survey (Appendix C and D). The Michigan Family Fare Survey was developed by this researcher and Mary Kerr, graduate student with EFNEP, in 1977. The survey was redesigned after a pilot test in five Michigan counties, March through May 1979.

The Michigan Family Fare Survey consists of a series of 68 questions that can be grouped and coded into seven major categories. These categories are: knowledge of food groups; nutrition knowledge; food storage and food sanitation; food preparation practices; food shopping practices; food shopping skills; and sources of food and nutrition information. A series of colorful pictures and a problem-solving approach are used in the administration of this instrument. The interviewer reads the question and the participant views the picture and selects a response. The interviewer marks the response on the questionnaire.

Nine scores are derived from the Michigan Family Fare Survey, one score for each component and an overall score that represents the Family Fare composite score. Six of the component categories and their maximum scores are:

1. Food Groups 15 points
2. Nutrients Sources/Functions 13 points
3. Food Storage/Safety 13 points

4.	Food Preparation Practices	33 points
5.	Food Shopping Practices	25 points
6.	Food Shopping Skills	12 points

The seventh component score is derived from responses to items that identify where the participant receives food and nutrition information (17 points). The eighth component score is based on the food preparation tasks that are disliked by the participant (8 points). (This score ranges from 0-8 points with eight representing the most disliked task.) The ninth score represents the total score of all eight comonents.

The fundamental reason for the development of the Michigan Family Fare Survey was to assess impacts of the Michigan EFNEP program not assessed by the 24-Hour Dietary Food Recall. Since EFNEP was designed to provide education rather than food, EFNEP program instruction concentrates on knowledge of food and nutrition, skillful buying and preparation of food for low-cost nutritious meals, and management of food-related resources. Consistent with this focus, the Michigan Family Fare Survey instrument was designed to supplement the 24-Hour Dietary Food Recall in determining how participation in EFNEP influences participant changes.

To test the instrument's content validity, the Family Fare Survey was administered in 1977 to 391 respondents before EFNEP instruction and nine months after instruction

and to control groups. Analysis performed across the entire sample revealed that Time 2 scores obtained by the respondents were significantly greater than Time 1 scores. The control group scores did not improve significantly.

Reliability of the Family Fare instrument was tested in a separate study (1982). The instrument was administered (test-retest) to the same sample of individuals on two occasions with no intermittent instruction. The results indicated that only one dimension improved, but the improvement over time was not statistically significant. Some participants in the reliability study were interviewed by the same interviewer on both occasions while others were interviewed by different interviewers on each occasion. There were no significant differences in scores in any category under either interview condition. Consequently, the Family Fare Survey is considered reliable or stable in producing similar results regardless of the method of administration. Any differences in participants' entering scores should be attributed to program participation rather than to the survey instrument or the interviewer.

The Family Fare Survey was evaluated in two additional studies with the same staff administering the survey but with different participants. The instrument demonstrated reliability and internal consistency in all the studies.

In addition, the Michigan Family Fare Survey has been

used in the following studies, which have shown it to be useful in measuring participant changes over time:

1. "You Too Can Participate in EFNEP," (Nierman, et. al., 1982)
2. "Effectively Teaching Foods and Nutrition to Low-Income Families," (Walker, et. al., 1983)
3. "A Follow-Up Evaluation of the Effects of the Michigan Expanded Food and Nutrition Education Program on Homemakers' Dietary Adequacy: Implication for Future Management," (Kateregga, 1981)
4. "Evaluation of the Long-Term Effects of the Expanded Food and Nutrition Education Program in Michigan: A Final Report," (Kerr, et. al., 1979)

Collection of Data

All data collection instruments were administered by the EFNEP Supervisory Nutrition Aide in the respective counties. The Supervisory Nutrition Aide accompanied the Nutrition Aide on the pre-instruction visit to administer the data collection instruments. Having the Supervisory Nutrition Aide administer all the instruments ensured that all data were collected pre-instruction and in the same manner. Identification numbers were assigned to participants by each county. To protect the identity of

the participants, only identification numbers and the last names were used on the instruments submitted for analysis.

The instruments were again administered post-instruction (Time 2) July through October 1980, by the Supervisory Nutrition Aide. The Time 2 measurement was taken nine months after enrollment or at graduation, whichever occurred first. The Supervisory Nutrition Aides who administered the data instruments pre-instruction, also administered the instruments post-instruction (Time 2) to ensure consistent instrument administration. Administration of the data collection instruments pre-instruction and post-instruction by the Supervisory Nutrition Aide is the only change from the usual Michigan EFNEP procedure for obtaining enrollment information.

The third data collection (Time 3) occurred July through August 1985, five years after the participant completed EFNEP instruction. All data collection instruments were identical to those used in the pre-instruction (Time 1) and post-instruction (Time 2) data collection. A former Supervisory Nutrition Aide who had been involved in administration of the instruments for the pre-instruction (Time 1) and post-instruction (Time 2), administered all the instruments for the Time 3 (five years after instruction) collection of data.

Administration of the Family Fare Survey and the 24-Hour Dietary Food Recall took approximately thrity minutes.

Treatment of the Data

Data were collected to obtain information to answer the questions stated in the research design section of this chapter. Data were analyzed to assess the change in program participants' scores on the two survey instruments from pre-instruction (Time 1) to post-instruction (Time 2), and the participants' retention of the post-instruction (Time 3) score five years after EFNEP instruction was completed. Additional analyses compared the change scores and retention according to selected demographic characteristics of participants and according to the number of instructional visits.

Since the primary purpose of the study was to describe changes in scores and the nature of the data limits, descriptive statistics (i.e. frequencies, percentages, means, and standard deviations) were used. All data were computerized.

Statistical correlations of repeated measures, like Analysis of Variance (ANOVA), t-tests and multiple linear regression analyis (MANOVA), were used for the analyses. An alpha level of 0.05 was used to determine the significance of the results. For statistical analysis, the 6.5 version of the Statistical Package for the Social Sciences (SPSS) by Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975, and the Statistical System (SAS) for Personal Computers, Version 6 Edition, SAS Institute Inc., Cary N.C. SAS Institute, 1985 were used.

Assumptions

Certain assumptions were made for the purpose of the study. They are as follows:

1. A time series longitudinal study of this nature is valid.
2. Participants interviewed for the study are representative of the Michigan EFNEP population.
3. The data collection instruments measure the array of foods and nutrition knowledge and foods and nutrition-related practices that constitutes the scope of Michigan EFNEP instruction.
4. Participants' reported responses on the survey instruments accurately reflects their actual behavior.

Limitations of the Study

Limitations to the study include the following:

1. Only ten counties of the original sixteen counties participated in the Time 3 collection of data since six counties were eliminated from the program in 1983. The potential number of participants for the Time 3 follow-up was reduced since no EFNEP contact was available in the six eliminated counties.

2. The sample size for the Time 3 data collection was further reduced due to the difficulty of locating low-income participants five years after personal contact had ceased. Original study participants were identified to the researcher only by identification and last name; consequently, local county EFNEP staff were asked to locate the former participants for the third (Time 3) data collection. In some counties, former participant records were not available for complete addresses. In so far as possible, former landlords and former EFNEP staff members were contacted in an attempt to locate participants. Telephone directories were not helpful as many EFNEP participants cannot afford telephones.
3. The study did not utilize a control group since a longitudinal study of this nature with a control group of low-income families would have been unmanageable due to some of the above mentioned limitations.

Summary

Final conclusions from this research study will be used to document retention of food and nutrition knowledge

and practices of participants from the Michigan Expanded Food and Nutrition Education Program. Information gained from these findings may be applicable to other adult education programs that reach similar clientele.

Footnotes

[1]This is section 32 of an Act identified as "Removal of Surplus Agriculture Commodities" passed on August 24, 1935. (United States Code reference 7, U.S.C. 612)

[2]"The Expanded Food and Nutrition Education Program: Historical and Statistical Profile;" USDA, SEA-Extension Program Aide 1230, January, 1979, pp. 40-41.

[3]L. Nierman, K. Akpom, and P. Boyce, "You Too Can Participate in EFNEP" a final report sponsored by USDA SEA-Extension, Michigan State University, Cooperative Extension Service, 1982.

[4]S. Walker, K. Akpom, and L. Nierman, "Effectively Teaching Foods and Nutrition to Low-Income Families," a final report sponsored by USDA SEA-Extension, Michigan State University, Cooperative Extension Service, 1983.

[5]C. Kateregga, "A Follow-Up Evaluation of the Effects of the Michigan Expanded Food and Nutrition Education Program on Homemakers Dietary Adequacy: Implications for Future Management." A Dissertation, Michigan State University, 1981.

[6]M. Kerr, M. Andrews, and L. Nierman, "Evaluation of the Long-Term Effects of the Expanded Food and Nutrition Education Program in Michigan: A Final Report," Michigan State University, 1979

CHAPTER IV

FINDINGS

Overview

The major research question addressed by this study was: Will EFNEP participants retain improvement of their food and nutrition knowledge and practices five years after program participation? This chapter presents a description of the findings regarding the retention of dietary adequacy changes and of foods and nutrition knowledge changes. The relationship of these changes to selected demographic variables and to the frequency of instructional visits is also discussed.

The population sample (n = 444) for this study was divided into the following groups for data analysis:

1. Sample (n = 399) of former EFNEP participants included in the Time 1 and Time 2 data collection only.
2. Sample (n = 45) of former EFNEP participants included in the Time 3 data collection.

The separation of the population sample (n = 444) into the two groups for analysis was needed to confirm that the

Time 3 group (n = 45), (Table 2), was demographically representative of the larger sample.

Data were analyzed, using descriptive statistics. Due to the nature of the data collection instruments and the multitude of variables measured, statistical analysis was concentrated on means and percentages derived from change scores. The means and percentages were then used for the comparative analysis of the two population sample groups over time. ANOVA, MANOVA, and t-tests provided additional analyses.

The significance level of .05 was used for all statistical tests of significance level in this study. Analyses used to test the overall time effect included Wilks' Lambda, Pillai's Trace, Hotelling-Lawley's Trace, and Roy's Greatest Root. To test the overall group effect, the t-test (LSD), Ryan-Einot-Gobril-Welsch multiple t-test, Sidak t-test, and Bonferroni (Dunna) t-test were used. To measure the overall time-group effect the Wilks' Lambda, Pillai's Trace, Hotelling-Lawley's Trace, and Roy's Greatest Root were used. The tests will not be mentioned in their entirety again as the results of the data analyses are described.

For ease in presenting and interpreting the data the following abbreviations of variables were used:

Survey	Variable Name	Abbreviation
24-Hour Food Recall		USDA Score
	Milk Group	MILK
	Meat Group	MEAT
	Vegetable & Fruit Group	VEG/FRT
	Bread & Cereal Group	BRD/CR
	Other Group	OTHER
Michigan Family Fare Survey		FAMFARE
	Food Groups	FDGP
	Nutrition	NUT
	Food Storage	FDSTO
	Food Preparation Practices	FDPRP
	Shopping Practices	SHOPPR
	Food Information	FNINFO
Family Record Demographics		
	Ethnic Group	RACE
	Food Stamp Family	FDSTAMP
	WIC Family	WIC
	Age of Participant	AGE
	Highest School Grade Completed	ED
	Children in the Home	CHINHM

Characteristics of the Population Sample

The population sample for this study consisted of 444 former EFNEP participants who participated in the Time 1, Time 2, and Time 3 data collection. All participants had received EFNEP instruction for nine months during enrollment.

The demographic characteristics of the Time 1 and Time 2 samples of 399 participants showed the ethnic population mix to be: White: 258 (65%); Black: 111 (27%). All minorities numbered 141 (35%) of the participants in this group. Most of the participants (227) were 22-33 years of age, and 321 (81%) had graduated from high school. The average number of children per family was two. Families receiving Food Stamps numbered 227 (69%), while 176 families, (44%), were receiving WIC coupons (Table 2).

Forty-five (45) participants completed the follow-up (Time 3) data collection interview five years after program completion. The selected demographic characteristics of these 45 participants and the remaining population sample (n = 399) for this study are presented in Table 2. Demographic characteristics of the Time 3 sample (n = 45) were representative of the larger sample. The ethnic population mix of the sample was 56% Majority and 44% Minority. Most of the participants, 47%, were 22-33 years of age. The majority, 82%, had graduated from high school. The number of children per family averaged three. Sixty percent (60%) of the sample participants were receiving Food Stamps and 40% were participating in WIC.

TABLE 2

CHARACTERISTICS OF PARTICIPANTS
TOTAL SAMPLE

Demographics	Participants (n = 399)	Participants (n = 45)
Race:		
Majority	258 65%	25 56%
(White)	(258)	(25)
Minority	141 35%	20 44%
(Black)	(111)	(13)
(Hispanic)	(28)	(5)
(Asian)	(2)	(2)
Age of Homemaker		
21 years or under	79 19%	7 16%
22-33 years	227 57%	21 47%
33-44 years	58 15%	12 26%
45 or older	35 8%	5 11%
Education of Homemaker		
Under 8th grade	45 11%	5 11%
9-12th grade/Grad.	321 81%	37 82%
Over 12th grade	33 8%	3 7%
No. Children in the Home		
none	18	3
one	104	7
two	116	12
three	94	10
four	35	8
five	7	3
six	7	0
seven	2	1
eight	2	0
nine	1	1
twelve	0	1
Average	2.24	2.88
No. Families on Food Stamps	277 69%	27 60%
No. Families in WIC	176 44%	18 40%
Average Monthly Expenditure on Food	$148	$175
No. of Instructional Visits Time 1 to Time 2		
0-6 visits	31	4
7-12 visits	168	19
13-24 visits	138	16
25-34 visits	62	6

Hypotheses

Three statistical hypotheses were used for this study. Stated in the null form and measured by the 24-Hour Dietary Food Recall and Michigan Family Fare Survey scores, the hypotheses were:

1. There will be no significant difference between participants' Time 1 and Time 2 scores.
2. There will be no significant difference between participants' Time 2 and Time 3 scores.
3. There will be no significant difference between participants' Time 2 and Time 3 scores based on selected demographics.

PRESENTATION OF THE FINDINGS

The tables that present most of the findings are organized, insofar as possible, to include both the 24-Hour Dietary Food Recall scores and Michigan Family Fare Survey scores in the same table. The composite 24-Hour Dietary Food Recall score is identified as the USDA score (maximum points 100) in this study. The component category scores from the Michigan Family Fare Survey are presented in some of the tables; however, most of the analyses to respond to the hypotheses are presented using Family Fare Survey composite score (maximum 128 points).

Tables 3 through 12 are addressing the two null hypotheses:

1. There will be no significant difference between participants' Time 1 and Time 2 scores.
2. There will be no significant difference between participants' Time 2 and Time 3 scores.

Table 3 presents the means and percentage change scores for the Family Fare Survey. Table 4 presents means and percentage change scores for the USDA score and the four food groups, Time 1 and Time 2. Tables 5 through 8 provide the same information for the 45 participants at Time 1, Time 2, and Time 3.

Composite USDA scores and composite Family Fare scores are presented in each table along with the data for each component category of the Family Fare Survey. All food group data are represented by serving size on the USDA score tables. Since the tables are self-explanatory, and the study contained so many variables, the data presented in the tables are not described in detail in the text.

USDA scores improved 26% for the 399 participants and 34.8% for the 45 participants from Time 1 to Time 2. The Family Fare Survey scores increased 14.5% for the sample of 399 and 17.3% for the sample of 45. Food Group serving scores and Family Fare Survey component scores also showed improvement over time.

TABLE 3

MEAN AND PERCENTAGE CHANGE OF FAMILY FARE SURVEY SCORES

(N=399)

Time	T1 Mean ± Sd	T2 Mean ± Sd	PERCENTAGE CHANGE
FAMILY FARE Category			
FDGP	9.77 ± 2.09	12.44 ± 2.32	27.33
NUT	8.09 ± 2.05	9.97 ± 2.19	23.24
FDSTO	9.49 ± 1.78	10.88 ± 1.64	14.65
FDPRP	22.98 ± 3.37	24.36 ± 3.57	6.01
SHOPPR	18.78 ± 4.36	20.58 ± 4.20	9.58
SHOPS	7.70 ± 2.66	9.76 ± 2.12	26.75
FNINFO	3.70 ± 2.54	6.67 ± 3.68	80.27
FAMILY FARE (Composite Score)			
	76.82 ± 9.50	87.99 ± 10.16	14.54

Measured score category variable names are explained in the text. All results are given as 'means ± SD'.

TABLE 4

MEAN AND PERCENTAGE CHANGE OF USDA SURVEY SCORES

(N=399)

Time	T1 Mean ± Sd	T2 Mean ± Sd	PERCENTAGE CHANGE
Food Group Serving			
MILK	1.08 ± 1.13	1.46 ± 1.10	35.19
MEAT	2.04 ± 1.21	2.20 ± 1.01	7.84
VEG/FT	1.94 ± 1.47	2.61 ± 2.42	34.54
BREAD/ CEREAL	2.77 ± 1.85	3.19 ± 1.73	15.16
OTHER	1.34 ± 2.34	1.35 ± 1.69	0.75
USDA (Composite Score)			
	52.38 ± 24.51	66.50 ± 23.81	26.96

Measured score category variable names are explained in the text. All results are given as 'means ± SD'.

TABLE 5

MEAN CHANGE OF FAMILY FARE SURVEY SCORES

(N=45)

Time	T1 Mean ± Sd	T2 Mean ± Sd	T3 Mean ± Sd
FAMILY FARE Category			
FDGP	9.71 ± 1.71	12.62 ± 2.24	11.51 ± 1.90
NUT	8.09 ± 2.00	10.16 ± 2.10	10.24 ± 2.24
FDSTO	9.80 ± 1.84	11.13 ± 1.49	11.78 ± 1.58
FDPRP	22.47 ± 4.04	24.67 ± 2.86	27.02 ± 3.26
SHOPPR	18.16 ± 4.14	20.56 ± 2.98	21.91 ± 3.78
SHOPS	7.42 ± 2.56	9.67 ± 2.39	10.53 ± 1.74
FNINFO	4.44 ± 3.21	7.87 ± 4.19	9.09 ± 4.50
FAMILY FARE (Composite Score)			
	75.64 ± 10.12	88.80 ± 9.82	93.00 ± 9.97

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Percentage changes of T1 to T2 are based on T2.

TABLE 6

MEAN SCORES OF USDA SURVEY

(N=45)

Time	T1 Mean ± Sd	T2 Mean ± Sd	T3 Mean ± Sd
Food Group Serving			
MILK	0.91 ± 0.92	1.56 ± 1.03	1.51 ± 1.27
MEAT	1.84 ± 0.85	2.04 ± 1.02	3.00 ± 1.40
VEG/FT	1.64 ± 1.37	2.38 ± 1.74	3.91 ± 3.18
BREAD/ CEREAL	2.73 ± 1.57	3.29 ± 1.91	3.91 ± 1.92
OTHER	1.22 ± 1.29	2.04 ± 3.69	2.20 ± 1.58
USDA (Composite Score)			
	48.53 ± 23.12	65.44 ± 23.48	64.93 ± 25.89

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Percentage changes of T1 to T2 are based on T2.

TABLE 7

PERCENTAGE CHANGE OF FAMILY FARE SURVEY SCORES

(N=45)

	T1 TO T2 (%)	T1 TO T3 (%)	T2 TO T3 (%)
FAMILY FARE Category			
FDGP	29.97	18.54	-8.80
NUT	25.59	26.58	0.79
FDSTO	11.53	20.20	5.84
FDPRP	9.79	20.25	9.53
SHOPPR	13.22	20.65	6.57
SHOPS	30.32	1.42	8.89
FNINFO	77.23	106.59	15.50
FAMILY FARE (Composite Score)			
	16.34	22.95	4.73

Measured score category variable names are explained in the text. Percentage changes of T1 to T2, and T1 to T3 are based on T1. Percentage changes of T2 to T3 are based on T2.

TABLE 8

PERCENTAGE CHANGE OF USDA SURVEY SCORES

(N=45)

	T1 TO T2 (%)	T1 TO T3 (%)	T2 TO T3 (%)
Food Group Serving			
MILK	71.43	65.93	65.93
MEAT	10.87	63.04	47.04
VEG/FT	45.12	38.41	64.29
BREAD/ CEREAL	20.51	43.22	43.22
OTHER	67.21	80.33	7.84
USDA (Composite Score)			
	34.84	33.79	0.78

Measured score category variable names are explained in the text. Percentage changes of T1 to T2, and T1 to T3 are based on T1. Percentage changes of T2 to T3 are based on T2.

The 45 participants from Time 2 to Time 3 had an increase of 4.73% on the Family Fare Survey score and .78% on the USDA score. All food group scores and component scores increased or remained the same except the Milk Group scores, which decreased 8.80%.

Major increases are noted when Time 1 to Time 3 percentage change scores are compared. The USDA score increased 33.79% and the Family Fare Survey score increased 22.9% for the 45 participants.

Tables 9 and 10 present the results of the t-tests completed for the 399 participants. The t-tests were used to analyze the difference between the high and low USDA score groups over time. The low USDA score group is 0-50 points, and the high group is 51-100 points. Participants were placed in one of the two groups based upon their entry USDA scores. The t-test results determine if the difference between the two USDA score groups is significant at entry and after instruction by the respective measurement instruments.

In Table 8, t-test results indicate that the Family Fare Survey score was significant between the two USDA (high and low) groups at entry; however, the scores were not significant at Time 2. The Family Fare component nutrition score was significant over time; however, the components of food practice and food shopping skills were significant at Time 1 but not Time 2.

TABLE 9

T-TEST ON THE FAMILY FARE SCORE BETWEEN HIGH USDA SCORE GROUP AND LOW USDA SCORE GROUP MEASURED AT T1 AND T2

(N=399)

		USDA SCORE GROUP		
		0-50 (N=197)	51-100 (N=202)	T-test Results
		Mean ± SD	Mean ± SD	
FAMILY FARE Category				
FDGP	T1	9.59 ± 2.22	9.96 ± 1.95	NS
	T2	12.43 ± 2.45	12.46 ± 2.19	NS
NUT	T1	7.81 ± 2.02	8.37 ± 2.05	*
	T2	9.71 ± 2.16	10.22 ± 2.20	*
FDSTO	T1	9.36 ± 1.75	9.63 ± 1.80	NS
	T2	10.67 ± 1.63	11.08 ± 1.61	*
FDPRP	T1	22.54 ± 3.38	23.41 ± 3.31	*
	T2	24.19 ± 3.66	24.52 ± 3.49	NS
SHOPPR	T1	18.29 ± 4.47	19.27 ± 4.20	*
	T2	20.18 ± 4.26	20.97 ± 4.12	NS
SHOPS	T1	7.29 ± 2.64	8.09 ± 2.63	*
	T2	9.59 ± 2.02	9.93 ± 2.21	NS
FNINFO	T1	3.64 ± 2.65	3.75 ± 2.44	NS
	T2	6.55 ± 3.76	6.79 ± 1.82	NS
FAMILY FARE (Composite Score)				
	T1	74.87 ± 9.72	78.73 ± 8.89	*
	T2	86.77 ± 10.34	89.19 ± 9.86	NS

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by T-test. NS, not significant. *, $p < 0.05$.

TABLE 10

T-TEST ON THE USDA SCORE BETWEEN HIGH USDA SCORE GROUP AND LOW USDA SCORE GROUP MEASURED AT T1 AND T2

(N=399)

		USDA Score Group 0-50 (N=197) Mean ± SD	USDA Score Group 51-100 (N=202) Mean ± SD	T-test Results
Food Group Serving				
MILK	T1	0.43 ± 0.77	1.72 ± 1.06	*
	T2	1.25 ± 1.04	1.66 ± 1.12	*
MEAT	T1	1.73 ± 1.22	2.34 ± 1.12	*
	T2	2.07 ± 0.99	2.32 ± 1.02	*
VEG/FT	T1	1.43 ± 1.34	2.44 ± 1.42	*
	T2	2.49 ± 3.09	2.73 ± 1.49	NS
BREAD/ CEREAL	T1	2.25 ± 1.86	3.27 ± 1.69	*
	T2	2.93 ± 1.74	3.44 ± 1.67	*
OTHER	T1	1.41 ± 2.97	1.28 ± 1.48	NS
	T2	1.46 ± 2.01	1.24 ± 1.29	NS
USDA (Composite Score)				
	T1	31.54 ± 12.94	72.71 ± 13.62	*
	T2	60.32 ± 23.30	72.53 ± 22.78	*

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by T-test. NS, not significant. *, $p < 0.05$.

The USDA scores were significantly different for the high and low USDA score group over time. All food group scores were significant except the Vegetable and Fruit group that was not significant at Time 2 and the Other group, which was never significant.

The 45 participants had similar t-test results. These results are presented in Tables 11 and 12.

The difference between high and low USDA scores for the 45 participants was significant at Time 1 for the composite USDA score and each food group-serving score. Only the meat-serving USDA score remained significant at Time 2.

On the Family Fare score the difference between the high and low USDA scores measured at Time 1, Time 2, and Time 3 is significant only at Time 3 for the food storage. USDA composite score difference was significant at Time 1. The four food groups were also significant at Time 1, and the Meat group was also significant at Time 2.

The USDA score was significantly different between the high and low USDA score groups at Time 1; this significance was sustained over Time 2 and Time 3. The Meat group continued to show significant difference also at Time 2.

TABLE 11

T-TEST ON THE FAMILY FARE SCORE BETWEEN HIGH USDA SCORE GROUP AND LOW USDA SCORE GROUP MEASURED AT T1, T2, AND T3 (N=45)

		-------USDA SCORE GROUP----- 0-50 (N=24)	51-100 (N=21)	T-test Results
		Mean ± SD	Mean ± SD	
FAMILY FARE Category				
FDGP	T1	10.17 ± 1.61	9.19 ± 1.72	NS
	T2	12.54 ± 2.36	12.71 ± 2.15	NS
	T3	11.37 ± 1.91	11.67 ± 1.93	NS
NUT	T1	8.08 ± 2.32	8.10 ± 1.61	NS
	T2	10.29 ± 2.40	10.00 ± 1.73	NS
	T3	9.96 ± 2.63	10.57 ± 1.69	NS
FDSTO	T1	9.38 ± 2.06	10.29 ± 1.45	NS
	T2	10.92 ± 1.53	11.38 ± 1.43	NS
	T3	11.17 ± 1.79	12.48 ± 0.93	*
FDPRP	T1	22.08 ± 3.93	22.90 ± 4.22	NS
	T2	24.67 ± 3.10	24.67 ± 2.63	NS
	T3	27.00 ± 3.56	27.05 ± 2.97	NS
SHOPPR	T1	18.12 ± 3.66	18.19 ± 4.72	NS
	T2	20.71 ± 2.54	20.38 ± 3.47	NS
	T3	21.33 ± 4.41	22.57 ± 2.86	NS
SHOPS	T1	8.04 ± 2.26	6.71 ± 2.76	NS
	T2	9.79 ± 2.50	9.52 ± 2.32	NS
	T3	10.29 ± 1.88	10.81 ± 1.57	NS
FNINFO	T1	4.42 ± 3.09	4.48 ± 3.41	NS
	T2	8.29 ± 4.40	7.38 ± 3.98	NS
	T3	9.00 ± 4.42	9.19 ± 4.70	NS
FAMILY FARE (Composite Score)				
	T1	75.87 ± 8.38	75.38 ± 12.06	NS
	T2	88.92 ± 10.45	88.67 ± 9.30	NS
	T3	91.12 ± 11.46	95.14 ± 7.65	NS

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by T-test. NS, not significant. *, $p < 0.05$.

TABLE 12

T-TEST ON THE USDA SCORE BETWEEN HIGH USDA SCORE GROUP AND LOW USDA SCORE GROUP MEASURED AT T1, T2, AND T3 (N=45)

Food Group	USDA Score Group 0-50 (N=24) Mean ± SD	USDA Score Group 51-100 (N=21) Mean ± SD	T-test Results
MILK SERVING			
T1	0.38 ± 0.49	1.52 ± 0.93	*
T2	1.50 ± 0.88	1.62 ± 1.20	NS
T3	1.50 ± 1.14	1.52 ± 1.44	NS
MEAT SERVING			
T1	1.46 ± 0.78	2.29 ± 0.72	*
T2	1.67 ± 1.01	2.48 ± 0.87	*
T3	2.71 ± 1.46	3.33 ± 1.28	NS
VEG/FT SERVING			
T1	1.08 ± 1.21	2.29 ± 1.27	*
T2	2.58 ± 1.01	2.14 ± 1.68	NS
T3	3.79 ± 1.46	4.05 ± 3.25	NS
BREAD/CEREAL SERVING			
T1	2.25 ± 1.22	3.29 ± 1.76	*
T2	3.08 ± 2.21	3.08 ± 1.54	NS
T3	3.83 ± 2.24	3.83 ± 1.52	NS
OTHER			
T1	1.37 ± 1.35	1.05 ± 1.24	*
T2	1.58 ± 1.35	2.57 ± 5.22	NS
T3	2.25 ± 1.45	2.14 ± 1.65	NS
USDA (Composite Scores)			
T1	30.25 ± 13.74	69.43 ± 9.98	*
T2	63.67 ± 25.23	67.48 ± 21.75	NS
T3	64.71 ± 27.35	65.19 ± 24.79	NS

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by T-test. NS, not significant. *, $p < 0.05$.

Tables 13 and 14 present the ANOVA tests on the difference between the average Family Fare scores and USDA scores measured at Time 1 and Time 2 for the 399 participants. ANOVA results show that the difference between the average Family Fare scores over time is significant for all components and the composite Family Fare score. The difference between average USDA score and the Food Group scores was also significant except for the other group which was not significant. The milk, meat, vegetable/ fruit, and bread and cereal mean serving scores reached .001 significance.

Tables 15 and 16 provide the results of the ANOVA tests for the 45 participants. The results show that the difference between the average Family Fare Survey score is significant over time. The USDA composite score and the Food Group Serving scores are also significant over time.

The tests reject the null hypothesis on the average Family Fare score for 399 participants at the .05 significance level that there is no overall time effect and no group effect. The tests fail to reject the hypothesis that these is no overall time-group effect on the average Family Fare score.

The Family Fare Survey component scores for 399 participants affect the hypotheses as follows:

TABLE 13

ANOVA TEST ON THE AVERAGE FAMILY FARE SCORES MEASURED AT T1, AND T2

(N=399)

	Repeated Measure T1 Mean ± SD	Repeated Measure T2 Mean ± SD	ANOVA Test Results
FAMILY FARE Category			
FDGP	9.77 ± 2.09	12.44 ± 2.32	* (F=336.02)
NUT	8.09 ± 2.05	9.97 ± 2.19	* (F=230.29)
FDSTO	9.49 ± 1.78	10.88 ± 1.64	* (F=179.38)
FDPRP	22.98 ± 3.37	24.36 ± 3.57	* (F=73.09)
SHOPPR	18.78 ± 4.36	20.58 ± 4.2	* (F=69.09)
SHOPS	7.7 ± 2.66	9.76 ± 2.12	* (F=280.87)
FNINFO	3.7 ± 2.54	6.67 ± 3.68	* (F=245.06)
FAMILY FARE (Composite Score)			
	76.83 ± 9.5	87.99 ± 10.16	* (F=527.75)

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by ANOVA. NS, not significant. **, $p < 0.05$. *, $p < 0.001$. F value from the tests are listed below *.

TABLE 14

ANOVA TEST ON THE AVERAGE USDA SCORE MEASURED AT T1 AND T2

(N=399)

	Repeated Measure T1 Mean ± SD	Repeated Measure T2 Mean ± SD	ANOVA Test Results
Food Group Serving			
MILK	1.08 ± 1.13	1.46 ± 1.1	* (F=28.64)
MEAT	2.04 ± 1.12	2.2 ± 1.01	** (F=5.28)
VEG/FT	1.94 ± 1.47	2.61 ± 2.42	* (F=24.44)
BC/SEREAL	2.77 ± 1.85	3.19 ± 1.73	* (F=12.31)
OTHER	1.34 ± 2.34	1.35 ± 1.69	NS
USDA (Composite Score)			
	52.38 ± 24.51	66.5 ± 23.81	* (F=96.34)

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by ANOVA. NS, not significant. **, $p < 0.05$. *, $p < 0.001$. F value from the tests are listed below *.

TABLE 15

ANOVA TEST ON THE AVERAGE FAMILY FARE SCORES MEASURED AT T1, T2, AND T3

(N=45)

	Repeated Measure			ANOVA
	T1	T2	T3	Test
	Mean ± SD	Mean ± SD	Mean ± SD	Results
Family fare Category				
FDGP	9.71±1.71	12.62±2.24	11.51± 1.9	* (F=21.93)
NUT	8.09±2.00	10.16±2.10	10.24±2.24	* (F=18.34)
FDSTO	9.80±1.84	11.13±1.49	11.78±1.58	* (F=27.97)
FDPRP	22.47±4.04	24.60±2.86	27.02±3.26	* (F=26.30)
SHOPPR	18.16±4.14	20.56±2.98	21.91±3.78	* (F=12.80)
SHOPS	7.42±2.56	9.67±2.39	10.53±1.74	* (F=33.19)
FNINFO	4.44±3.21	7.87±4.19	9.09±4.50	* (F=39.28)
FAMILY FARE (Composite Score)				
	75.64±10.12	88.8±9.82	93.00±9.97	* (F=52.75)

Masured score category variable names are explained in the text. All results are given as 'Mean ± Sd.' Statistical significance results were assessed by ANOVA. NS, not significant. **, $p < 0.05$. *, $p < 0.001$.

TABLE 16

ANOVA TEST ON THE AVERAGE USDA SCORES MEASURED AT T1, T2, AND T3

(N=45)

ANOVA	Repeated Measure			
	T1 Mean ± SD	T2 Mean ± SD	T3 Mean ± SD	Test Results
Food Group Serving				
MILK	0.91±0.92	1.56±1.03	1.51±1.27	* (F=6.48)
MEAT	1.84±0.85	2.04±1.02	3.00±1.40	* (F=14.38)
VEG/FT	1.64±1.37	2.38±1.74	3.91±3.18	* (F=10.33)
BD/CL	2.73±1.57	3.29±1.91	3.91±1.92	** (F=5.12)
OTHER	1.22±1.29	2.04±3.69	2.20±1.53	* (F=5.76)
USDA (Composite Score)				
	48.53±23.12	65.44±23.48	64.93±25.89	* (F=7.24)

Masured score category variable names are explained in the text. All results are given as 'Mean ± Sd.' Statistical significance results were assessed by ANOVA. NS, not significant. **, $p < 0.05$. *, $p < 0.001$.

1. The tests reject the hypothesis that there is no overall time effect and fail to reject that there is no group effect, and no time-group effect for the average food group score.
2. The tests reject the hypothesis that there is no time effect, and no group effect; however, they fail to reject the time-group effect for the average nutrition score.
3. The tests reject the hypothesis that there is no overall time effect and no group effect; however, the tests fail to reject the time-group effect for the average food storage score.
4. The tests reject the hypothesis that there is no overall time effect, and no group effect; however, they fail to reject the time-group effect for the average food practice score.
5. The tests reject the hypothesis that there is no overall time effect, and fail to reject that there is no group effect, and no time-group effect for average shopper score.
6. The tests reject the hypothesis that there is no overall time effect, and fail to reject that there is no group effect, and no time-group effect for the average shopping skills score.

7. The tests reject the hypothesis that there is no time effect, and fail to reject that there is no group effect, or no overall time-group effect for the average source of information score.

The tests reject the hypothesis at the .05 significance level for the 399 participants on the average USDA score that there is:

1. No overall time effect.
2. No group effect.
3. No overall time-group effect.

Therefore, there is a significant difference in the USDA scores for the 399 participants from Time 1 to Time 2.

The tests reject the hypothesis for the 399 participants at the .05 significance level that there is:

1. No overall time effect, no overall group effect, and no overall time-group effect on the average milk group score.
2. No overall time effect, no overall group effect, and no overall time-group effect on the average meat group score.
3. No time effect, no group effect, and no overall time-group effect on the average vegetable/fruit group score.
4. No overall time effect, no group effect, and no time-group effect on the average bread and cereal group score.

The tests fail to reject the hypothesis that there is no overall time effect, no group effect, or overall time-group effect for the average other group score. All Food Group scores except the other group score increased significantly over time.

The tests reject the hypothesis on the average Family Fare score for 45 participants at .05 significance level that there is no overall time effect and fail to reject that there is no group effect and no overall time-group effect on the average composite Family Fare score.

The average Family Fare Survey component scores for the 45 participants affect the hypotheses as follows:

1. The tests reject the hypothesis that there is no overall time effect and fail to reject that there is no group effect and no overall time-group effect for the average food group score.
3. The tests reject the hypothesis that there is no overall time effect and fail to reject that there is no group effect and no overall time-group effect for the average nutrition score.
4. The tests reject the hypothesis that there is no overall time effect and fail to reject the group effect and the overall time-group effect for the average food practice score.

5. The tests reject the hypothesis that there is no overall time effect and fail to reject that there is no group effect and no overall time-group effect for the average shopper score.

All Family Fare Survey component scores and the Family Fare Survey composite score showed there was a time effect on the average scores and that the scores over time did change signficantly.

The tests reject the hypothesis for 45 participants at the 0.5 significnace level on the average USDA score that there is:

1. No overall time effect.
2. No group effect.
3. No overall time-group effect.

Therefore, there is a significant difference in the average USDA score for the 45 participants from Time 1 to Time 2, Time 2 to Time 3, and Time 1 to Time 3.

The tests reject the hypotheses for the 45 participants at the 0.5 significance level that there is:

1. No overall time effect, no group effect, and no overall time-group effect for average milk group score.
2. No overall time effect and no group effect; however, the tests fail to reject the hypothesis that there is no overall time-group effect for average meat group score.

3. No overall time effect and no group effect; however, the tests fail to reject the hypothesis that there is no overall time-group effect for average vegetable/fruit score.
4. No overall time effect, and fail to reject the hypothesis that there is no group effect, and no overall time-group effect on the average bread and cereal group score.
5. No overall time effect, and the tests fail to reject the hypothesis that there is no group effect and no overall time-group effect on the average other group score.

All food group serving scores incresed significantly from Time 1 to Time 2, Time 2 to Time 3, and Time 1 to Time 3.

Table 17 presents the percentage change score by USDA score and Family Fare score for each of the selected demographics for the 399 participants at Time 1 to Time 2. It appears the Minority participants and participants 22 to 33 years of age, with a high school education who had 25 to 34 instructional visits had the most percentage change in the USDA score. Family Fare Survey scores changed among Food Stamp participants and among particpants who were 33 to 44 years of age.

TABLE 17

PERCENTAGE CHANGE OF USDA/FAMILY FARE SCORES BETWEEN T1, AND T2

(N=399)

Demographic Variable	Category	Percentage Change USDA (%)	Percentage Change FAMFARE (%)	N
RACE	Majority	25.64	12.57	258
	Minority	29.42	18.36	141
FDSTMP	Yes	25.58	14.93	122
	No	29.94	13.68	277
WIC/FOCUS	Yes	18.57	12.68	223
	No	34.78	16.01	179
AGE	21 or under	15.51	16.07	79
	22 - 33	28.29	13.40	227
	33 - 44	36.28	17.62	58
	45 or older	32.01	13.53	35
EDUC	Under 8th	23.83	20.08	45
	9-12th/Grad	28.59	13.91	321
	Higher	16.45	13.79	33
CHINHM	None	13.39	15.76	18
	One	32.31	14.72	104
	Two	23.23	13.24	116
	Three	25.42	15.51	94
	Four	35.48	13.70	35
	Five	19.93	18.27	20
	Six	32.37	12.43	7
	Seven	1.69	17.68	2
	Eight	412.00	12.55	2
	Nine	-73.33	0.00	1
VISIT	3 - 6	21.96	10.55	31
	7 - 12	25.65	14.14	168
	13 - 24	28.49	14.14	138
	25 - 34	67.98	67.98	62

Measured score category variable names are explained in the text. The percentage change is based on measure T1.

Table 18 presents the Family Fare Survey's percentage change scores for the 45 participants at Time 1 to Time 2. Minority and Food Stamp participants who were 33 to 44 years of age with 13 to 24 instructional visits appeared to have increased their USDA score. This was also true for the Family Fare Survey.

Table 19 presents percentage change scores for the 45 participants between Time 2 and Time 3 for the same selected demographics. Again, minority participants on Food Stamps and WIC seemed to have increased USDA scores and Family Fare Survey scores.

Table 20 presents the percentage change scores for Time 1 to Time 3. The minority participants, and participants on Food Stamps and WIC had the largest percentage change. Participants 33 to 44 years of age achieved on the USDA score but not on the Family Fare Survey score. Participants 21 years and younger also achieved.

The minority ethnic group had the largest percentage of change on both the USDA score and the Family Fare Survey score over all three time periods. Participants in Food Stamps had larger percentage changes over time than non-Food Stamp participants; however, WIC participants increased their scores more than non-WIC participants at Time 2 to Time 3 and Time 1 to Time 3. USDA scores

TABLE 18

PERCENTAGE CHANGE OF USDA/FAMILY FARE SCORES BETWEEN T1, AND T2 BY SELECTED DEMOGRAPHICS

(N=45)

Demographic Variable		--------Percentage Change--------- USDA (%)	FAMFARE (%)	N
RACE	Majority	34.45	13.86	25
	Minority	35.30	22.28	20
FDSTMP	Yes	38.24	17.82	27
	No	29.70	16.74	18
WIC/FOCUS	Yes	32.14	15.56	18
	No	36.62	18.59	27
AGE	21 or under	40.13	23.24	7
	22 - 33	34.84	15.40	21
	33 - 44	56.98	19.30	12
	45 or older	-15.09	13.89	5
EDUC	Under 8th	56.74	-16.90	5
	9-12th/Grad	27.80	1.31	37
	Higher	133.34	1.73	3
CHINHM	None	81.95	39.69	3
	One	93.92	21.76	7
	Two	21.17	15.23	12
	Three	18.12	12.92	10
	Four	26.74	18.37	8
	Five	-14.61	16.18	3
	Seven	553.85	9.52	1
	Twelve	42.86	9.46	1
VISIT	3 - 6	32.31	33.33	4
	7 - 12	25.45	13.36	19
	13 - 24	68.05	16.32	16
	25 - 34	-1.03	23.97	6

Measured score category variable names are explained in the Text. The percentage change is based on measure T1.

TABLE 19

PERCENTAGE CHANGE OF USDA/FAMILY FARE SCORES BETWEEN T2, AND T3 BY SELECTED DEMOGRAPHICS

(N=45)

Demographic Variable	Category	Percentage Change USDA (%)	Percentage Change FAMFARE (%)	N
RACE	Majority	-4.84	3.02	25
	Minority	3.85	6.93	20
FDSTMP	Yes	5.17	6.20	27
	No	-8.17	2.59	18
WIC/FOCUS	Yes	7.67	8.77	18
	No	-6.17	2.17	27
AGE	21 or under	-2.08	9.02	7
	22 - 33	-8.19	5.30	21
	33 - 44	-5.56	1.68	12
	45 or older	64.44	3.77	5
EDUC	Under 8th	3.56	6.55	5
	9-12th/Grad	-2.62	4.92	37
	Higher	13.79	-0.43	3
CHINHM	None	-3.61	10.51	3
	One	-4.60	6.02	7
	Two	1.73	0.95	12
	Three	6.17	6.68	10
	Four	-10.77	5.22	8
	Five	-22.60	2.20	3
	Seven	10.59	9.78	1
	Twelve	51.67	2.47	1
VISIT	3 - 6	-27.62	-2.99	4
	7 - 12	-17.30	5.36	19
	13 - 24	4.42	7.24	16
	25 - 34	85.72	1.64	6

Measured score category variable names are explained in the Text. The percentage change is based on measure T2.

TABLE 20

PERCENTAGE CHANGE OF USDA/FAMILY FARE SCORES BETWEEN T1, AND T3

(N=45)

Demographic Variable	Category	Percentage Change USDA (%)	Percentage Change FAMFARE (%)	N
RACE	Majority	27.93	17.30	25
	Minority	40.51	30.76	20
FDSTMP	Yes	45.38	25.13	27
	No	19.10	19.77	18
WIC/FOCUS	Yes	42.29	25.69	18
	No	28.19	21.16	27
AGE	21 or under	37.22	34.35	7
	22 - 33	23.80	21.52	21
	33 - 44	48.26	21.31	12
	45 or older	39.62	18.18	5
EDUC	Under 8th	62.33	37.85	5
	9-12th/Grad	24.46	22.13	37
	Higher	165.52	11.24	3
CHINHM	None	75.39	54.36	3
	One	85.00	29.09	7
	Two	23.26	16.32	12
	Three	25.40	20.46	10
	Four	13.09	24.55	8
	Five	-33.91	24.55	3
	Seven	623.08	20.24	1
	Twelve	116.67	12.16	1
VISIT	3 - 6	-4.23	29.35	4
	7 - 12	3.75	19.43	19
	13 - 24	75.48	24.74	16
	25 - 34	83.80	26.01	6

Measured score category variable names are explained in the Text. The percentage change is based on measure T1.

increased the most from Time 1 to Time 2 for 13 to 24 instructional visits. This change was sustained over time and also showed a large increase (75%) from Time 1 to Time 3.

Correlations between the USDA score and Family Fare Survey scores are provided in Table 21 for both the sample populations. The correlations for the 399 participants are significant; however, the Time 2 USDA Score to Time 3 Family Fare score is a significantly positive relationship. This general relationship pattern does not exist with the 45 participants. The Family Fare Survey score relationship is stronger than the USDA score relationship Time 1 to Time 2.

The grand mean of the USDA score and Family Fare Survey score for 45 participants confirms the change in scores from Time 1 to Time 2 and Time 2 to Time 3 for the Family Fare Survey score (Table 23). Grand mean scores increased for the 399 participants from Time 1 to Time 2. The USDA score regressed .78% from Time 2 to Time 3 (Table 23).

Tables 24 through 37 present the MANOVA tests over time to confirm the findings. MANOVA's look at the demographic effects on the average USDA scores and Family Fare scores. The purpose of the MANOVA test is to test the effect of the demographic and the time variables to verify if their effect is significant. Tables 24 through 29 represent the 399 participants.

TABLE 21

CORRELATION BETWEEN USDA SCORE AND FAMILY FARE SCORE

Correlation Coefficient

(N=399)

	-------USDA------- T1	T2	----FAMILY FARE---- T1	T2
USDA T1	1.00			
USDA T2	0.29**	1.00		
FAMILY FARE T1	0.20**	0.05	1.00	
FAMILY FARE T2	0.11*	0.23**	0.51**	1.00

(N=45)

	-------USDA------- T1	T2	T3	----FAMFARE FARE----- T1	T2	T3
USDA T1	1.00					
USDA T2	0.13	1.00				
USDA T3	-0.05	0.25	1.00			
FAMILY FARE T1	0.01	-0.10	0.09	1.00		
FAMILY FARE T2	-0.09	0.21	0.25	0.55	1.00	
FAMILY FARE T3	0.06	0.36*	0.27	0.26	0.55	1.00

*, correlation coefficient is significantly different at the .05 level. **, correlation coefficient is significantly different at the .01 level.

TABLE 22

GRAND MEAN OF COMPOSITE USDA SCORE AND FAMILY FARE SCORE BY T1, T2, AND T3

(N=399 And N=45)

Time	USDA Mean ± Sd	FAMILY FARE Mean ± Sd
	(N=45)	
T1	48.53 ± 23.12	75.64 ± 10.12
T2	65.44 ± 23.48	88.80 ± 9.82
T3	64.93 ± 25.12	93.00 ± 9.97
	(n=399)	
T1	52.38 ± 24.51	76.82 ± 9.49
T2	66.50 ± 23.80	87.99 ± 10.16

Measured score category variable names are explained in the text. All results are given as 'Means ± SD.'

TABLE 23

PERCENTAGE CHANGE OF COMPOSITE USDA SCORE AND FAMILY FARE SCORE BY T1, T2, AND T3

(N=399 And N=45)

Time	USDA (%)	FAMILY FARE (%)
	(N=45)	
T1 TO T2	34.84	17.40
T1 TO T3	33.79	22.95
T2 TO T3	-0.78	5.68
	(n=399)	
T1 TO T2	26.96	14.54

Measured score category variable names are explained in the text. Percentage change T1 to T2 and T1 to T3 are based on T1. Percentage change T2 to T3 is based on T2.

Table 24 shows the overall time effect on the difference between Time 1 and Time 2 on the average USDA score and Family Fare Survey scores by racial ethnic groups of Majority and Minority. The USDA score and Family Fare Survey score are significant for time and race. The Family Fare Survey score is significant for time, racial group and for the overall time and racial group effect.

Table 25 shows that the USDA and Family Fare Survey score difference between Time 1 and Time 2 is only significant for overall time effect for the Food Stamp particpants.

Table 26 provides support for the USDA score and Family Fare Survey score difference between WIC and non-WIC participants that is significant in overall time effect, WIC group effect and overall time-WIC group participant effect.

Table 27 shows that the USDA and Family Fare Survey score difference between various age groups of the population sample is significant for Time 1 and Time 2 in overall time effect. The Family Fare Survey is also significant in overall age-group effect. However, neither USDA nor the Family Fare Survey scores are significant in overall time-age effect for the population.

TABLE 24

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BY MAJORITY AND MINORITY ETHNIC GROUP MEASURED AT T1 AND T2

(N=399)

Score		-------Ethnic Group------- Majority (N=258) Mean ± Sd	Minority (N=141) Mean ± Sd	MANOVA Test
USDA				
	T1	52.81 ± 24.09	51.60 ± 25.33	
	T2	66.35 ± 24.30	66.78 ± 22.96	a,NS,NS
FAMILY FARE				
	T1	78.36 ± 9.19	74.01 ± 9.44	
	T2	88.21 ± 10.25	87.60 ± 10.02	a,b,c

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall race effect. 'c', significantly different in time*race effect. $p < 0.05$.

TABLE 25

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN FOODSTAMP AND NON-FOODSTAMP GROUP AT T1, AND T2

(N=399)

Score		----------Foodstamp Group---------- No (N=277) Mean ± Sd	Yes (N=122) Mean ± Sd	MANOVA Test
USDA				
	T1	53.65 ± 25.82	51.83 ± 23.94	
	T2	69.71 ± 23.21	65.09 ± 23.97	a,NS,NS
FAMILY FARE				
	T1	78.07 ± 8.79	76.27 ± 9.75	
	T2	88.75 ± 10.38	87.66 ± 10.06	a,NS,NS

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall foodstamp effect. 'c', significantly different in time*foodstamp effect. $p < 0.05$.

TABLE 26

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN WIC AND NON-WIC GROUP AT T1, AND T2

(N=399)

Score		WIC: No (N=223) Mean ± Sd	WIC: Yes (N=176) Mean ± Sd	MANOVA Test
USDA				
	T1	48.51 ± 23.3	57.29 ± 24.5	
	T2	65.38 ± 23.5	67.93 ± 24.0	a,b,c
FAMILY FARE				
	T1	76.51 ± 9.71	77.20 ± 9.23	
	T2	88.78 ± 9.88	86.99 ± 10.40	a,b,c

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall WIC group effect. 'c', significantly different in time*WIC effect. $p < 0.05$.

TABLE 27

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN DIFFERENT AGE GROUPS AT T1, AND T2

(N=399)

Score	Age: 21 Yrs/under (N=79)	22-33 Yrs (N=227)	33-44 Yrs (N=58)	45 Yrs/older (N=35)
	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
USDA				
T1	56.34±25.94	52.66±24.17	49.09±23.42	47.14±24.57
T2	65.08±26.33	67.56±22.85	66.90±24.72	62.23±22.78
				MANOVA test: a,NS,NS
FAMILY FARE				
T1	72.29± 9.43	77.70± 9.18	79.89± 9.46	77.26± 8.79
T2	83.91±10.91	88.11± 9.67	93.26± 8.72	87.71± 9.98
				MANOVA test:a,b,NS

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall age group effect. 'c', significantly different in time*age effect. $p < 0.05$.

Table 28 shows that the USDA and Family Fare Survey score difference between educational level of the participants is significant over time; however, the Family Fare Survey score is also significant in overall educational group population effect.

Table 29 shows that the difference between USDA and Family Fare Survey scores over time, for the number of children in a family, is significant in overall time effect only.

Table 30 shows that the difference between USDA and Family Fare Survey scores over time, between the number of instructional visits, is not significant for overall time effect, group effect, or overall time-group effect.

Tables 31-37 present the MANOVA test results for 45 participants at Time 1, Time 2, and Time 3.

Table 31 shows that race is significant for overall time effect for the three time periods on average USDA and Family Fare Survey scores. The Family Fare Survey score is also significant in overall time-race effect.

Table 32 presents the USDA and Family Fare Survey score difference between Food Stamp and non-Food Stamp participants over time. The differences are significant in overall time effect only.

Table 33 shows the USDA and Family Fare Survey score differences by WIC and non-WIC participants. The differences are significant only in overall time effect.

TABLE 28

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN DIFFERENT EDUCATIONAL LEVELS AT T1, AND T2

(N=399)

Score	Education Level: Under 8th (N=45)	9-12th/Grad (N=321)	Higher (N=33)
	Mean ± Sd	Mean ± Sd	Mean ± Sd
USDA			
T1	51.02 ± 23.95	51.94 ± 24.42	58.55 ± 26.06
T2	63.18 ± 19.73	66.79 ± 23.99	68.18 ± 27.20
			MANOVA test: a,NS,NS
FAMILY FARE			
T1	71.38 ± 9.05	77.15 ± 9.44	81.06 ± 7.55
T2	85.71 ± 10.09	87.88 ± 10.25	92.24 ± 8.23
			MANOVA test: a,b,NS

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall education effect. 'c', significantly different in time*education effect. $p < 0.05$.

TABLE 29

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN NUMBER OF CHILDREN AT T1, T2, AND T3

(N=399)

Score	Time One (Repeat Measure)	Time Two (Repeat Measure)	N
USDA	Mean ± Sd	Mean ± Sd	
None	72.28 ± 17.44	83.67 ± 21.62	18
One	76.29 ± 27.08	87.52 ± 25.44	104
Two	77.13 ± 23.79	87.34 ± 21.27	116
Three	77.20 ± 23.76	89.17 ± 25.89	94
Four	77.40 ± 22.82	88.00 ± 24.04	35
Five	79.10 ± 26.37	93.55 ± 23.75	20
Six	80.43 ± 24.74	90.43 ± 16.97	7
Seven	73.50 ± 7.07	86.50 ± 26.87	2
Eight	73.50 ± 17.68	82.50 ± 2.83	2
Nine	66.00 ± 0.00	66.00 ± 0.00	1
		MANOVA test: a,NS,NS	
FAMILY FARE	Mean ± Sd	Mean ± Sd	
None	72.28 ± 8.43	83.67 ± 9.57	18
One	76.29 ± 9.55	87.52 ± 9.88	104
Two	77.13 ± 9.10	87.34 ± 10.61	116
Three	77.20 ± 9.30	89.17 ± 10.19	94
Four	77.40 ± 10.73	88.00 ± 9.09	35
Five	79.10 ± 11.21	93.55 ± 9.71	20
Six	80.43 ± 8.60	90.43 ± 7.32	7
Seven	73.50 ± 0.71	86.50 ± 3.54	2
Eight	73.50 ± 13.44	82.50 ± 13.44	2
Nine	66.00 ± 0.00	66.00 ± 0.00	1
		MANOVA test: a,NS,NS	

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b'. significantly different in overall child number effect. 'c', significantly different in time*child-number effect. $p < 0.05$.

TABLE 30

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN NUMBER OF INSTRUCTIONAL VISITS AT T1, T2

(N=399)

	Number of Visits			
	0-6 (N=31)	7-12 (N=168)	13-24 (N=138)	25-34 (N=62)
	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
USDA				
T1	51.87±23.54	54.35±25.96	50.2±22.83	52.19±23.95
T2	63.26±21.32	68.29±23.72	64.5±24.36	67.98±24.60
				MANOVA test: NS,NS,NS
FAMILY FARE				
T1	77.06±10.58	78.07± 9.27	75.88±9.08	75.68±10.37
T2	85.19±11.28	89.11±10.45	86.61±9.89	89.42± 8.83
				MANOVA test: NS,NS,NS

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall visiting number effect. 'c', significantly different in time*visit effect. $p < 0.05$.

TABLE 31

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BY MAJORITY AND MINORITY ETHNIC GROUP MEASURED AT T1, T2 AND T3

(N=45)

Score		-------Ethnic Group------ Majority (N=25) Mean ± Sd	Minority (N=20) Mean ± Sd	MANOVA Test
USDA				
	T1	46.68 ± 22.63	50.85 ± 24.10	
	T2	62.76 ± 25.17	68.80 ± 21.34	
	T3	59.72 ± 28.43	71.45 ± 21.23	a,NS,NS
FAMILY FARE				
	T1	79.08 ± 9.22	71.35 ± 9.74	
	T2	90.04 ± 9.36	87.25 ± 10.40	
	T3	92.76 ± 10.44	93.30 ± 9.60	a,NS,c

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall race effect. 'c', significantly different in time*race effect. $p < 0.05$.

TABLE 32

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN FOODSTAMP AND NON-FOODSTAMP GROUP AT T1, T2, AND T3

(N=45)

Score	Foodstamp Group: No (N=27) Mean ± Sd	Foodstamp Group: Yes (N=18) Mean ± Sd	MANOVA Test
USDA			
T1	53.50 ± 20.4	45.22 ± 24.58	
T2	69.39 ± 25.4	62.81 ± 22.14	
T3	63.72 ± 25.5	65.74 ± 26.56	a,NS,NS
FAMILY FARE			
T1	77.28 ± 9.9	74.56 ± 10.3	
T2	90.22 ± 8.2	87.85 ± 10.81	
T3	92.56 ± 10.1	93.30 ± 10.00	a,NS,NS

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall foodstamp group effect. 'c', significantly different in time*foodstamp effect. $p < 0.05$.

TABLE 33

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN WIC AND NON-WIC GROUP AT T1, T2, T3

(N=45)

Score		WIC: No (N=27) Mean ± Sd	WIC: Yes (N=18) Mean ± Sd	MANOVA Test
USDA				
	T1	48.74 ± 22.60	48.22 ± 24.50	
	T2	66.59 ± 23.50	63.72 ± 24.00	
	T3	62.48 ± 25.50	68.61 ± 26.70	a,NS,NS
FAMILY FARE				
	T1	76.33 ± 10.60	74.61 ± 9.510	
	T2	90.52 ± 8.98	86.22 ± 10.70	
	T3	92.48 ± 11.00	93.78 ± 8.37	a,NS,NS

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall WIC group effect. 'c', significantly different in time*WIC effect. $p < 0.05$.

Table 34 shows that the USDA and Family Fare Survey score differences are significant only in overall time effect for the different age groups.

Table 35 shows that the USDA and Family Fare Survey score differences over time for educational levels are significant only on the Family Fare Survey scores.

Table 36 shows that the USDA and Family Fare Survey score difference over time are only significant between the number of children in a family and overall time effect.

Table 37 shows that the difference between USDA and Family Fare Survey scores over time between the number of instructional visits is significant only for USDA scores in overall time effect.

The third statistical hypothesis is rejected as significant differences do exist over time between USDA scores and Family Fare Survey scores by selected demographics.

TABLE 34

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN DIFFERENT AGE GROUPS AT T1, T2, AND T3

(N=45)

Score	Age: 21 Yrs/under (N=7)	22-33 Yrs (N=21)	33-44 Yrs (N=12)	45 Yrs/older (N=5)
	Mean±Sd	Mean±Sd	Mean±Sd	Mean ± Sd
USDA				
T1	49.14±29.60	68.00±20.42	43.00±24.3	53.0±26.80
T2	68.86±28.60	66.95±24.14	67.50±18.9	45.0±18.64
T3	67.43±31.44	62.43±22.36	63.75±29.3	74.8±29.27
				MANOVA test: a,NS,N
FAMILY FARE				
T1	70.71± 7.95	77.00±10.55	74.67±8.38	79.2±14.52
T2	87.14±13.07	88.86± 9.47	89.08±9.3	90.2±10.52
T3	95.00±10.18	93.57± 9.17	90.58±10.0	93.6±14.50
				MANOVA test:a,NS,NS

Measured score category variable names are explained in the text. All results are given as 'means + SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall age group effect. 'c', significantly different in time*age effect. $p < 0.05$.

TABLE 35

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN EDUCTAIONAL LEVELS AT T1, T2, AND T3

(N=45)

Nutrition Score Category	Education Level: Under 8th (N=5)	9-12th/Grad (N=37)	Higher (N=3)
	Mean ± Sd	Mean ± Sd	Mean ± Sd
USDA			
T1	43.00 ± 31.87	50.86 ± 22.08	29.00 ± 14.42
T2	67.40 ± 28.36	65.00 ± 23.86	67.67 ± 15.82
T3	69.80 ± 27.24	63.30 ± 25.52	77.00 ± 34.77
			MANOVA test: NS,NS,NS
FAMILY FARE			
T1	70.80 ± 11.37	75.46 ± 9.92	86.00 ± 2.00
T2	91.60 ± 9.45	87.84 ± 10.05	96.00 ± 3.46
T3	97.60 ± 7.57	92.16 ± 10.47	95.67 ± 4.73
			MANOVA test: a,NS,NS

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall education effect. 'c', significantly different in time*education effect. $p < 0.05$.

TABLE 36

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN NUMBER OF CHILDREN AT T1, T2, AND T3

(N=45)

Score	Repeat Measure: Time One	Time Two	Time Three	N
	Mean ± Sd	Mean ± Sd	Mean ± Sd	
USDA				
None	40.67 ± 35.23	74.00 + 10.39	71.33 ± 21.55	3
One	40.00 ± 24.32	77.57 ± 26.43	74.00 ± 19.93	7
Two	51.58 ± 22.59	62.50 ± 26.22	63.58 ± 27.86	12
Three	56.30 ± 17.52	66.50 ± 23.06	70.60 ± 23.46	10
Four	46.75 ± 28.94	59.25 ± 24.93	52.87 ± 30.08	8
Five	57.00 ± 12.29	48.67 ± 10.60	37.67 ± 14.05	3
Seven	13.00 ± 00.00	85.00 ± 00.00	94.00 ± 00.00	1
Twelve	42.00 ± 00.00	60.00 ± 00.00	91.00 ± 00.00	1
			MANOVA test: a,NS,NS	
FAMILY FARE				
None	61.33 ± 13.05	85.67 ± 15.50	94.67 ± 7.09	3
One	76.14 ± 8.32	92.71 ± 10.39	98.29 ± 4.23	7
Two	76.08 ± 9.27	87.67 ± 8.61	88.50 ± 13.65	12
Three	78.20 ± 10.96	88.30 ± 9.37	94.20 ± 9.33	10
Four	74.87 ± 10.97	88.62 ± 13.24	93.25 ± 9.82	8
Five	78.33 ± 7.02	91.00 ± 4.58	93.00 ± 3.61	3
Seven	84.00 ± 0.00	92.00 ± 0.00	101.00 ± 0.00	1
Twelve	74.00 ± 0.00	81.00 ± 0.00	83.00 ± 0.00	1
			MANOVA test: a,NS,NS	

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall child number effect. 'c', significantly different in time*child-number effect. $p < 0.05$.

TABLE 37

MANOVA TEST ON THE USDA/FAMILY FARE SCORE DIFFERENCE BETWEEN DIFFERENT NUMBER OF VISITS AT T1, T2, AND T3

(N=45)

	Number of Visits			
	0-6 (N=4)	7-12 (N=19)	13-24 (N=16)	25-34 (N=6)
	Mean ± Sd	Mean ± Sd	Mean ± Sd	Mean ± Sd
USDA				
T1	65.00±16.21	53.37±21.60	38.75±24.58	48.33±21.0
T2	86.00± 9.7	66.95±24.87	65.12±23.45	47.83±14.1
T3	62.25±28.98	55.37±25.73	68.00±21.14	88.83±24.5
				MANOVA test: a,b,c
FAMILY FARE				
T1	69.00±17.96	78.84± 9.69	74.25±7.73	73.67± 9.20
T2	92.00±10.03	89.37±10.26	86.37±9.62	91.33± 9.79
T3	89.25±12.69	94.16± 9.32	92.62±9.14	92.83±14.00
				MANOVA test: NS,NS,NS

Measured score category variable names are explained in the text. All results are given as 'means ± SD.' Statistical significance results were assessed by MANOVA test. NS, not significant. 'a', significantly different in overall time effect, 'b', significantly different in overall visiting number effect. 'c', significantly different in time*visit effect. $p < 0.05$.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Purpose of the Study

The United States Congress funds several food programs to provide food for low-income families; however, the Expanded Food and Nutrition Education Program (EFNEP) is the only federally funded program that provides education to low-income families with young children but not food. From its beginning in 1969, EFNEP has directed its attention to nontraditional methods on how to reach and educate the low-income participants with foods and nutrition information.

Many evaluations have shown that participation in EFNEP improves the nutritional status of the participant and their family; however, EFNEP has still been faced with the formidable task of demonstrating that it is cost-effective and has a real and lasting impact on the graduated participant.

This longitudinal five-year study seeks to determine if participants of the Michigan EFNEP program retain their food and nutrition knowledge and practice change scores as

measured by the 24-Hour Dietary Food Recall (USDA score) and Michigan Family Fare Survey score five years after program participation.

Objectives of the Study

Analyses of retention of food and nutrition knowledge and practices of participants from the Michigan EFNEP program occurred by conducting follow-up interviews with participants after completion of their initial nine months or less of participation and instruction. The objectives of this study were:

1. To compare participant USDA scores upon entry (Time 1), into the program (pre-instruction), post-instruction (Time 2), and five years after program completion (Time 3), and to further analyze these change scores by selected demographics.
2. To compare program participants' Michigan Family Fare Survey scores upon entry (Time 1) into the program (pre-instruction), post-instruction (Time 2), and five years after program completion (Time 3), and to further analyze these scores by selected demographic characteristics.

3. To draw conclusions and make recommendations to the USDA and Cooperative Extension Service leadership, State Legislatures, and the U.S. Congress regarding the long-term impact of the Michigan EFNEP program on participants' retention of improved food and nutrition knowledge and practices.

Summary of Procedures

All newly enrolled EFNEP participants from October through December 1979 participated in Time 1 data collection at program entry. Time 2 data collection occurred nine months or less after the program enrollment. Time 3 follow-up was conducted five years after program participation. The population for Time 1 and Time 2 data collection was 444 participants of which 45 were interviewed for the follow-up (Time 3) data collection five years later.

Summary of Major Findings

The results of the longitudinal study indicate that EFNEP participants retain post-instruction change scores for five years as measured by the 24-Hour Dietary Food Recall and Michigan Family Fare Survey. Analysis of the change scores for both instruments rendered the same research finding. This finding is supported since

participants' mean retention scores on the 24-Hour Dietary Food Recall (USDA score) and Michigan Family Fare Survey were significantly higher than entry and post-instruction scores.

Conclusions and Implications

The results of this study indicate that participants did significantly improve their dietary adequacy and food and nutrition knowledge and that participants retained this improvement over time. It is also apparent that participants with the lowest entry USDA score and minority participants significantly gained the most from program participation and that this gain was retained.

Very few evaluation studies of EFNEP have examined the post-program effect of EFNEP on participants' food and nutrition practices beyond 38 months. Most of these long-term impact studies have provided program instruction for 12 to 18 months before the impact study was completed. The completed studies have documented that participants do maintain dietary adequacy improvements.

The implications of this study for the Expanded Food and Nutrition Education Program are:

1. Verification of other studies that participants do learn from participation in EFNEP.

2. Information learned in EFNEP is used for long periods of time, at least five years after program participation. Therefore, the educational methodology used by the EFNEP program appears to be appropriate for the low-income audience.
3. Participant retention scores did not regress to post-instruction levels after five years. Therefore, the new food and nutrition behavior and practice may be ingrained by the participant for life.
4. Participants retained these significantly improved scores for five years with nine months or less of EFNEP instruction. Therefore, shorter length of enrollment for instruction is not a detriment to participant learning.
5. Participants enrolled in the WIC and Food Stamp program are prime candidates for EFNEP enrollment since they retain their improvement more than non-participants.
6. Participants under 21 years of age and 33 to 44 years of age appear to improve during instruction and to retain this improvement. However, younger participants had younger children; therefore, the transfer of the new educational knowledge to practice with the family may occur more rapidly with the younger participants and lead to more lifetime behavior change of more family members.

7. Minority participants enter with lower scores and progress to higher scores than Caucasian participants within the same amount of instruction time. These same minority participants retain this improvement; minority participants with low assessment entry scores are prime candidates for the program.
8. The program seems to have equal impact on participants regardless of educational attainment and the number of children at home.
9. The number of instructional visits significantly impacted the 24-Hour Dietary Food Recall score over time. Therefore, it appears reinforcement and practice do lead to behavior change.
10. Participants who have lower 24-Hour Dietary Food Recall scores (0-50 points) at entry significantly improve their Family Fare Survey scores and their 24-Hour Dietary Food Recall scores over time and retain this improvement for five years. Therefore, if resources are limited, it appears the program should address participants most in need as measured by the entry 24-Hour Dietary Food Recall score.
11. Funding sources need to be made aware of EFNEP program participants' change of food and nutrition knowledge and practice from entry to graduation and the retention of this change over time.

Implications for Future Research

Future research on the EFNEP needs to be examined from these points of view:

1. There is a continued need and potential for EFNEP.
2. An efficient and effective delivery system to meet these needs and problems has been developed.
3. EFNEP program instruction does significantly alter the food and nutrition knowledge and practices of enrolled participants.
4. EFNEP graduated participants retain this improvement for long periods of time.

Since the inception of this study, Michigan EFNEP has undertaken development of a standardized national curriculum for the program. This national curriculum is competency-based. Competency-based education programs are effective and efficient because teaching is directed toward specific outcomes that are defined by explicitly stated competencies and learner needs. Teaching is directed only to specific competency areas that the learner does not possess. Future research needs to focus on the cost-effectiveness of the competency-based curriculum over time. The questions to be addressed by this research are:

1. Do participants improve their competency levels from Time 1 to Time 2?
2. Do participants retain this improvement over time?

3. How do the levels of retention compare with this study's levels?
4. What is the cost-effectiveness of the program?
5. What is the optimum instruction time per participant to achieve mastery?

Reflections

The first step in changing any food and nutrition behavior is awareness for change. This is followed by the acquisition of knowledge and skills needed for improving dietary practices. Concurrently, attitudes toward health and proper nutrition improve, providing motivation and reinforcement for the new behaviors. The end product is an improved diet.

To promote changes in behavior the learner must not only learn <u>about</u> them, but must engage in them. Behavior is contingent upon its consequences: people learn to do those things that have positive consequences and they learn not to do those things that have negative consequences. Therefore, learning takes place when the consequences are immediate. EFNEP's approach to teaching is to tailor the lessons to the participants and involve them immediately in food preparation. For food preparation, stretching the family's food resources so that the food lasts the entire month, and the resulting

increased self-confidence all provide the positive reinforcements for the participants' changed behavior.

EFNEP participants also teach others especially other family members and relatives. This "chain reaction" to learning is unmeasurable. Many people have been changed in the "chain reaction" learning process. EFNEP program spin-offs have also occurred as graduated families have aspired to a higher quality of life; have improved their management of family finances, and have motivated their children to stay in school. Former EFNEP participants have found jobs and left public assistance.

Maslow's model of the Hierarchy of Human Needs follows the basic assumption that an individual cannot fully satisfy any level of need unless the prerequisite need is satisfied.

This theory is relevant to EFNEP. EFNEP contributes to a family's personal development by helping members learn to meet basic nutritional needs for survival. By meeting this need they are able to meet higher levels of need. EFNEP helps the participant to move up the hierarchy of needs. For some participants it is their first educational success. The problem-solving and self-help skills learned through EFNEP are often generalized to other life tasks. Other participants have learned some basic concepts like being on time for appointments. Organizational skills learned for shopping

and planning of meals have been applied to budgeting, planning, and comparison shopping for non-food items and purposes. This planning also teaches delayed gratification. Children benefit not only through improved diets, but also through role modeling of improved behaviors.

Through Maslow's Hierarchy of Needs, EFNEP helps participants increase self-esteem and self-confidence. Only by removing the barriers to self-actualization can families break out of the cycle of poverty.

This study confirms that the EFNEP participants do significantly well in the program and that they retain their learning. This study found that there were a limited number of demographics that had any effect on participant change scores over the five years. When differences did occur, they reflected the tendency for participants who knew less orignally to benefit more from the program.

EFNEP has had seventeen years of experience. During these seventeen years there has been much probing and searching for the most effective way to reach and teach low-income families. The challenge now is to build from the program's strength of experience. The need is to focus only on the essentials of basic foods and nutrition survival skills; to teach those "most in need" of education with the new direction of concentrated teaching

in a shorter time frame: basically, the economy of more with less.

EFNEP is a mature program that is constantly changing. There is no other program within the Cooperative Extension Service that has been studied, evaluated, and audited more often by Congressional Committtees and others than EFNEP. A total of 256 State and National studies have been completed on EFNEP. By the nature of its funding and its concise purpose it has attained high visibility. Visibility occurs with a viable program that has measurable results and increased efficiency and effectiveness in program management. EFNEP has a need to use this high visibility to generate more public and private support; to tell the story that low-income participants do retain the foods and nutrition knowledge and practice learned in EFNEP.

This study confirms that EFNEP participants do retain their significantly improved food and nutrition practices. Performance differences noted by minority participants, younger participants and participants who have low 24-Hour Dietary Food Recall (USDA scoress) at entry achieve significantly, over time in their change scores as measured by the Family Fare Survey and 24-Hour Dietary Food Recall. EFNEP does make a difference.

EFNEP instruction has followed basic adult learning processes and provided participants an opportunity to

"learn by doing." The instruction has been designed based on the needs of the audience with appropriate goals established. The learning environment has been low-risk and the reinforcement provided by the Nutrition Aide has helped to relieve the isolation felt by many low-income families. EFNEP instruction provides that "sense of expectation" for the participant. The awareness before adoption of the new foods and nutrition information.

Results of this study show that participants are improving more than just their dietary adequacy as measured by the 24-Hour Dietary Food Recall, they are also gaining in food knowledge, food shopping skills, food management, and food storage techniques. Self-confidence is also achieved as participants begin to feel life can be different. It appears EFNEP has proven its worth to society as a whole. Now the question is: Will society (U.S. Citizens) now reward EFNEP for a job well-done and continue its funding?

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APPENDICES

APPENDIX A

FAMILY RECORD

Expanded Food and Nutrition Education
FAMILY RECORD

A. Description

1. AIDE'S NAME _____ 2. STATE NO. ☐☐ 3. UNIT NO. ☐☐

AIDE'S NO. ☐☐

Fill out for each family in unit as soon as possible and every 6 months thereafter. Keep in family file after review by Trainer/Agent.

4. FAMILY
I.D. No. ☐☐☐
(a) Name _____
(b) Street _____
(c) City _____ (d) State _____
(e) Telephone _____

5. DATE FAMILY ENROLLED:
Mo. ☐☐ Day ☐☐ Yr. ☐☐

6. FAMILY RECEIVED *(Some time during year)*
(a) ☐ Participating USDA Food Stamp/ Food Distribution Program
(b) ☐ WIC/CSFP
(c) ☐ Welfare

FAMILY MEMBERS (First name) (7)	AGE (years) (8)	SEX Male (9)	SEX Female (10)	Now in School (11)	CHECK IF "YES" Participated in Child Nutrition Programs last week (12)
NO. OF FAMILY MEMBERS _____	TOTALS →				

13. HIGHEST GRADE IN SCHOOL COMPLETED BY HOMEMAKER
☐ 8th Grade or Less ☐ 9th thru 10th ☐ 11th thru 12th ☐ Beyond High School

14. CHECK FOR HOMEMAKER
(a) ☐ White (not of Hispanic origin) (c) ☐ Hispanic (e) ☐ Asian or Pacific Islander
(b) ☐ Black (not of Hispanic origin) (d) ☐ American Indian/Alaskan Native

15. TERMINATION DATE AND REASON
Date: Mo. ☐☐ Day ☐☐ Yr. ☐☐
Reason:
(a) Graduated _____
(b) Terminated
Moved _____
Illness _____
Deceased _____
Other _____
(c) Total No. of Visits
Group ☐
Individual ☐

16. PLACE OF RESIDENCE
☐ Farm
☐ Towns under 10,000 and rural non-farm
☐ Towns and Cities 10,000 to 50,000
☐ Suburbs of Cities over 50,000
☐ Central Cities of over 50,000

17. TOTAL ACTUAL INCOME FOR FAMILY LAST MONTH?
$ _____
(Include wages and salaries, social security, welfare and insurance payments, pensions and cash support from others. If family has income from farming, include 1/12th of last year's income after expenses.)
Check one:

☐ Under $315	☐ $822-$723
☐ $316-$418	☐ $724-$824
☐ $419-$519	☐ $825-$917
☐ $520-$621	☐ $918 and over

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APPENDIX B

24-HOUR DIETARY FOOD RECALL

B. HOMEMAKER FOOD CONSUMPTION RECORD

Name of Homemaker _____ Unit No. ☐☐ County _____

Homemaker I.D. No. ☐☐☐

Aide's Name _____ Aide's No. ☐☐ Date Family Enrolled: Mo. ☐☐ Day ☐☐ Yr. ☐☐

1. How many food recall records have you taken on this family *(including this one)*? _____

   No. of visits since last recall: ☐☐ Group ☐☐ Individual

2. Date of Food Recall: Mo. ☐☐ Day ☐☐ Yr. ☐☐

3. What Did Homemaker Eat and Drink in the Last 24 Hours? To be filled out by Aide on Homemaker List specific name of each food and drink consumed. *(Enter main foods in mixed dishes)* Include size of serving or amount of food eaten.	To Be Filled Out by Trainer Agent				
	Milk	Meat	Veg./ Fruit	Bread/ Cereal	Other
Morning:					
Midmorning:					
Noon:					
Afternoon:					
Evening:					
Before bed:					
TOTAL NO. OF SERVINGS	(4)	(5)	(6)	(7)	
8. Totals 1 or more servings of each of four food groups.	1	1	1	1	
	☐ yes ☐ no				
9. Totals 2 or more servings milk/meat; 4 or more Veg/Fruit and Bread/Cereals.	2	2	4	4	
	☐ yes ☐ no				

APPENDIX C

MICHIGAN EXPANDED FOOD & NUTRITION EDUCATION PROGRAM

FAMILY FARE SURVEY QUESTIONS AND SCORE SHEET

Michigan Expanded Food & Nutrition Education Program
"Family Fare" Survey

Family - Name: _____

Street: _____ City: _____

County: _____ I.D. No. _____

Survey given by: _____ Date: _____

NOTE TO AIDE: REMEMBER, DO NOT GIVE HOMEMAKER THE ANSWERS TO THE SURVEY QUESTIONS. READ EACH QUESTION CLEARLY AND MOVE RAPIDLY THROUGH THE SURVEY.

Picture Number				*Circle the number that matches the homemaker's response*
(1-2)	Here is a picture of some food. What do you think all these foods have in common?	(1)	dairy/milk	1
			other	0
	How many servings do you think is the least amount an adult needs every day from this group, counting milk substitutes?	(2)	2 servings	1
			other	0
(3)	This is a picture of a half glass of milk (4 oz.) and a full glass of milk (8 oz.). Which one do you think equals one serving?	(3)	8 oz. glass	1
			4 oz. glass	0
(4) (fold-out)	If you don't like to drink milk, what two foods would give you the same food value as milk?	(4)	2 dairy products	2
			1 dairy product	1
			no dairy product	0
(5-6) (fold-out)	Here is another picture of some food. What do you think we'd call this food group?	(5)	fruit/ vegetable	1
			other	0
	How many servings do you need every day from this group?	(6)	4 servings	1
			other	0
(7)	This is an 8-ounce glass of orange juice. How many servings of orange juice does this equal?	(7)	2 servings	1
			other	0
(8)	How many servings do you think a 1/2 cup of peas equal?	(8)	1 serving	1
			other	0
(9-10) (fold-out)	This is a third group of foods. What would you you call this group?	(9)	meat/protein	1
			other	0
	How many servings do you think you need every day from this group?	(10)	2 servings	1
			other	0
(11)	Here is a big hamburger sandwich and an egg. How many servings from the meat group do you get with the sandwich, not counting the cheese?	(11)	2 servings	1
			other	0
(12)	How many servings from the meat group do you get with one egg?	(12)	1/2 serving	1
			other	0
(13-14) (fold-out)	This is another group of foods. Can you figure out the name of this group?	(13)	grain/bread/ cereal	1
			other	0
	How many servings do you think you need every day from this group?	(14)	4 servings	1
			other	0

(15a)	How many servings from the bread/cereal group would you get if you had a bowl of cereal for breakfast, a sandwich and apple for lunch, and one taco for supper?	(15)	4 servings other	1 0
(b)	We have talked about the basic four food groups: milk, fruit & vegetables, meat, and bread & cereals. This is a picture of the "other" group, where we put food that doesn't belong in the other four food groups. We need some of these foods, like fat and oil, but we need to be careful to eat enough food from the other four groups first. All foods have some nutrients, like vitamins and minerals, but some have more of certain kinds than others have.			
(c)	Which do you think has more protein--meat loaf or popcorn? (Let the homemaker answer, but do not record her answer for this question.)			
(16)	Which food would you choose for vitamin C, tomato juice or an apple?	(16)	tomato juice apple	1 0
(17)	Which food would you say had more vitamin A, corn or carrots?	(17)	carrots corn	1 0
(18)	Which food do you think has more iron, cheese or a meat patty?	(18)	meat patty cheese	1 0
(19)	Which food would you choose for protein, bacon or peanut butter?	(19)	peanut butter bacon	1 0
(20)	Which food has more calcium, milk or scrambled eggs?	(20)	milk scrambled eggs	1 0
(21)	Which food do you think would be a more nutritious snack, potato chips or bread and butter?	(21)	bread & butter potato chips	1 0
(22)	Which food do you think has more vitamin B, rice or peaches?	(22)	rice peaches	1 0
(23)	Which do you think has more calories, baked potato with butter or fried fish?	(23)	fried fish baked potato with butter	1 0
(24)	Which item do you think has more calories, a can of cola or a 3/4 glass of milk?	(24)	cola milk	1 0
(25)	Which item do you think has more calories, one tablespoon of jelly or one tablespoon of mayonnaise?	(25)	mayonnaise jelly	1 0
(26-28) (fold-out)	These are pictures of how vitamins A and C and iron help our bodies. Picture X shows carrying oxygen to all parts of our bodies. Picture Y shows healing cuts and making healthy gums. Picture Z shows helping our eyes see in the dark.			
	Which picture shows what vitamin A does?	(26)	picture Z other	1 0
	Which picture shows what vitamin C does?	(27)	picture Y other	1 0
	Which picture shows what iron does?	(28)	picture X other	1 0
(29-32)	Here are pictures of many kinds of food we store in our homes, and these are various storage places. Please tell me where you think various foods should be stored: refrigerator, cupboard, or freezing compartment of refrigerator.			
	Where would you store eggs?	(29)	refrigerator other	1 0

	Where would you store potatoes?	(30)	cupboard other	1 0
	Where would you store a leftover pork chop you wanted to keep for a week?	(31)	freezer other	1 0
	Where would you keep half an orange?	(32)	refrigerator other	1 0
(33)	This is a picture of raw hamburger, a hot dog, and a whole chicken. If properly wrapped, which food do you think would keep the <u>longest</u> in the refrigerator before spoiling?	(33)	hot dog other	1 0
(34)	This is a picture of some cottage cheese, yogurt and cheddar cheese. Which do you think would spoil <u>most quickly</u> in the refrigerator?	(34)	cottage cheese other	1 0
(35)	An eight year old boy came home from school hungry, so he made a bologna sandwich, and had some chocolate pudding. He left the bologna, bread, butter, and dish of pudding on the table. His mom came home from work late and was tired. She didn't discover the food on the table until the next morning. Which food items would still be <u>safe</u> to eat?	(35)	bread & butter bread & butter, and pudding bread & butter, and bologna pudding or bologna	2 1 1 0
(36) (fold-out)	A family went to a neighborhood potluck. Everyone ate about noon, then played and talked all afternoon, leaving the food covered on the picnic table. About six o'clock that evening everyone snacked on the food. Some people got ill later that night. Which foods do you think made them sick? *(Circle any or all of the items if they are mentioned. If none of the items are mentioned, the total is 0.)*	(36)	baby food potato salad hot dogs baked beans pie Total:	1 1 1 1 1

(37-44) This is a picture of many foods. Some may be foods you eat regularly; others you may have never tasted. For each food, I'd like you to tell me about how often you prepare it for your family--often, sometimes, or almost never.

(Circle the appropriate numbers.)

Food	Almost Never	Some-times	Often
Sweet potatoes	1	2	3
Broccoli	1	2	3
Non-fat dry milk	1	2	3
Liver	1	2	3
Cabbage	1	2	3
Winter squash	1	2	3
Tuna	1	2	3
Greens/spinach	1	2	3

(45)	Which picture do you think shows the <u>best way</u> to prepare vegetables, such as green beans: - a small amount of water for a short time - a small amount of water for a long time - a large amount of water for a short time - a large amount of water for a long time	(45)	small amount of water, short time other	1 0

(46-54) (No pictures) I'm going to describe some food shopping and preparation practices and I want you to tell me whether you almost always (4), usually (3), sometimes (2), or almost never (1) do it:

(Circle homemaker's answer. Questions begin on the following page.)

			Almost Never	Sometimes	Usually	Almost Always
	How often do you prepare breakfast for your family?	(46)	1	2	3	4
	How often do you prepare dinner/supper for your family?	(47)	1	2	3	4
	How often do you make a written list of what you want to buy and use it when shopping?	(48)	1	2	3	4
	How often do you compare prices of two brands of the same kind of food?	(49)	1	2	3	4
	How often do you look over the advertised specials in the store?	(50)	1	2	3	4
	How often do you plan some of your menus before you go shopping?	(51)	1	2	3	4
	How often do you write down how much you spent in the grocery store?	(52)	1	2	3	4
	How often do you read the nutrition labels on food?	(53)	1	2	3	4

	Most of us have to pick up an extra loaf of bread or carton of milk once in awhile. How many times each month do you do most of your grocery shopping?	(54)	twice a week	0
			once a week	1
			once a month	1
			twice a month	1
(55)	Here are some pictures of wrappers from two loaves of bread. Both loaves are the same size and same price. Which kind of bread would you buy and why? *(Circle 1 for example A+ enriched bread only. If homemaker chooses example A for other reasons or example B, circle 0.)*	(55)	example A+ enriched	1
			other	0
(56)	Here are labels from three kinds of canned vegetables. Which two vegetables have the most iron?	(56)	kidney beans & spinach	2
			green beans & other	1
			other	0
(57)	Suppose you were going to buy canned vegetables and you saw these on special at three cans for $1.00 and these at 32¢ a can. They are both the same size can. Which would be a better buy?	(57)	32¢ each	1
			3/$1.00	0
(58-59)	Suppose you were going to make chocolate pudding and you could use either a quart of fresh whole milk or a quart of milk made from a package of dry milk that makes 10 quarts. The whole milk costs 49¢ for one quart.			
	If the package of dry milk costs $2.99 and makes 10 quarts, how much does one quart cost?	(58)	29-30¢	1
			other	0
	Which milk would make the cheapest pudding?	(59)	dry milk	1
			whole milk	0
(60-61)	*(Show pictures 60 and 61--two separate pictures.)* Here are pictures of wrappers from two kinds of rice--instant rice and regular rice. The package of instant rice costs 75¢ and you get 15 servings. *(Point to numbers.)*			
	If 15 servings cost 75¢, how much does one serving cost?	(60)	5¢	1
			other	0
	The other package of rice costs 64¢ and you get 32 servings. *(Point to numbers.)* If 32 servings cost 64¢, how much does one serving cost?	(61)	2¢	1
			other	0

(62-65) Here are pictures of fresh fruits and vegetables. I'd like you to tell me which season of the year--winter, spring, summer, or fall--they are most likely to be cheapest because they are "in season."

When are oranges in season and usually cheaper?	(62)	fall/winter	1
		other	0
When is corn on the cob in season and usually cheaper?	(63)	summer/fall	1
		other	0
When are apples in season and usually cheaper?	(64)	fall	1
		other	0
When are tomatoes in season and usally cheaper?	(65)	summer/fall	1
		other	0

THE FOLLOWING QUESTIONS WILL NOT HAVE ANY PICTURES. JUST READ THE QUESTION TO THE HOMEMAKER AND RECORD RESPONSE PLEASE.

(66-67) (no picture) Where do you get foods and nutrition information? *(Listen and circle all answers.)* (66-67)

nowhere	0
friends & relatives	1
radio/TV	2
newspapers, magazines, books	2
nutrition labels	3
agencies	3
Health Dept., WIC, doctor	3
Cooperative Extension	3
Total	

(68) Taking care of a home and family is hard work. There are some things we don't like to do. Which picture here shows <u>one</u> thing you don't like to do? *(Circle one only.)* (68)

cooking	1
putting away leftovers	2
planning meals	3
washing dishes	4
grocery shopping	5
cleaning the kitchen	6
throwing out the trash	7
doesn't mind/ likes all	8

(69) Thank you for answering our survey questions.

(70) Now we would like to get better acquainted with you and your family.

NOTE TO AIDE/DATA COLLECTOR: The following questions are identical to the Family Record, parts A & B. If you already have recent Family Record and 24-Hour Dietary Food Recall completed, you do not need to use the next questions to get the information. If you do use this form to get the data you may want to record it on the Family Record form, Parts A & B, with the self-carbon.

Can you tell me the first name of all family members, their sex, and their ages?

(69) Total number of family members: ____

Name	M or F	Age
_____	____	____
_____	____	____
_____	____	____
_____	____	____
_____	____	____
_____	____	____
_____	____	____

Did any of your children participate in the school lunch program, summer food program, or child care (day care) food program last week? (70) Yes _____ No _____

How many? (71) How many _____

How many of your children are in school (K-12)? (72) _____

Please share your age in one of these categories: *(Read choices.)* (73)

18 and under	1
19-21	2
22-25	3
26-30	4
31-40	5
41-44	6
45 and over	7
refused	8

What was the highest grade you completed in school? (74)

8th or less	1
9th	2
10th	3
11th	4
12th	5
H.S. Grad.	6
G.E.D.	7
Beyond H.S.	8
Refused	9

Ethnic background of homemaker. *(Ask only if unsure.)* (75)

White (not Hispanic)	1
Black (not Hispanic)	2
Hispanic	3
American Indian or Alaskan Native	4
Asian or Pacific Islander	5
Refused	6

Homemaker place of residence. (76)

farm	1
town under 10,000 & rural non-farm	2
town or city 10,000-50,000	3
suburb of city over 50,000	4
central city of over 50,000	5

Can you tell me the total amount you spent for food last month, including cash and credit and value of food stamps?

(77)

Under $315	1
$316-$418	2
$419-$519	3
$520-$621	4
$622-$723	5
$724-$824	6
$825-$917	7
$918 & over	8

Now I would like to ask you a few questions about the food you have eaten in the last 24 hours. *(Take 24-Hour Food Recall on homemaker.)*

RECORD WHAT HOMEMAKER ATE AND DRANK IN THE LAST 24 HOURS IN SPACE BELOW.

Meal	Food	Number of Servings
Breakfast:		
Lunch:		
Dinner:		
Other:		

Total number of servings from each of the food groups.	(78)	milk	___
	(79)	meat	___
	(80)	vegetable/ fruit	___
	(81)	bread/ cereal	___
	(82)	other	___
USDA 24-Hour Food Recall score (Code a score of 100 as 99.)	(83)	score	___
One or more servings in each of four food groups?	(84)	yes	___
		no	___
Two or more servings milk/meat; four or more vegetable/fruit; and bread/cereal?	(85)	yes	___
		no	___
How many food recalls have you taken on this family?	(86)		___
Family Fare interview number.	(87)	first	___
		second	___
		third	___
		other (specify)	___

Family Name_____ "FAMILY FARE" SURVEY Aide's Name_____

SCORE SHEET County_____

Initial Interview Date_____ Second Interview Date_____ Third Interview Date_____

Ave. State Score		Possible Points	Score	Score	Score
9.8	Food Groups (#1-15)	15			
8.0	Nutrient Sources & Functions (#16-28)	13			
9.0	Food Storage & Safety (#29-34)	6			
	(#35-36)	7			
22.7	Food Preparation (#37-44)	24			
	(#45-47)	9			
18.4	Food Shopping Practices (#48-53)	24			
	(#54)	1			
7.6	Food Shopping Skills (#55-65)	12			
3.6	Sources of Food & Nutrition Information (#66-67)	17			
	TOTAL	128			
	FOOD RECALL:		No. Servings	No. Servings	No. Servings
	Milk (#78)				
	Meat (#79)				
	Fruit/Vegetables (#80)				
	Bread-Cereals (#81)				
	Other (#82)				
	USDA Food Recall Score (#83)				
	One or more servings in each of four food groups		Yes or No	Yes or No	Yes or No
	Two or more servings milk/meat, four or more veg/fruit; bread/ cereal		Yes or No	Yes or No	Yes or No

APPENDIX D

MICHIGAN EXPANDED FOOD & NUTRITION EDUCATION PROGRAM

FAMILY FARE SURVEY QUESTIONNAIRE PICTURES


FAMILY FART
SURVEY
FLOUR
MILK

"FAMILY FARE SURVEY"

AUTHORS:

LINDA NIERMAN, ASSOCIATE PROGRAM DIR., FAMILY LIVING EDUCATION, COOPERATIVE EXTENSION SERVICE, MICHIGAN STATE UNIVERSITY

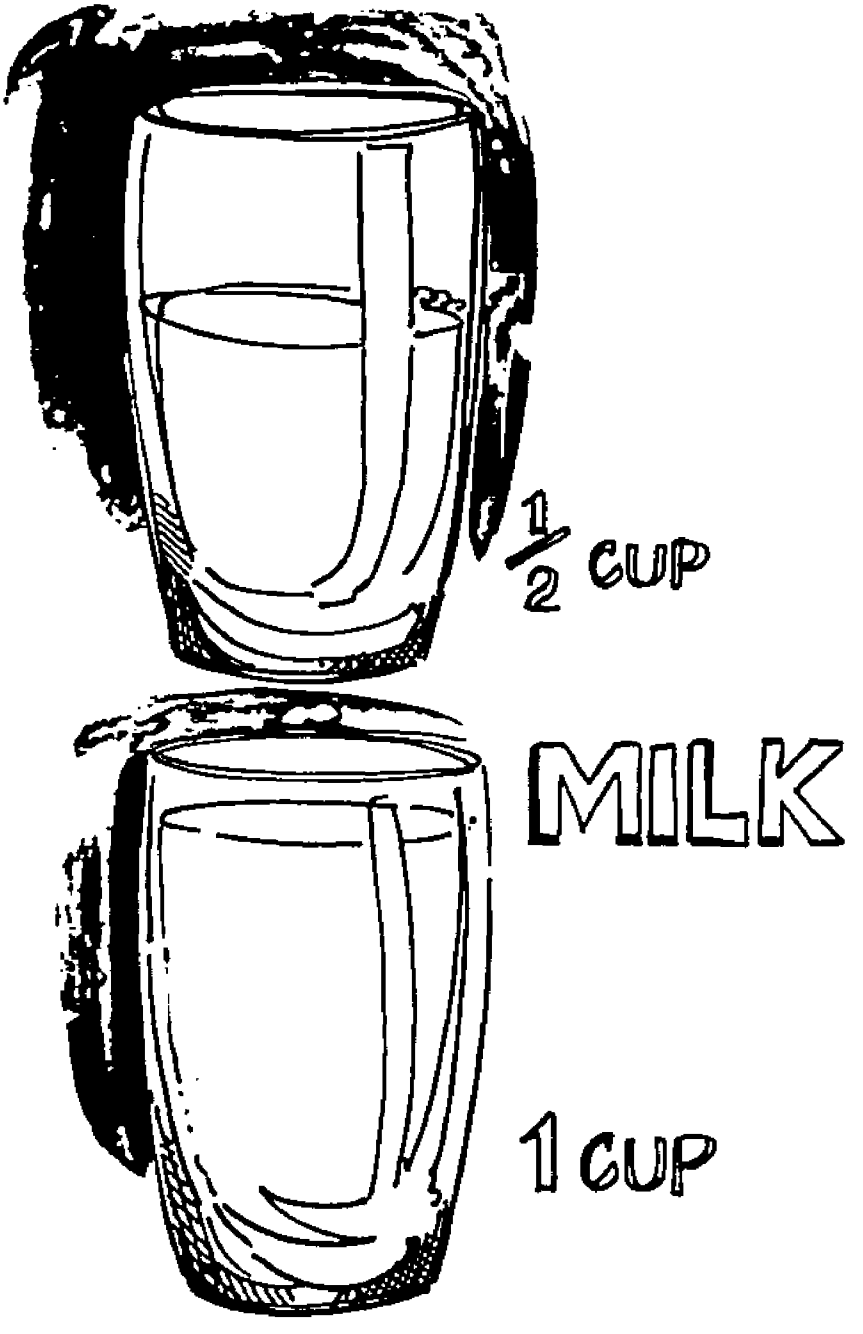
MARY KERR, FORMER EXTENSION ASSOCIATE, EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM, MICHIGAN STATE UNIVERSITY, COOPERATIVE EXTENSION SERVICE

THE AUTHORS WOULD LIKE TO THANK THE SIXTEEN MICHIGAN EFNEP COUNTIES THAT PILOTED THE SURVEY AND BELIEVED IN IT'S IMPORTANCE FOR EVALUATION.

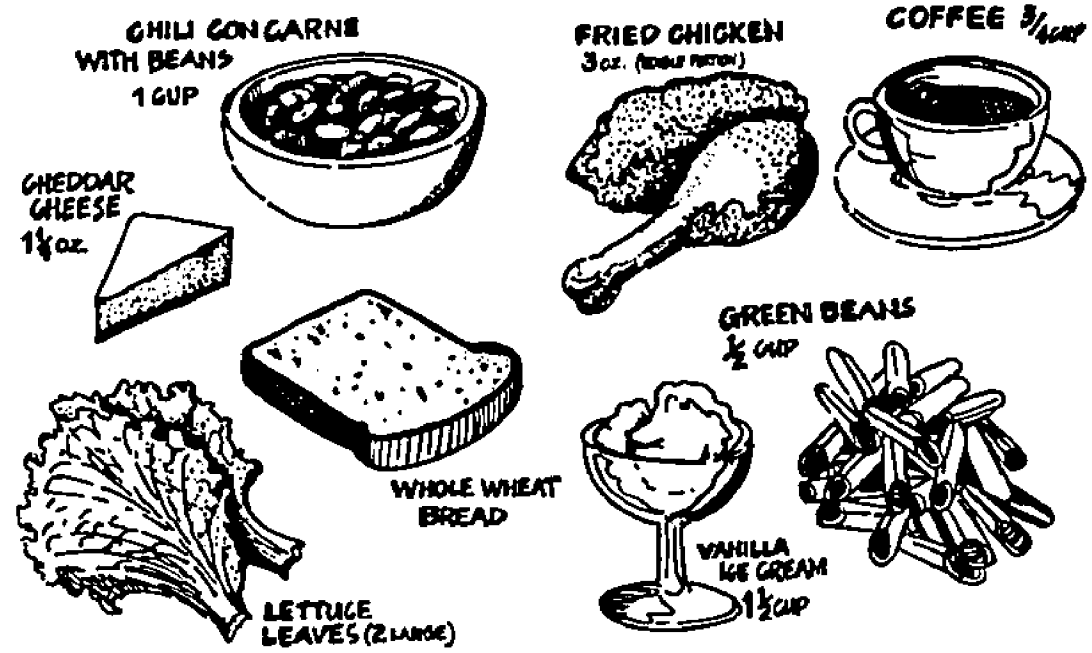
FOR MORE INFORMATION CONTACT:

LINDA NIERMAN
EXPANDED NUTRITION PROGRAM
202 WILLS HOUSE
MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN 48824

Question 1 and Question 2



Question 3

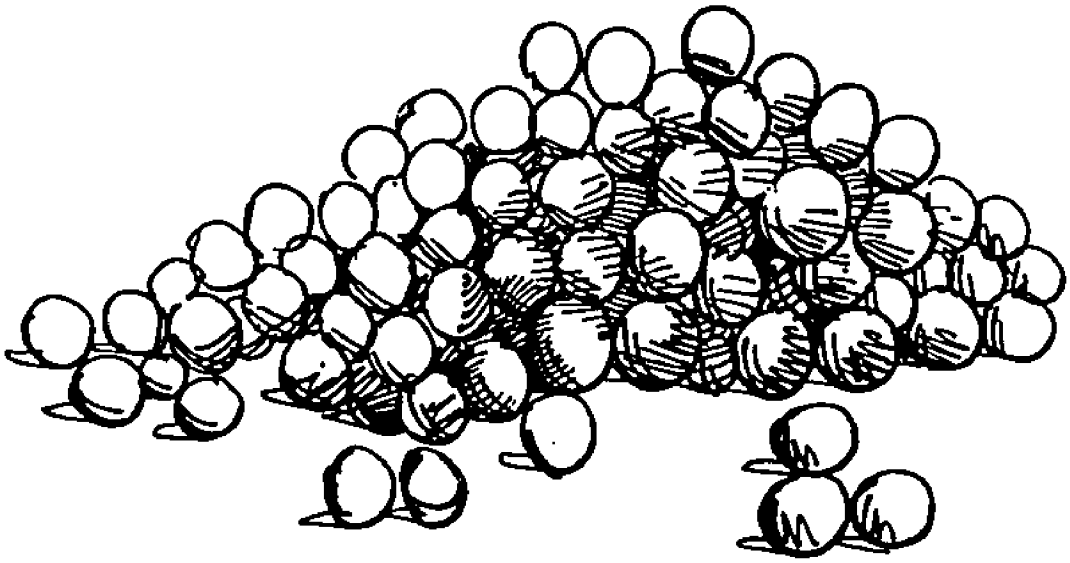


Question 4, Question 5 and Question 6

Question 7

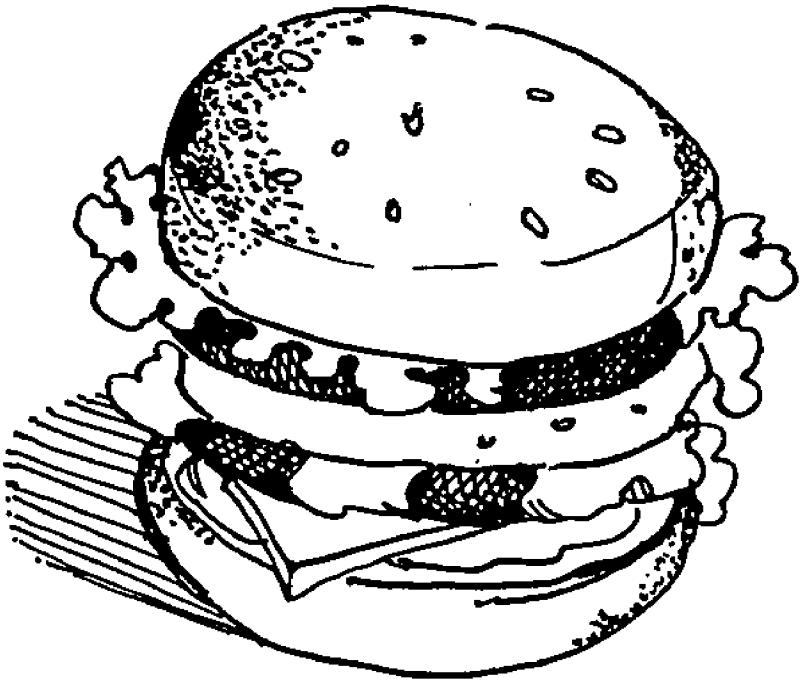
½ CUP

GREEN PEAS



Question 8

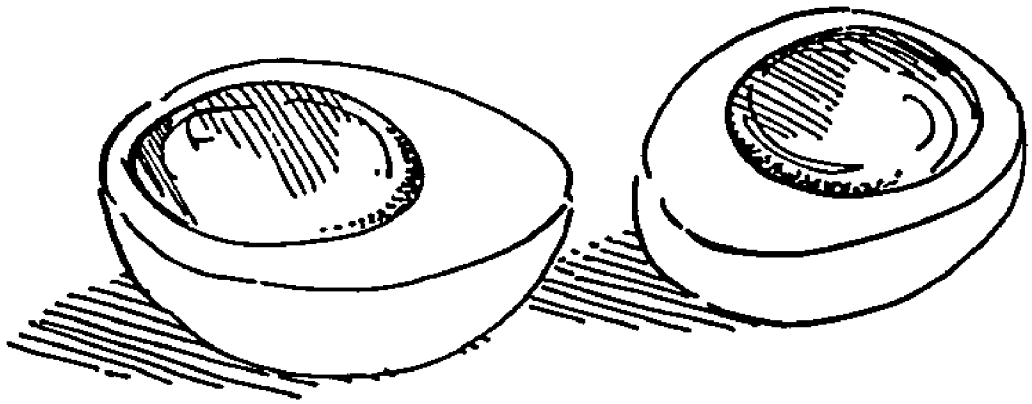
Question 9 and Question 10



BIG
HAMBURGER

Question 11

HARD-COOKED
EGG
LARGE



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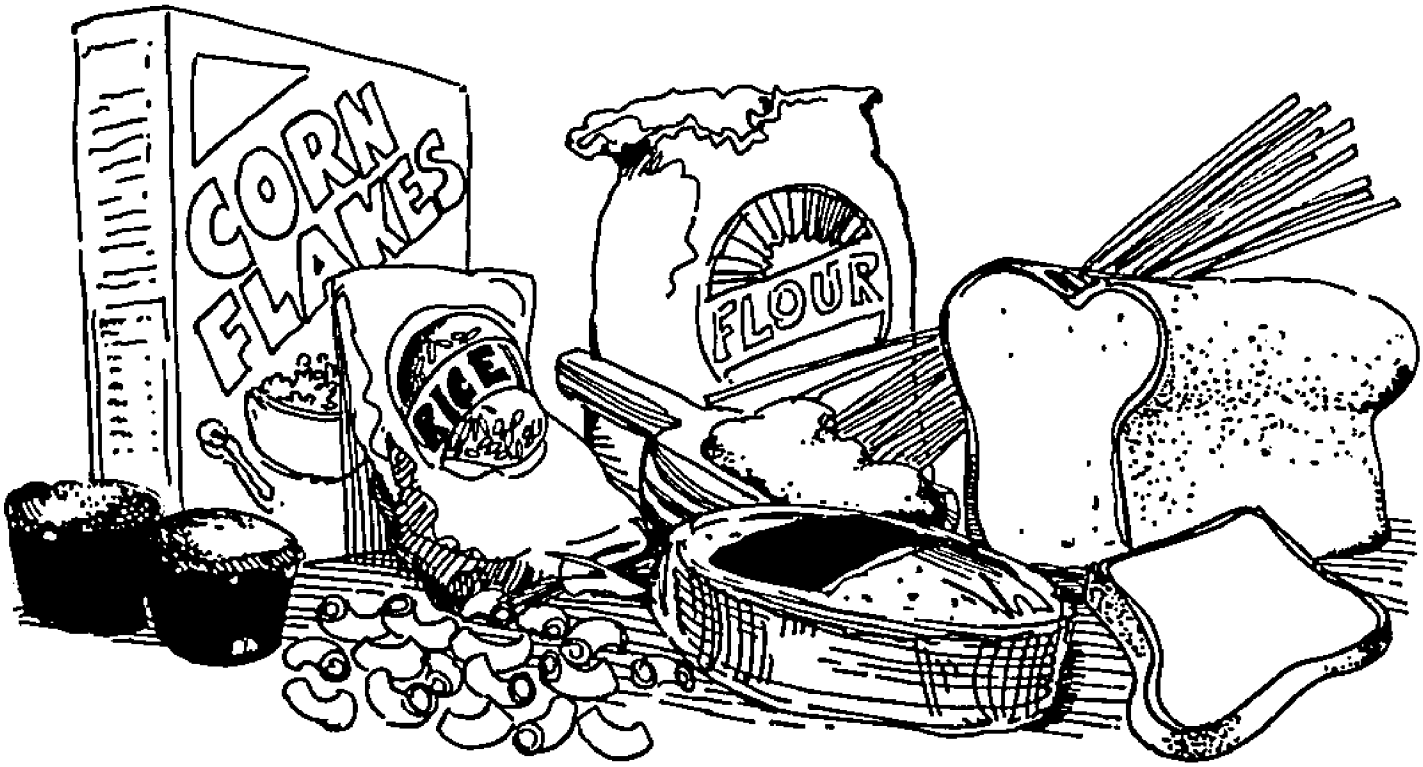
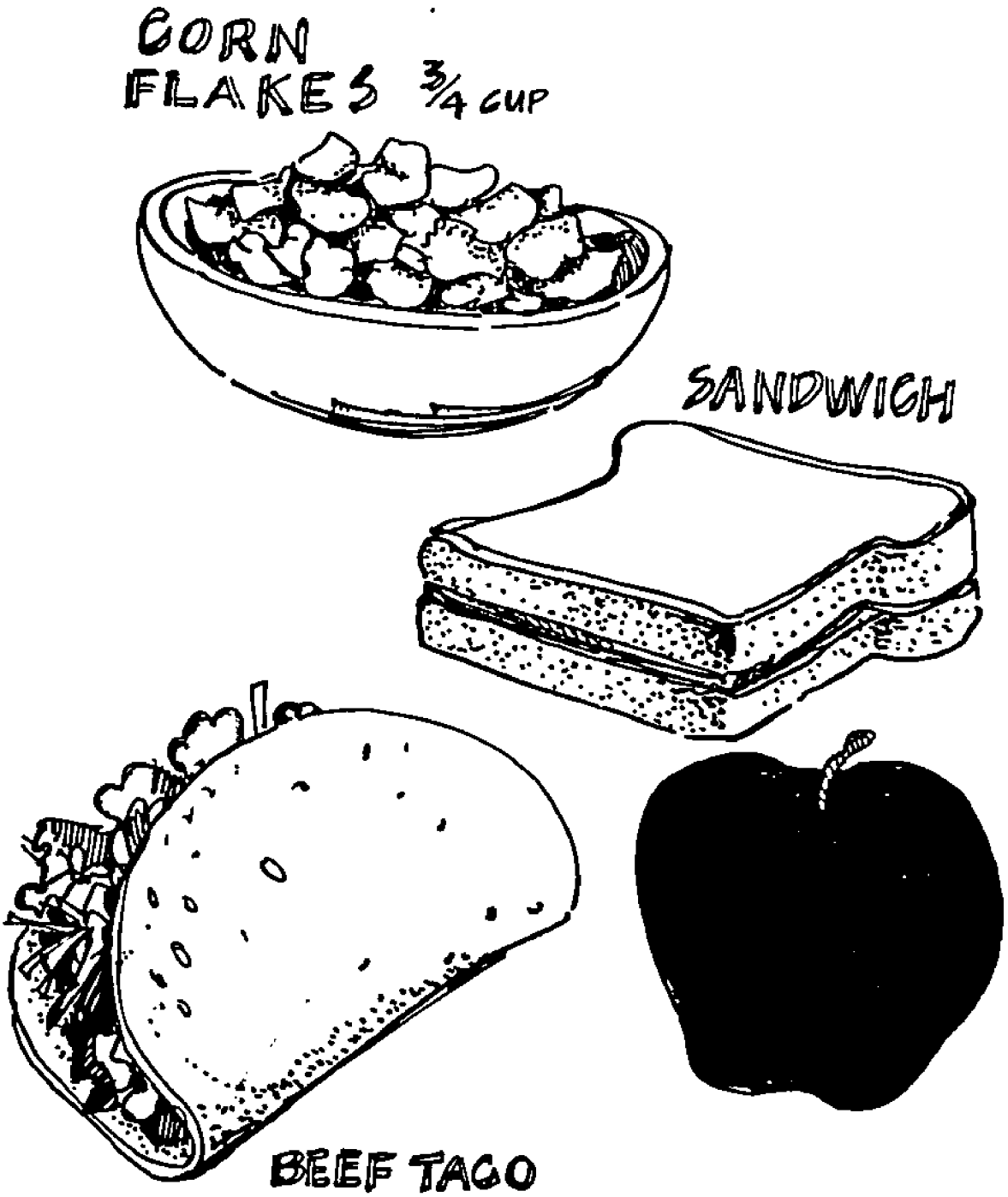
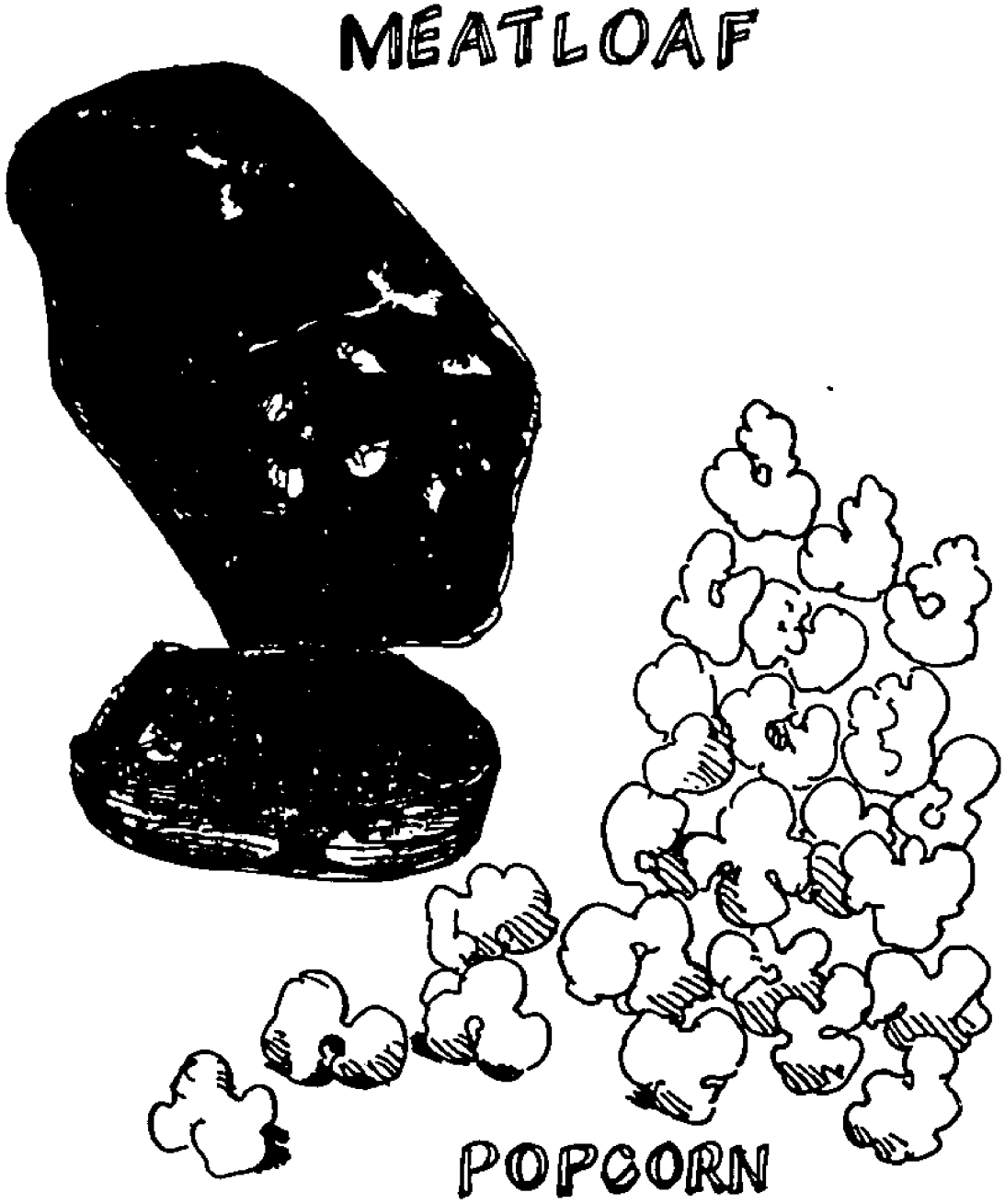


Question 13 and Question 14



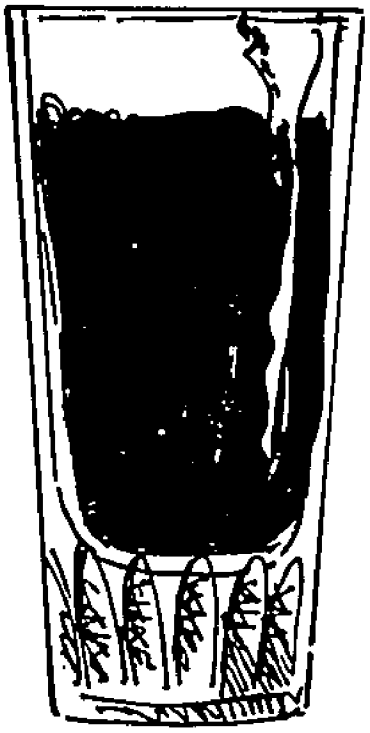
Question 15A

Question 15B

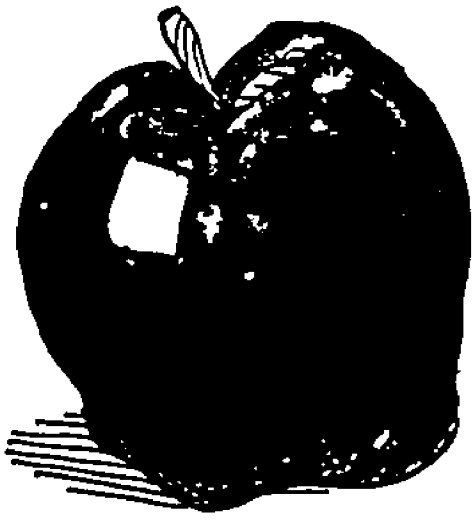


Question 15C

TOMATO JUICE



APPLE



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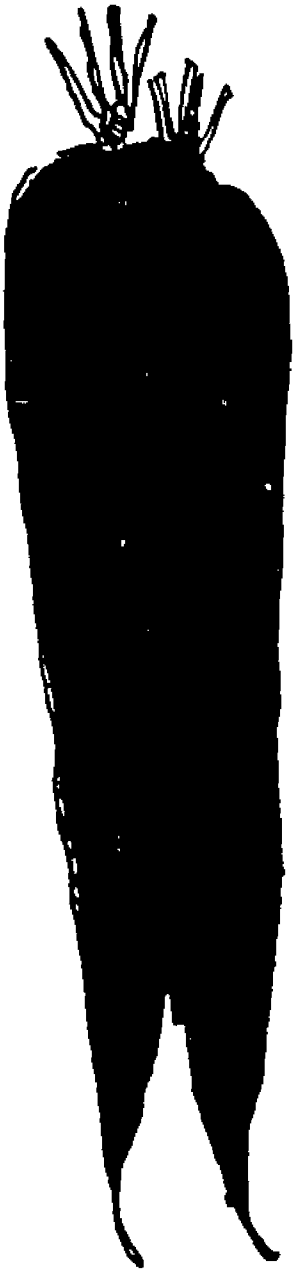
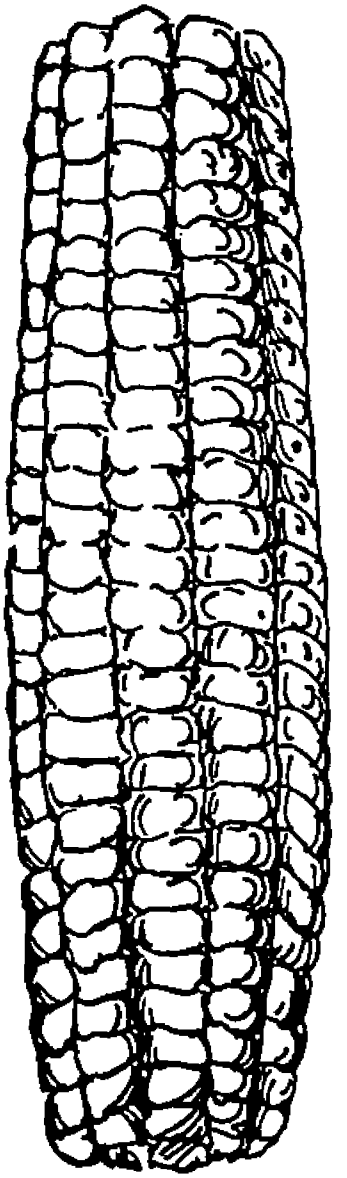


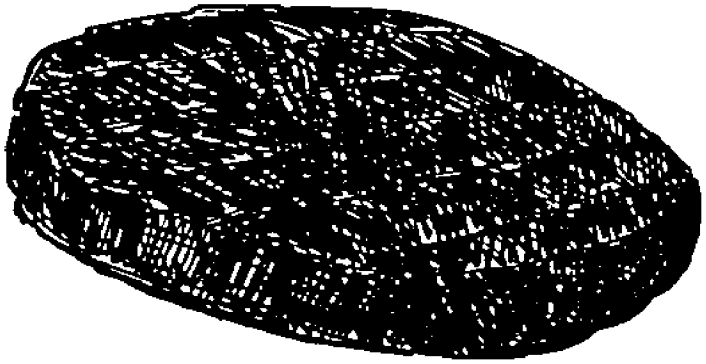
CARROTS

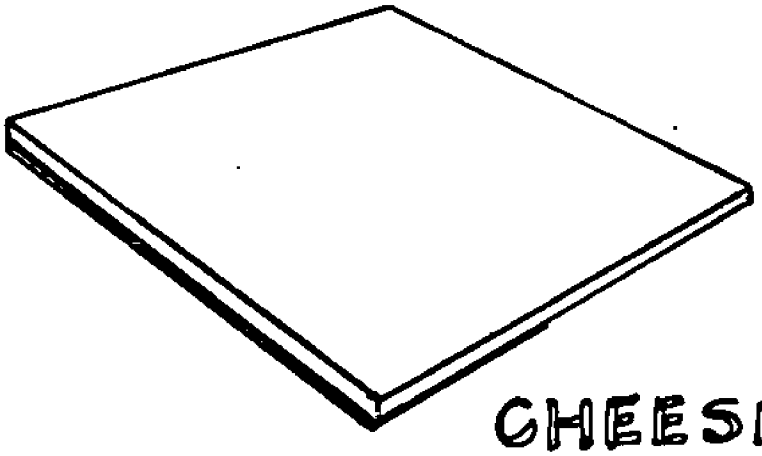


CORN

Question 17

MEAT PATTY

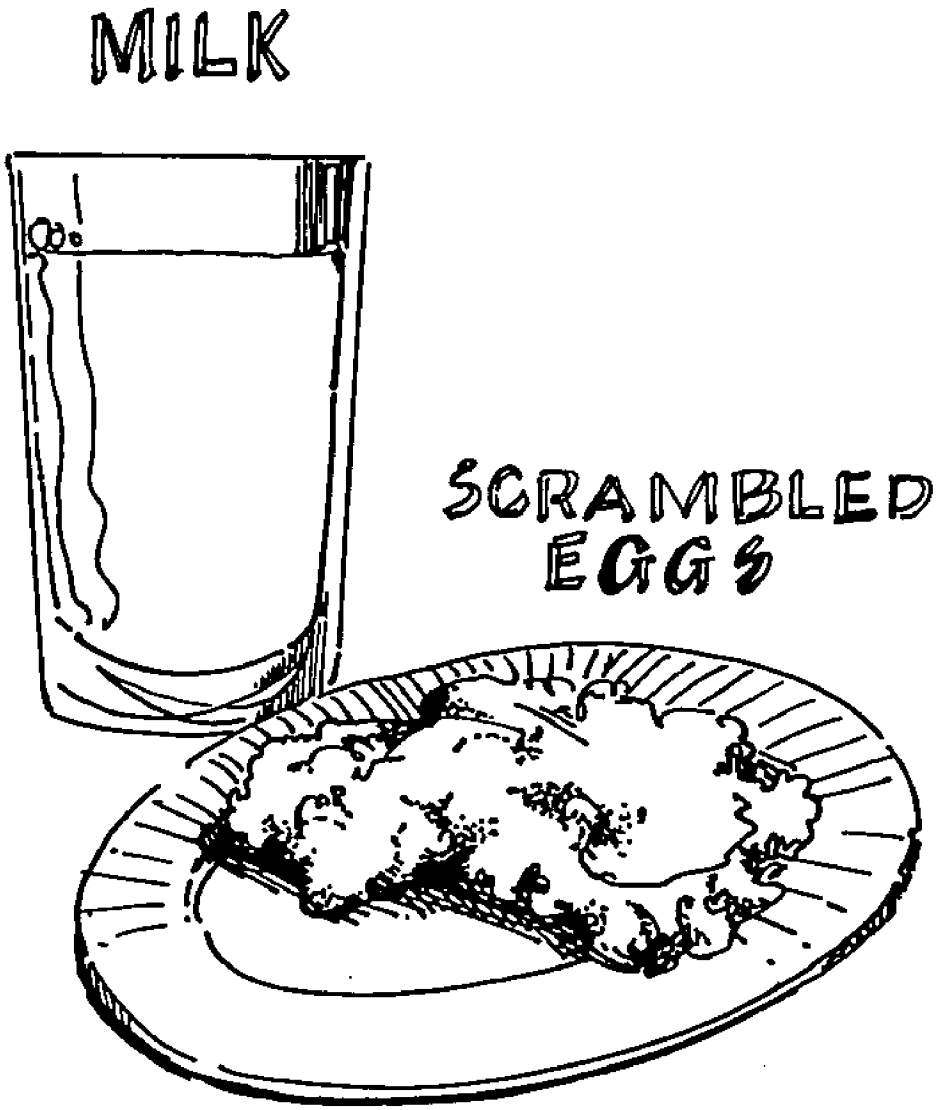




CHEESE

Question 18

Question 19



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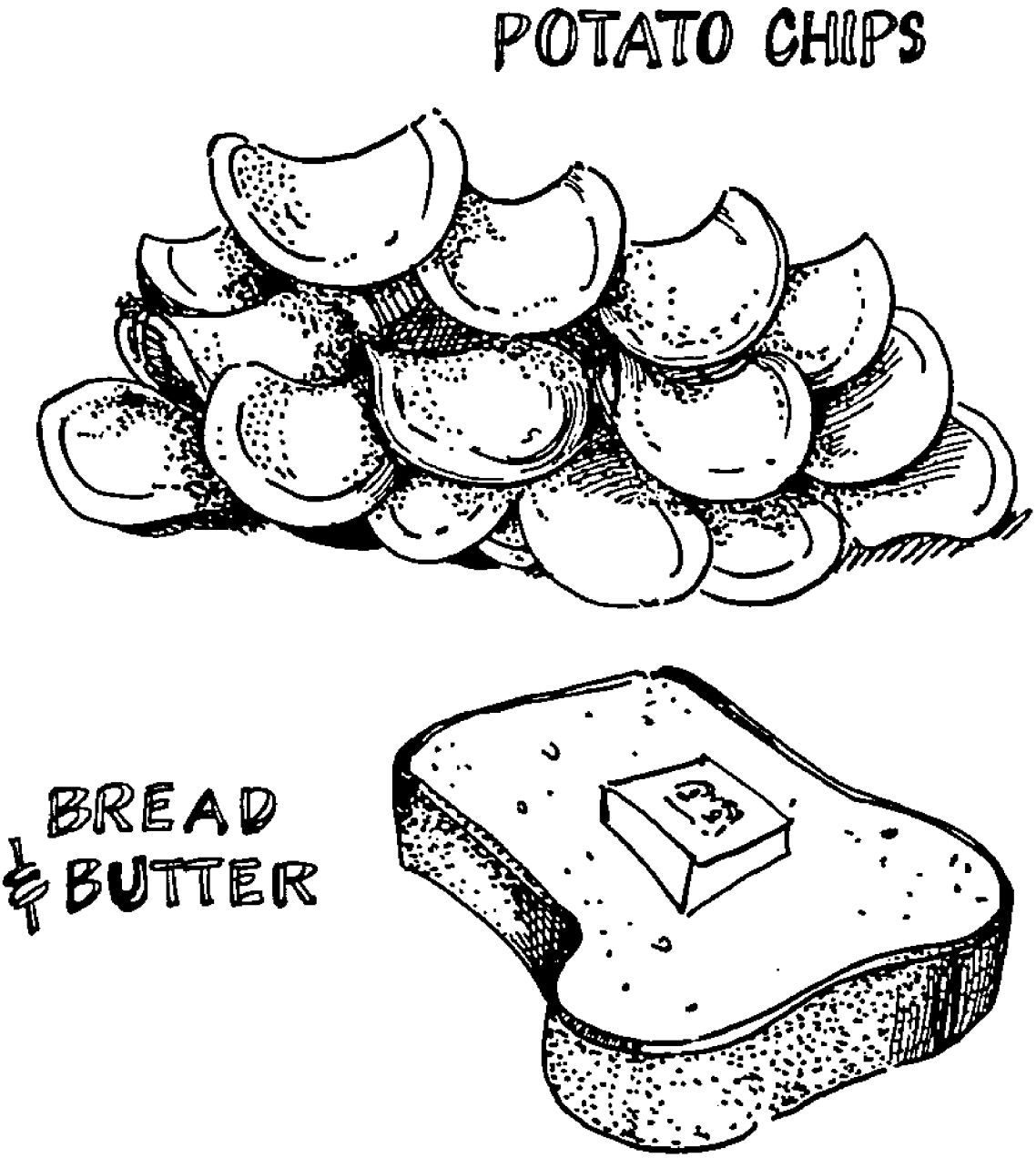
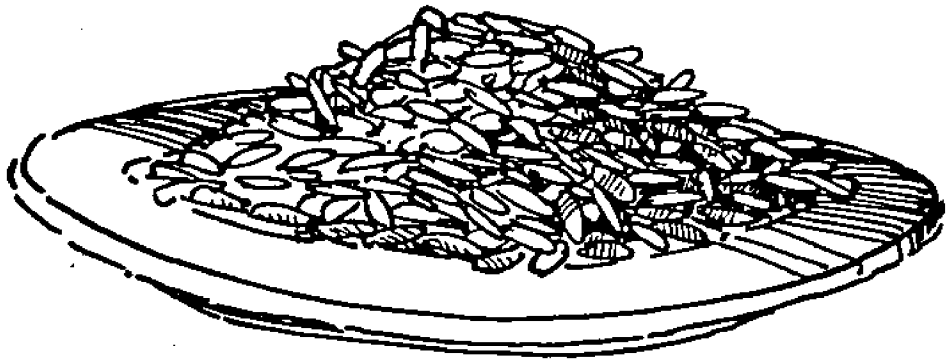
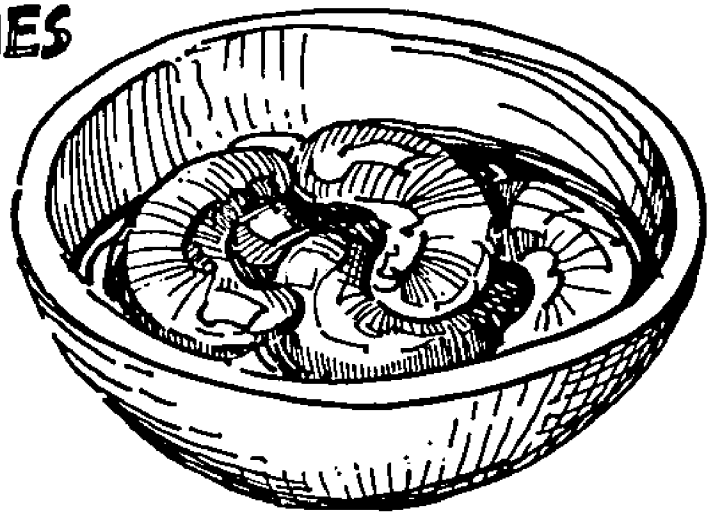


Question 21

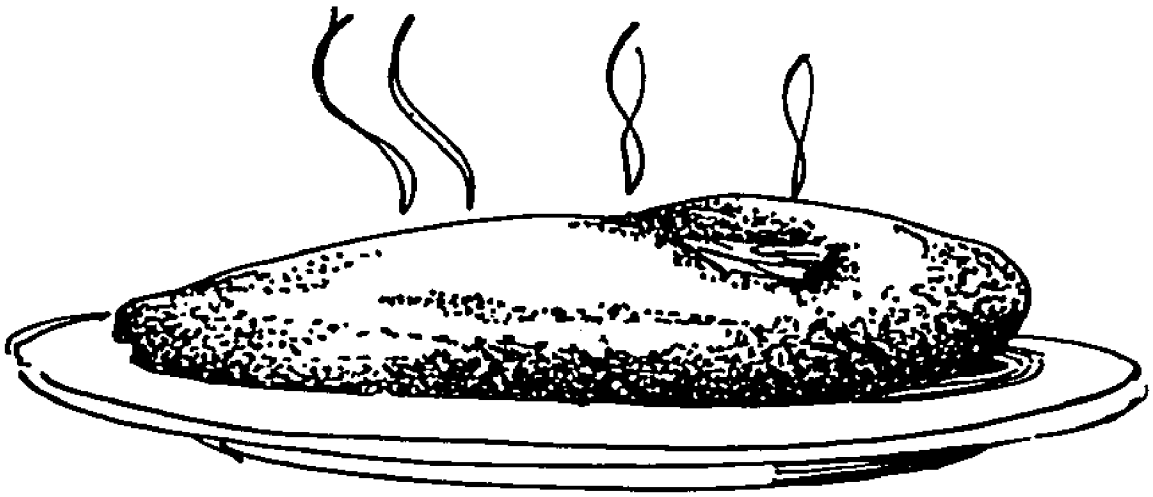
RICE



PEACHES

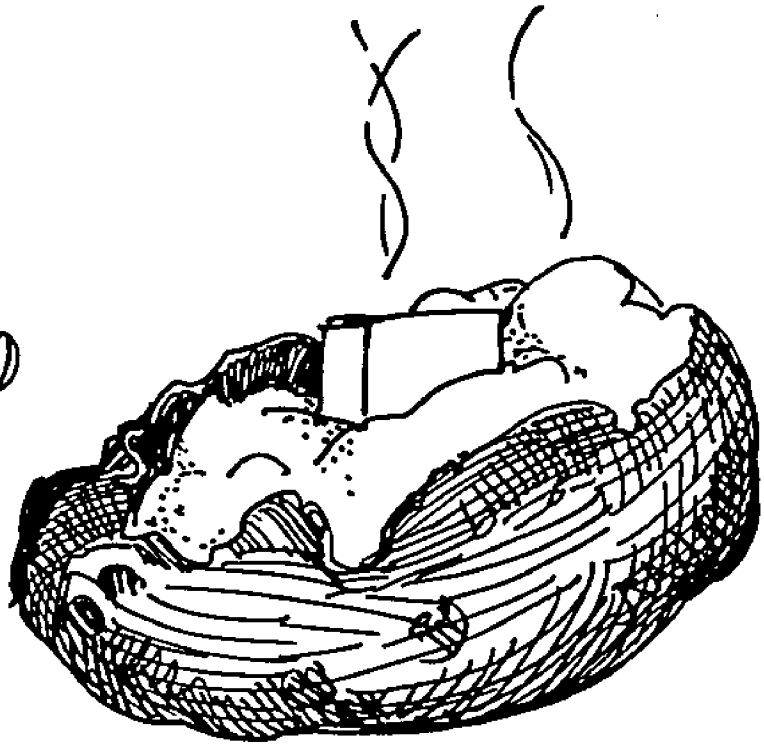


Question 22



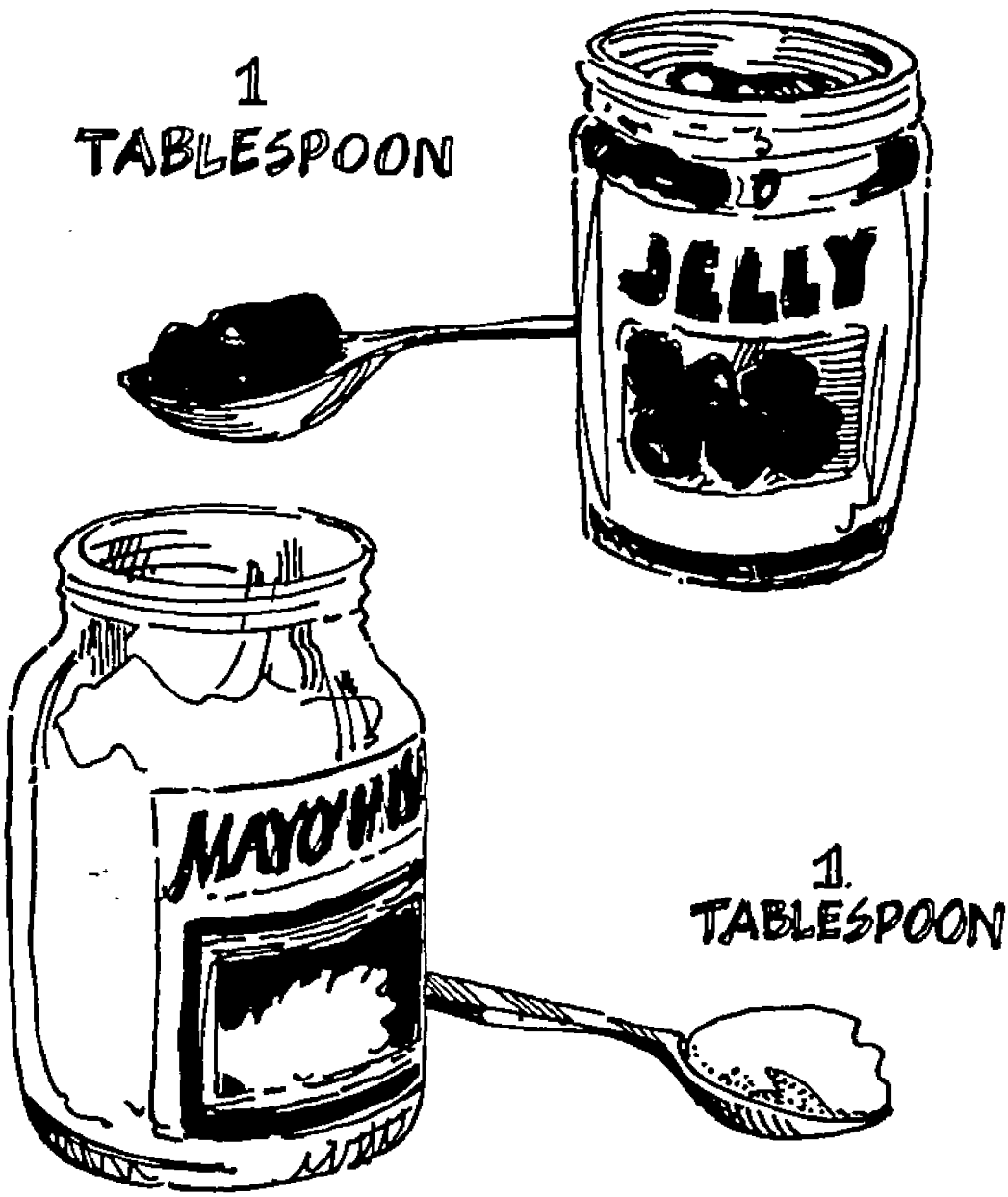
FRIED FISH

BAKED POTATO WITH BUTTER



Question 23

Question 24



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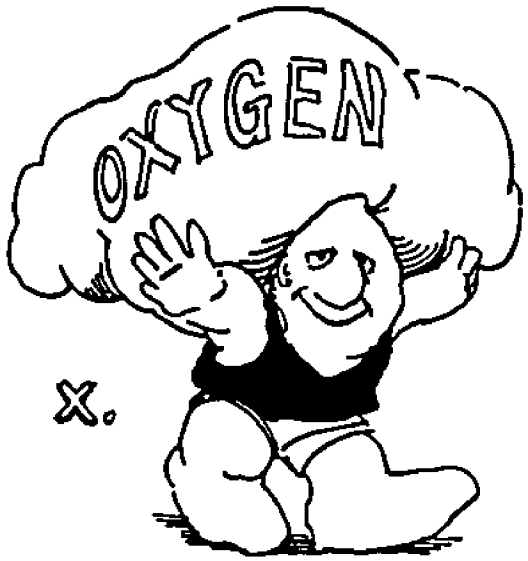
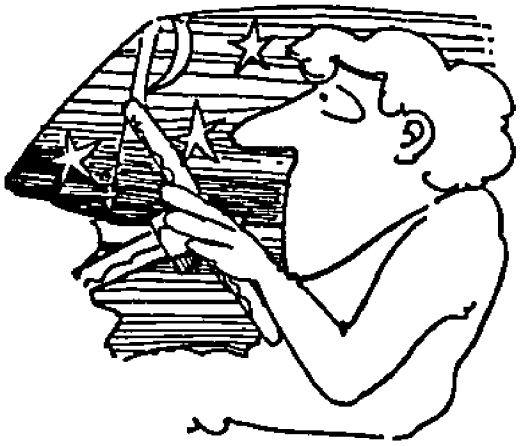


CARRIES OXYGEN TO ALL PARTS OF THE BODY

HELPS OUR EYES SEE IN THE DARK

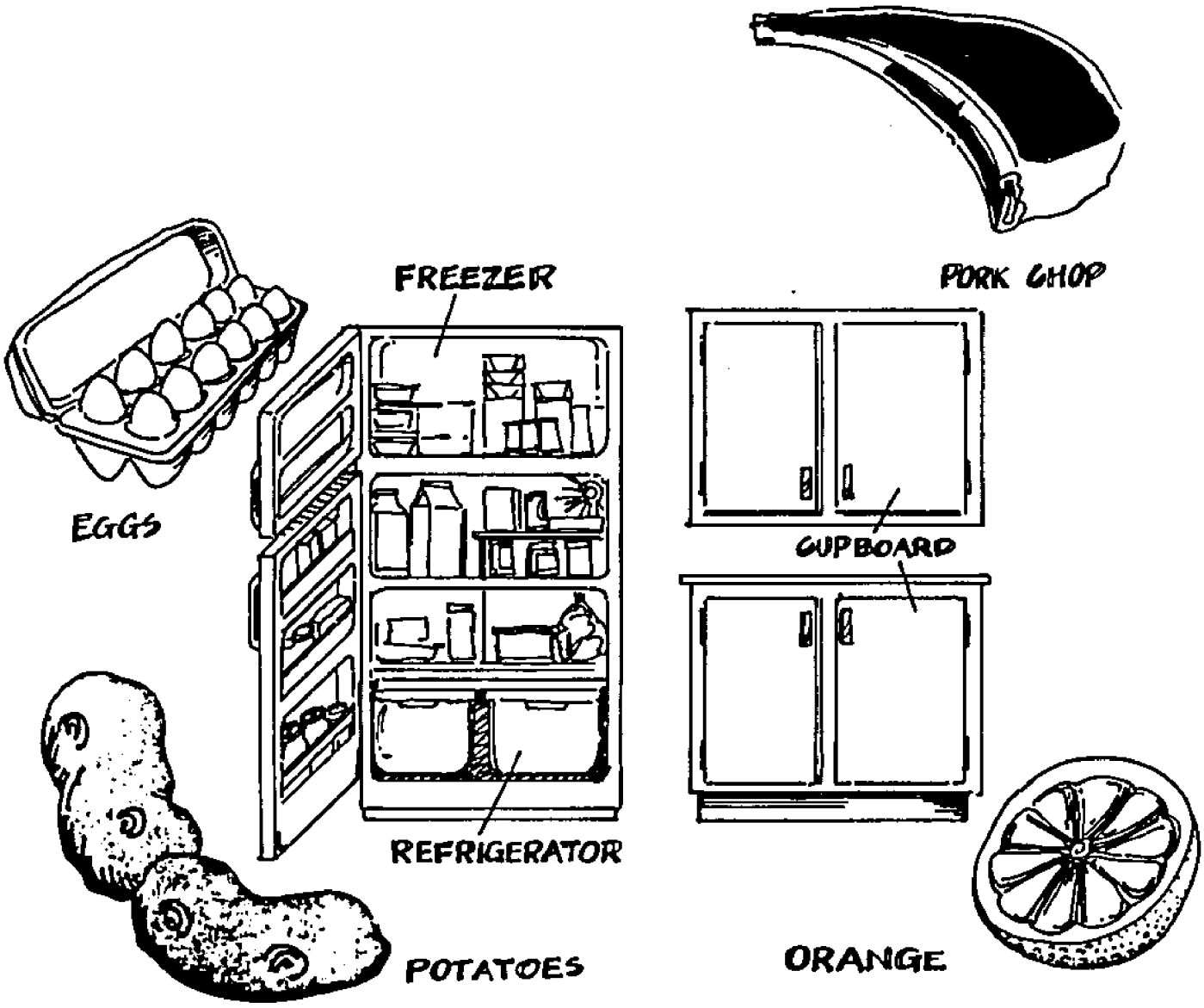
Z.



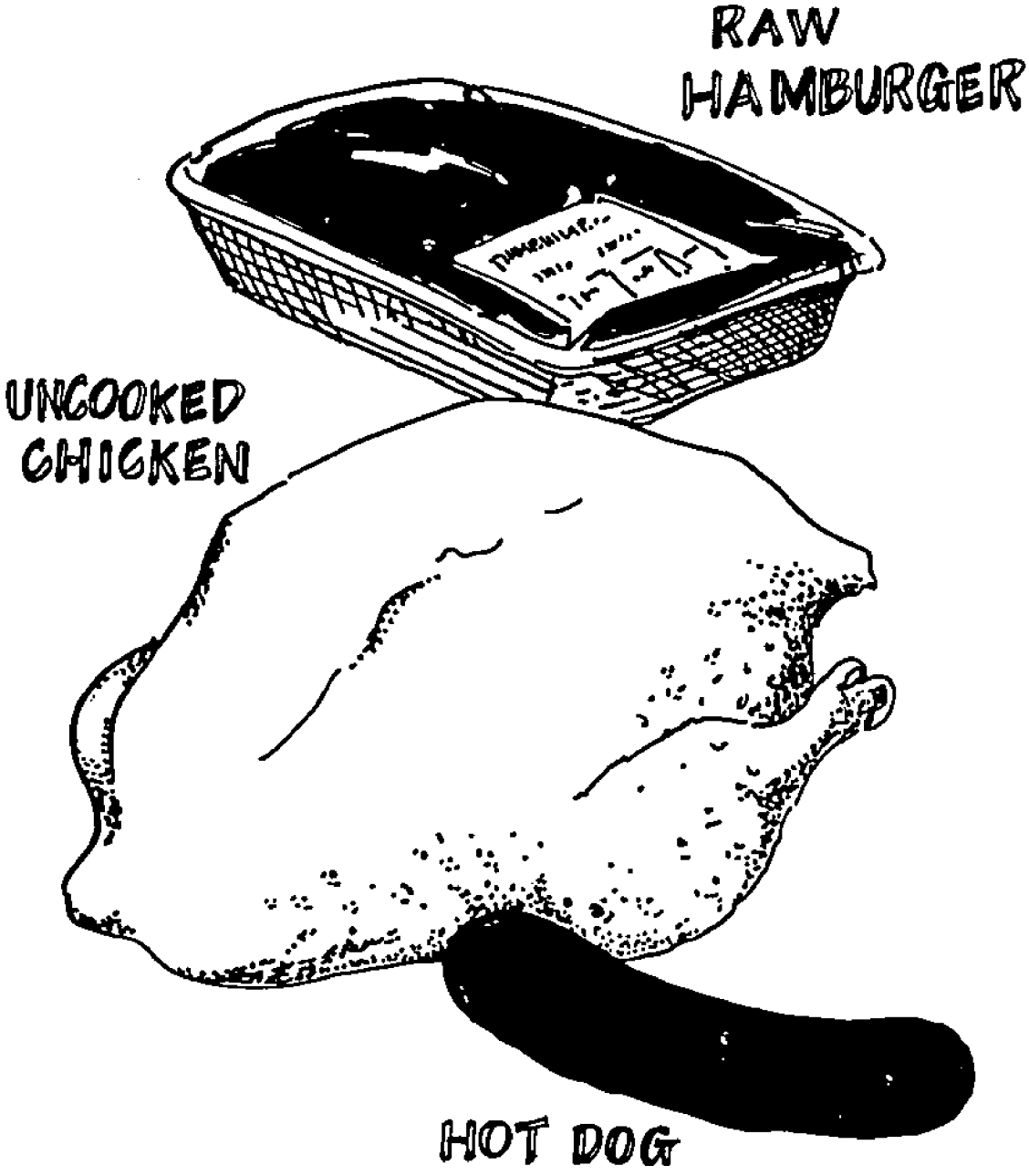
FOR HEALING CUTS

FOR HEALTHY GUMS

Question 26, Question 27 and Question 28



Question 29, Question 30, Question 31, and Question 32



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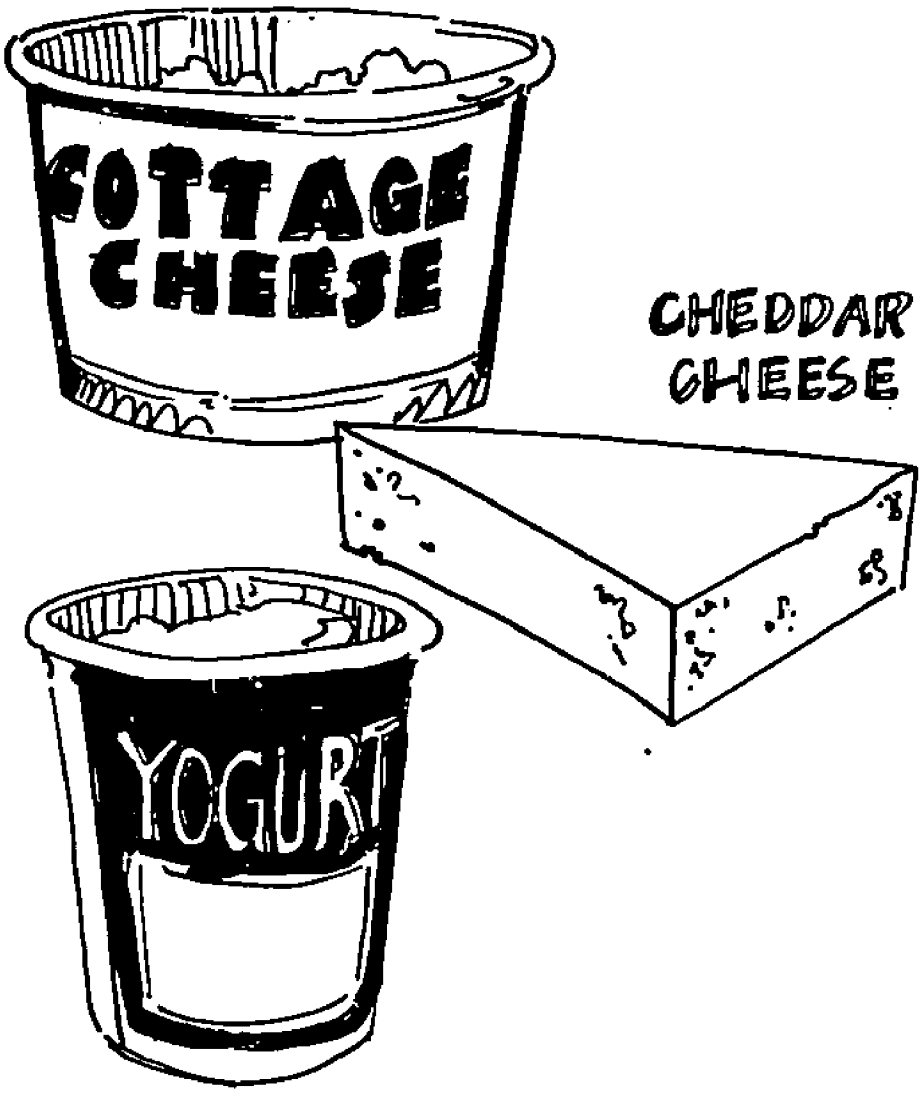

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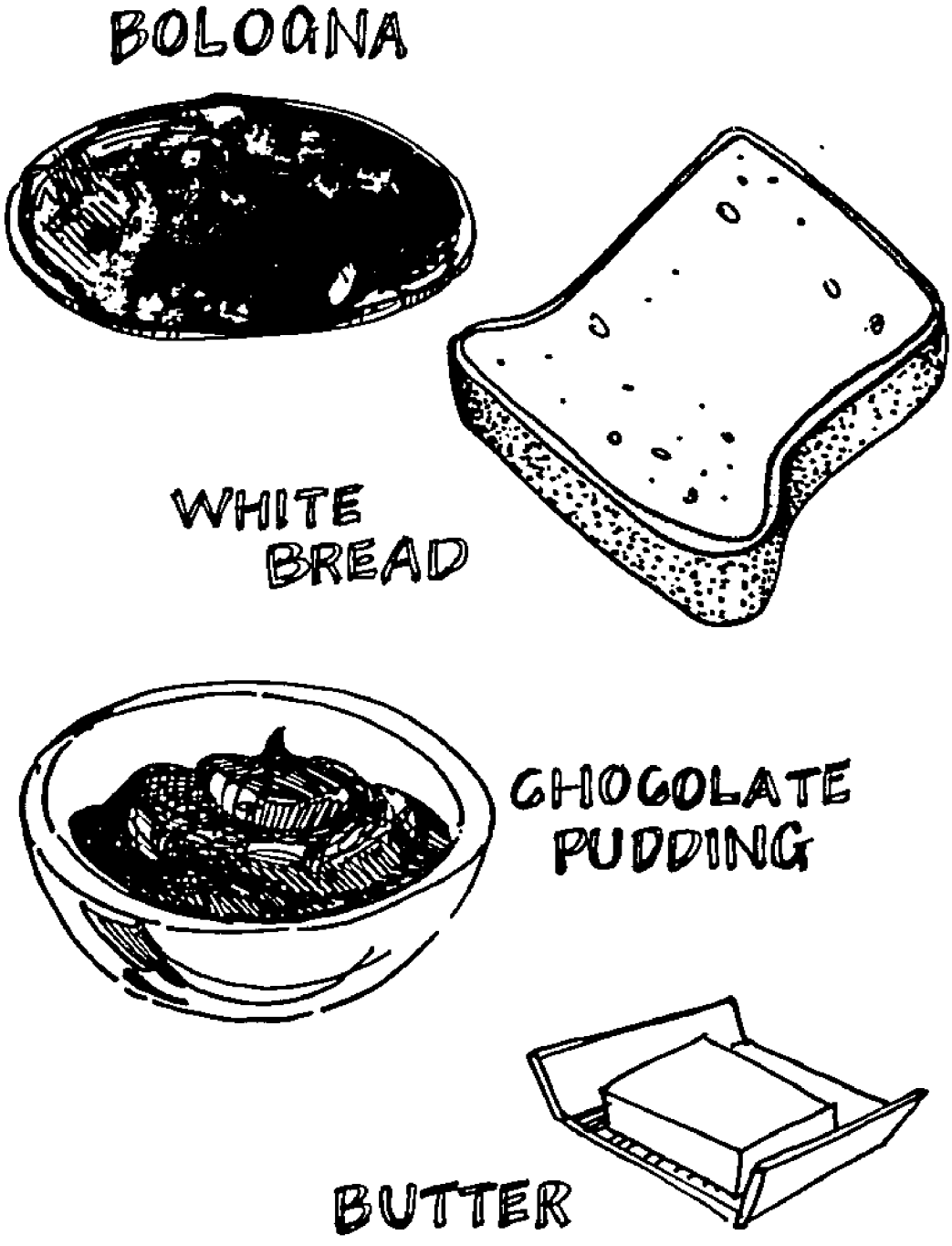
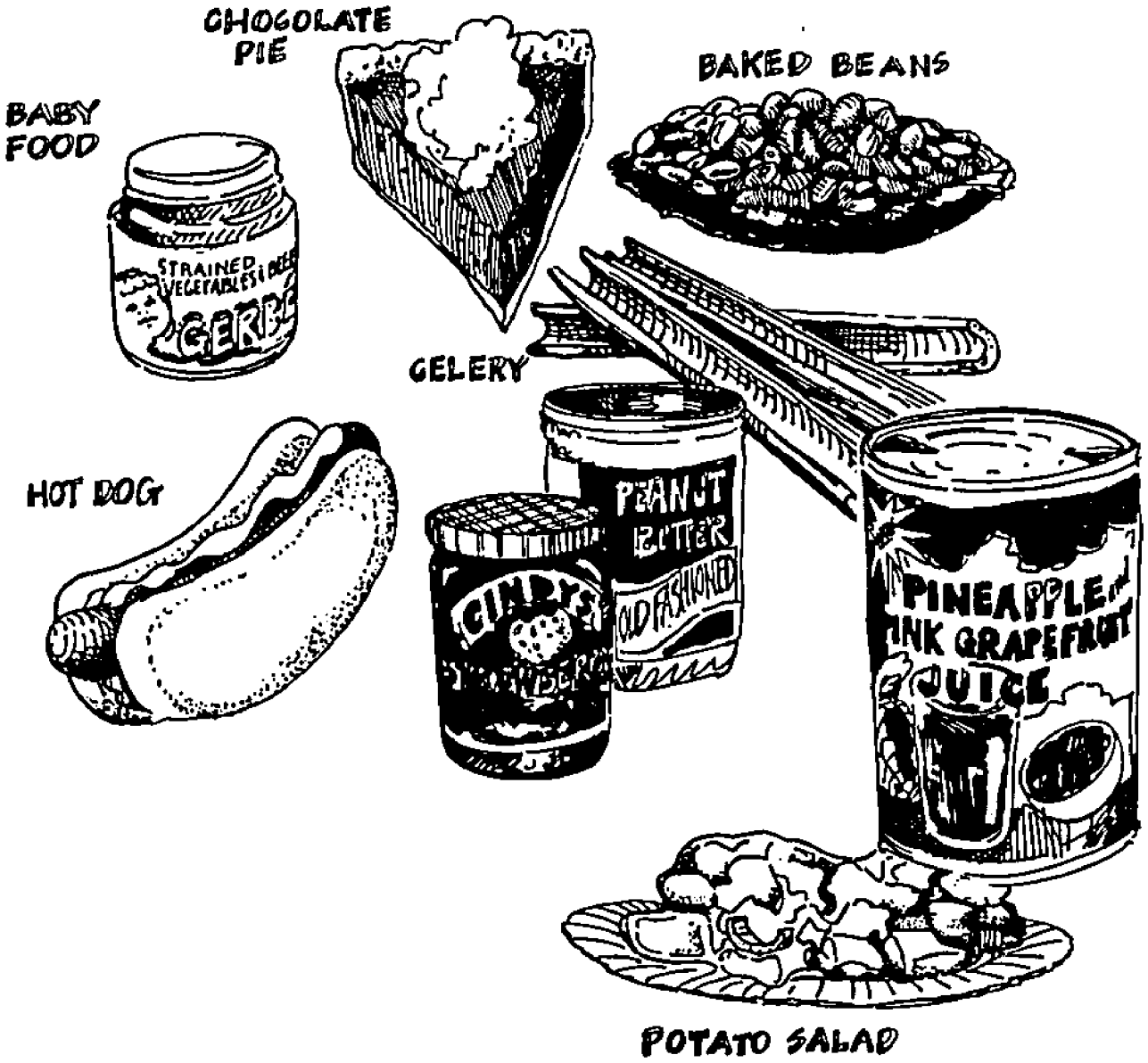
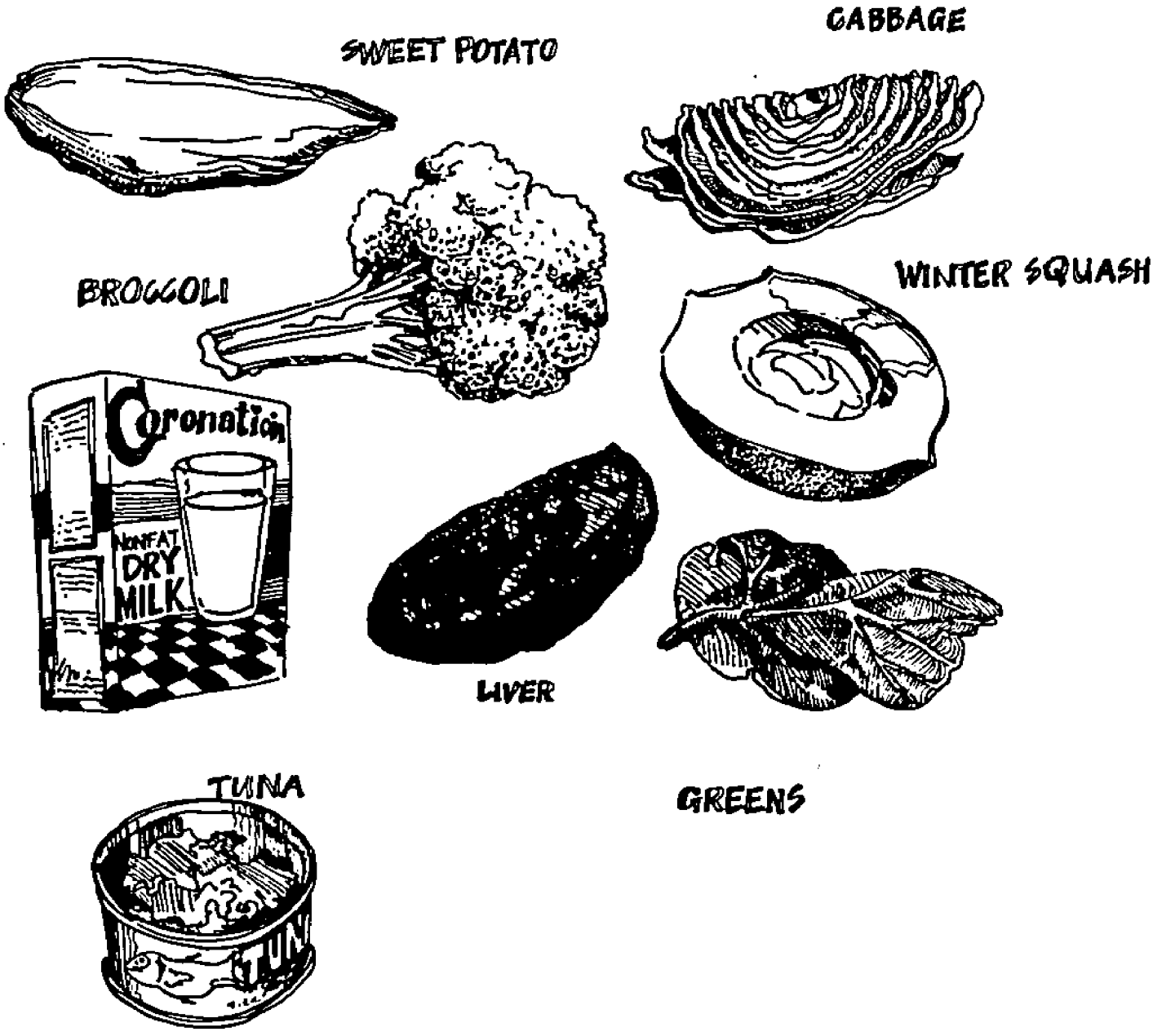


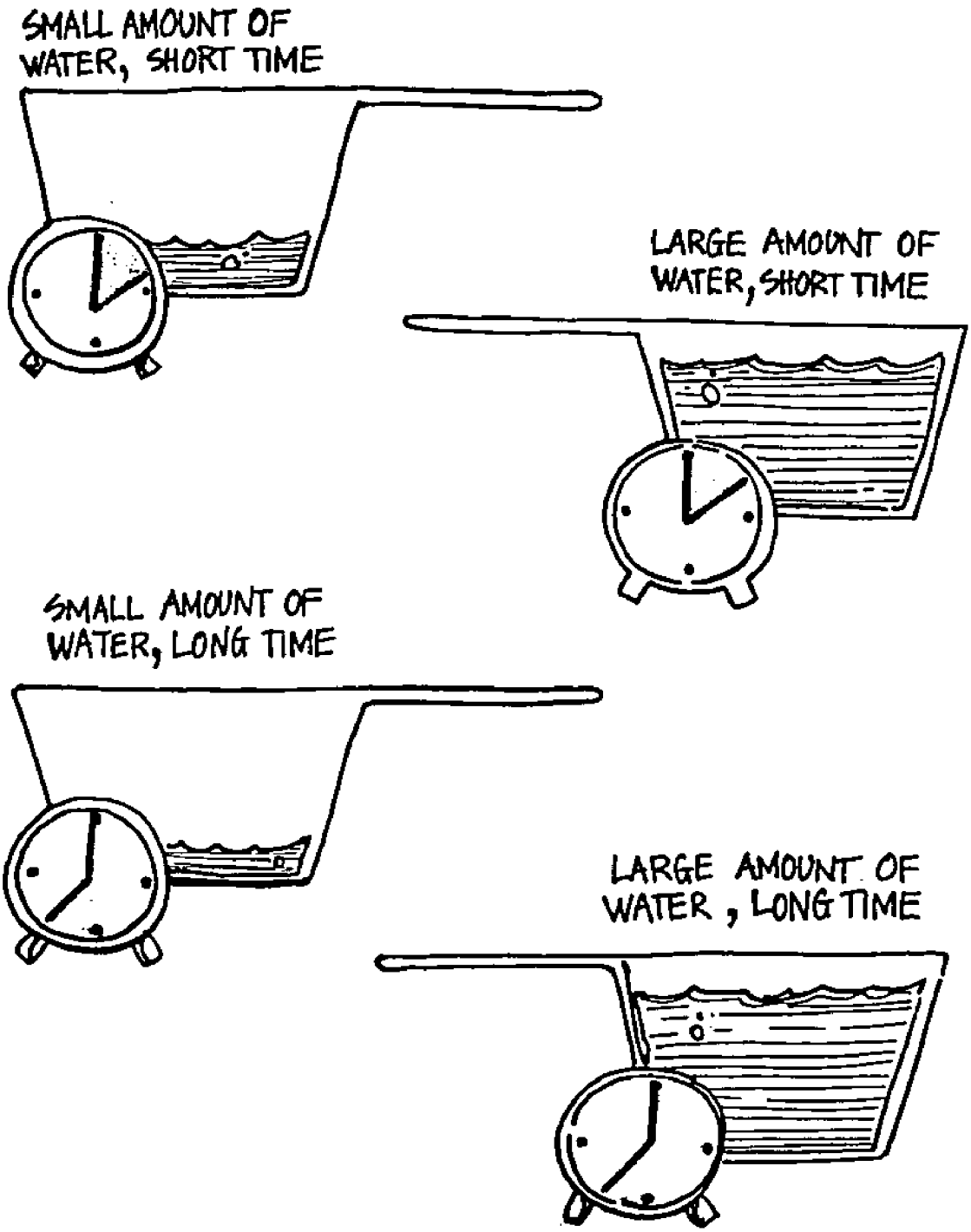
Question 35


CHOCOLATE PIE
BAKED BEANS
BABY FOOD
STRAINED VEGETABLES
GERBER
GELERY
HOT DOG
PEANUT BUTTER
OLD FASHIONED
CINDY'S
PINEAPPLE
GRAPEFRUIT
JUICE
POTATO SALAD

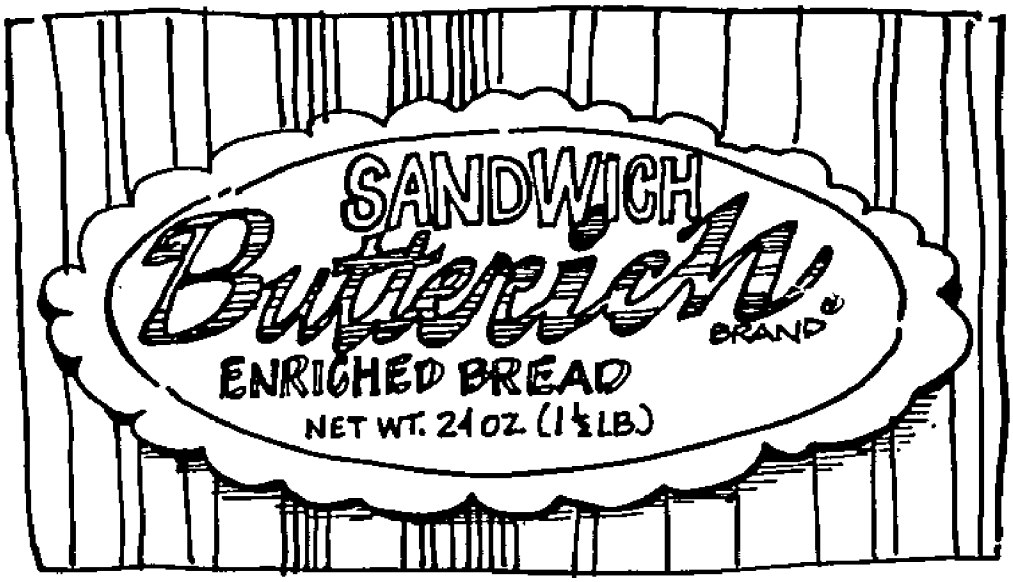
Question 36



Question 37, Question 38, Question 39, Question 40,
Question 41, Question 42, Question 43, and Question 44


SMALL AMOUNT OF
WATER, SHORT TIME
LARGE AMOUNT OF
WATER, SHORT TIME
SMALL AMOUNT OF
WATER, LONG TIME
LARGE AMOUNT OF
WATER, LONG TIME

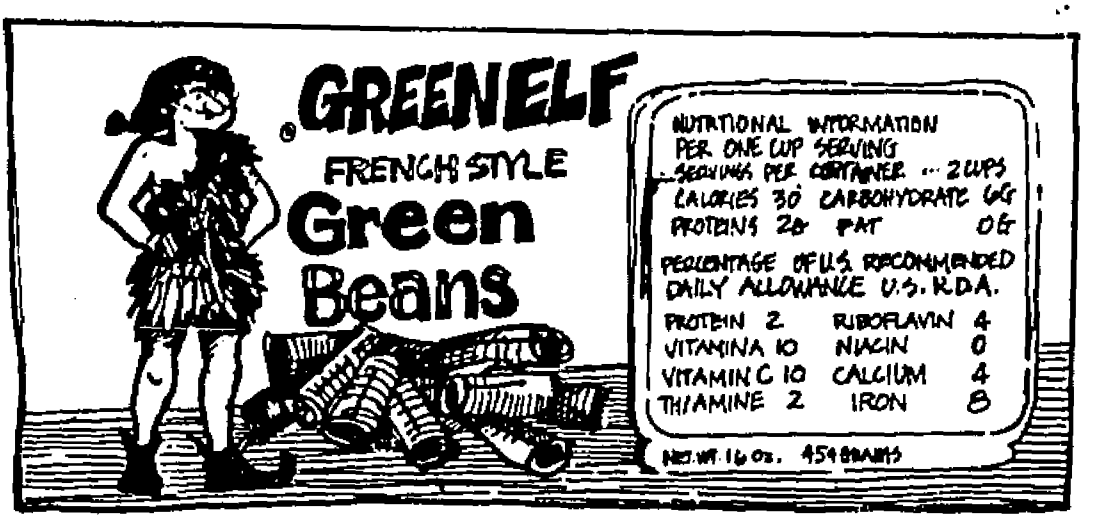
Question 45

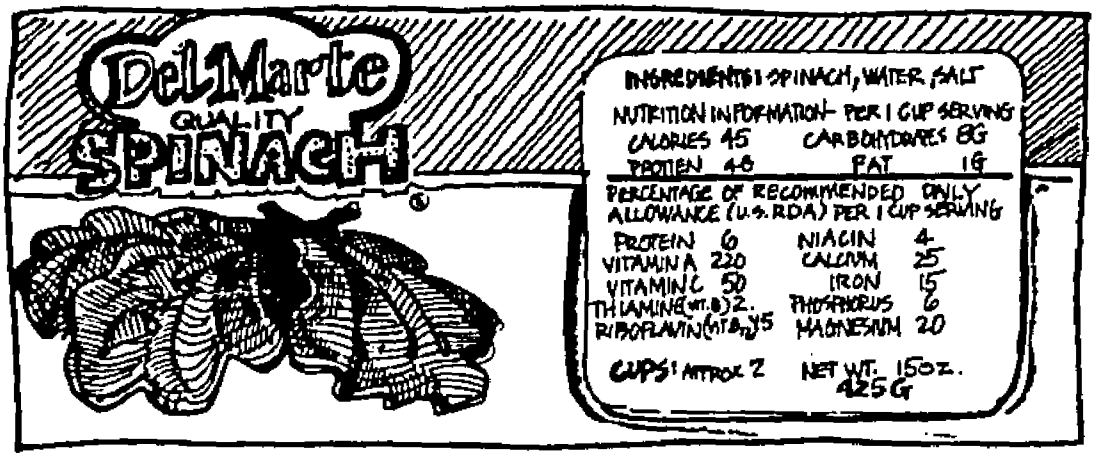


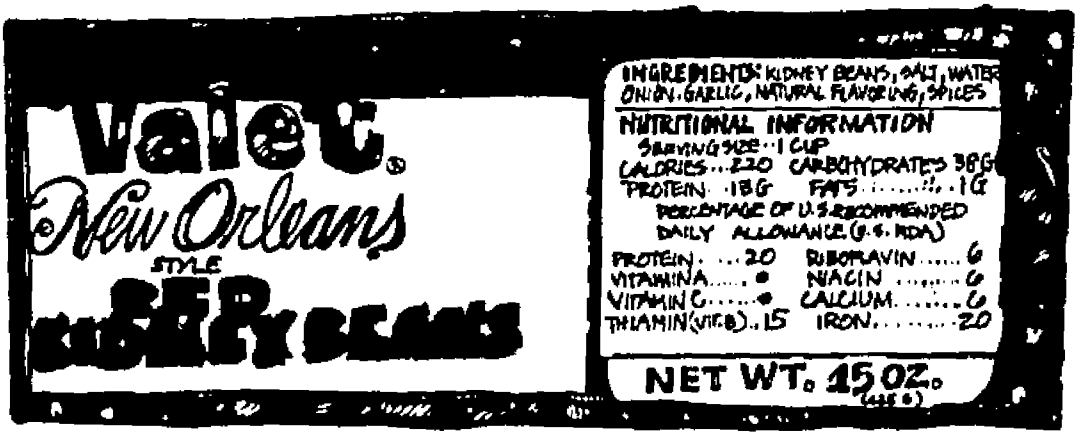
EXAMPLE A

EXAMPLE B

Question 55


GREENELF
FRENCH STYLE
Green
Beans
NUTRITIONAL INFORMATION
PER ONE CUP SERVING
SERVINGS PER CONTAINER ... 2 CUPS
CALORIES 30 CARBOHYDRATE 6G
PROTEINS 2G FAT 0G
PERCENTAGE OF U.S. RECOMMENDED
DAILY ALLOWANCE U.S. R.D.A.
PROTEIN 2 RIBOFLAVIN 4
VITAMIN A 10 NIACIN 0
VITAMIN C 10 CALCIUM 4
THIAMINE 2 IRON 8
NET WT. 16 OZ. 454 GRAMS


DelMarte
QUALITY
SPINACH
INGREDIENTS: SPINACH, WATER, SALT
NUTRITION INFORMATION- PER 1 CUP SERVING
CALORIES 45 CARBOHYDRATES 8G
PROTEIN 4G FAT 1G
PERCENTAGE OF RECOMMENDED DAILY
ALLOWANCE (U.S. RDA) PER 1 CUP SERVING
PROTEIN 6 NIACIN 4
VITAMIN A 220 CALCIUM 25
VITAMIN C 50 IRON 15
THIAMINE(VIT. B1) 2. PHOSPHORUS 6
RIBOFLAVIN(VIT. B2) 5 MAGNESIUM 20
CUPS: APPROX 2 NET WT. 15 OZ. 425 G

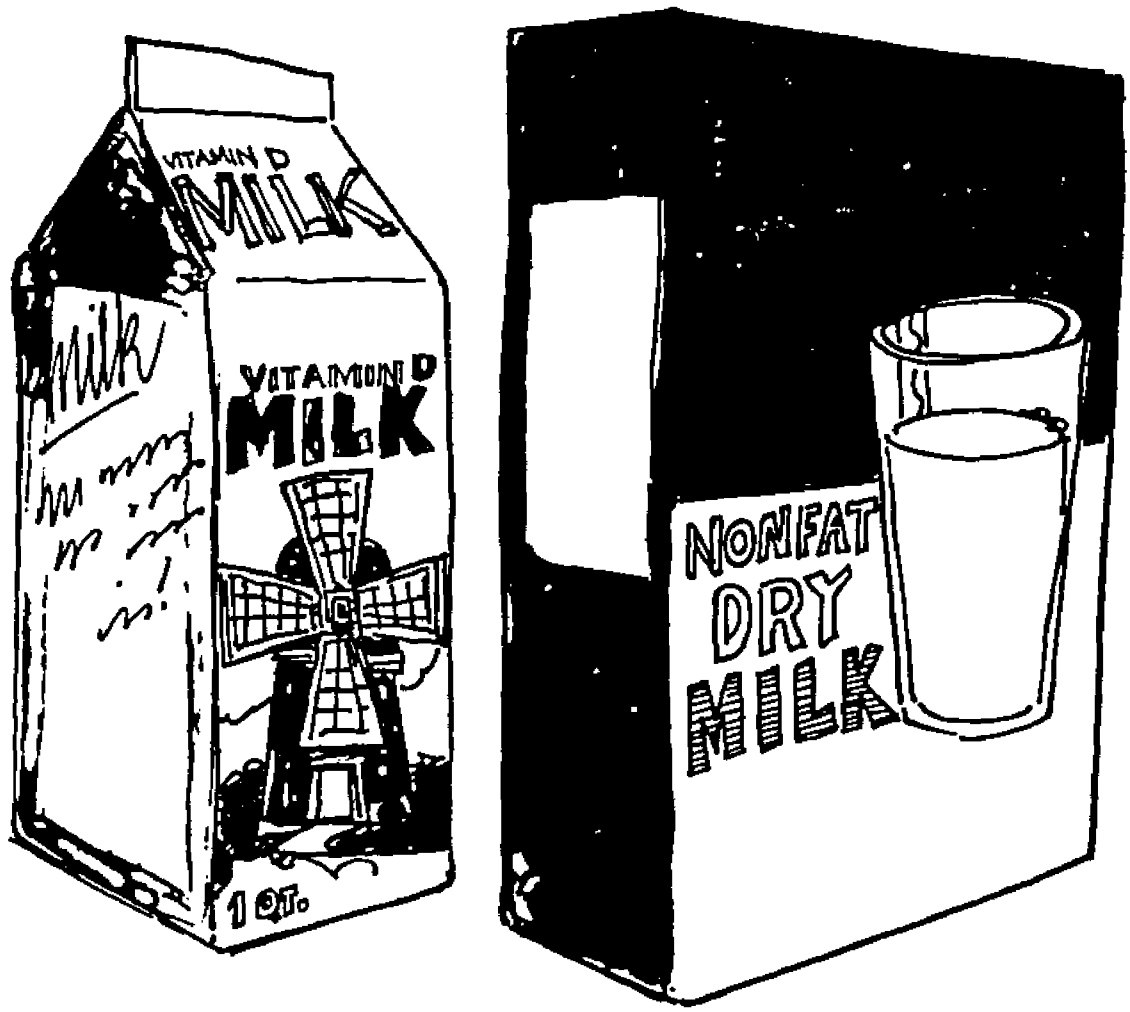

Valet
New Orleans
STYLE
INGREDIENTS: KIDNEY BEANS, SALT, WATER
ONION, GARLIC, NATURAL FLAVORING, SPICES
NUTRITIONAL INFORMATION
SERVING SIZE - 1 CUP
CALORIES - 220 CARBOHYDRATES 38G
PROTEIN - 18G FATS - 1G
PERCENTAGE OF U.S. RECOMMENDED
DAILY ALLOWANCE (U.S. RDA)
PROTEIN - 20 RIBOFLAVIN - 6
VITAMIN A - 0 NIACIN - 6
VITAMIN C - 0 CALCIUM - 6
THIAMIN (VIT. B1) - 15 IRON - 20
NET WT. 15 OZ.

Question 56

16oz.
3 CANS FOR $1.00

16 oz.
32¢ PER CAN

Question 57



FRESH WHOLE MILK
1QT. 49¢

INSTANT NON FAT
DRY MILK
PACKAGE MAKES 10 QUARTS
$2.99

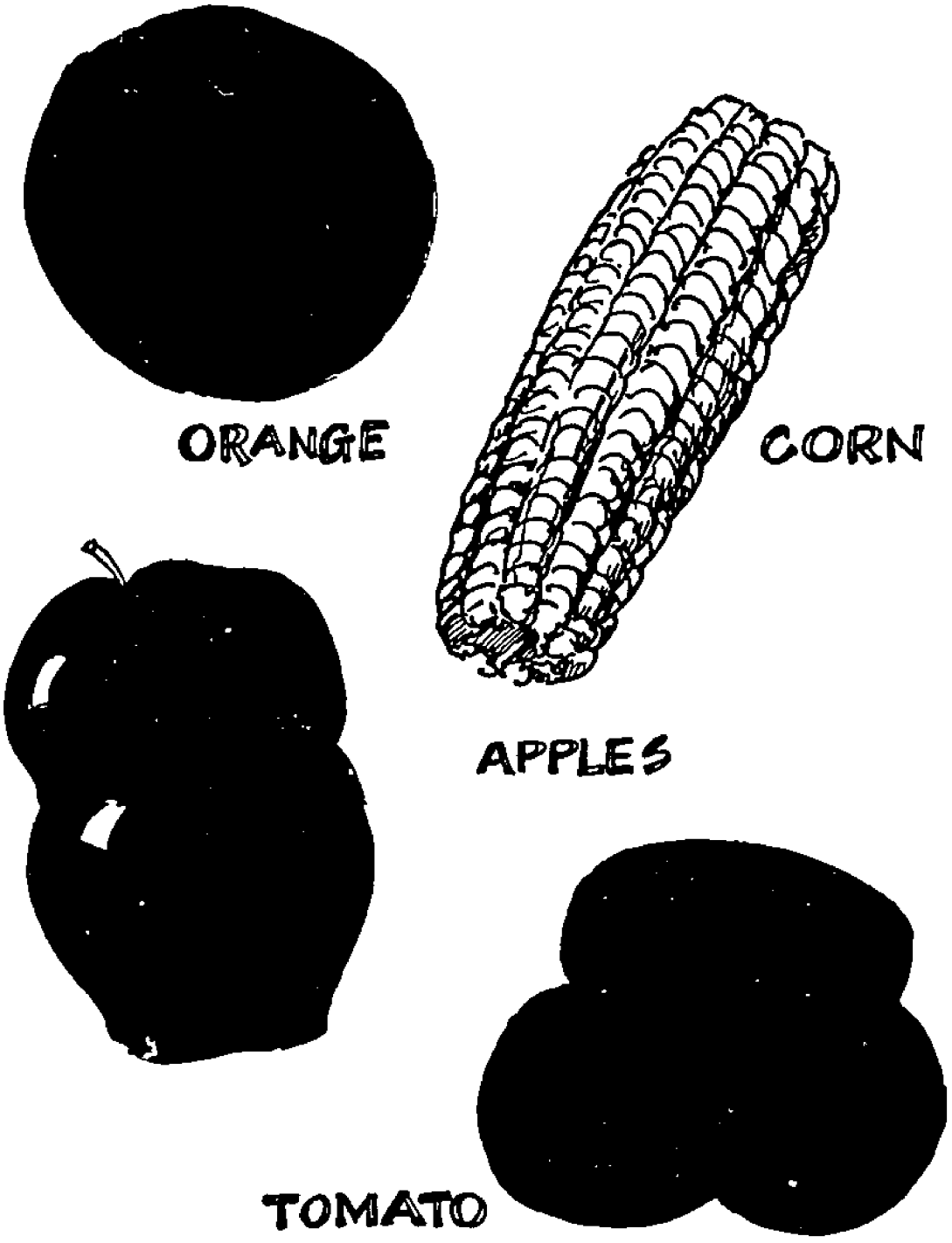
Question 58, and Question 59

75¢ 15 servings

Question 60

64¢ 32 servings

Question 61



Question 62, Question 63, Question 64, and Question 65


GROCERY SHOPPING
COOKING
WASHING DISHES
CLEANING THE KITCHEN
PUTTING AWAY LEFTOVERS
PLANNING MEALS
THROWING OUT THE TRASH

Question 68

Question 69

APPENDIX E

SCORING TABLE FOR 24-HOUR DIETARY FOOD RECALL

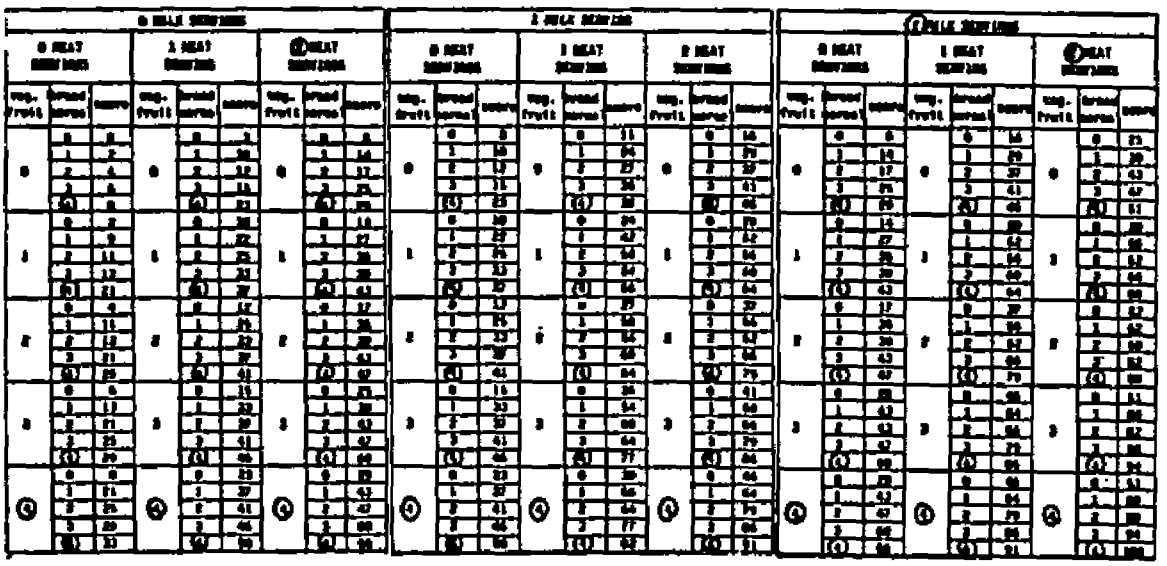
Question 70

SCORING TABLE FOR TWENTY-FOUR HOUR DIET

To find the Twenty-Four Hour Diet Score:

1. Select the appropriate table (below on the basis of the number of milk servings reported in Item 7, HOURLY RECORD-A (0, 1, 2 or more). Note: Circled numbers (1, 4) are the highest score possible in a food group. For number of servings larger than the circled number, use the circled number. Example, for 3 servings of milk, use the (1) milk servings table.
2. Select the proper column of the table on the basis of the number of meat servings reported in Item 8.
3. Select the proper area of the table on the basis of the number of vegetable/fruit servings reported in Item 9 (0, 1, 2, 3, (4) or more).
4. Find the proper line of the table on the basis of the number of bread/cereal servings reported in Item 10.

The number to the right of this (in type style "77") is the Twenty-Four Hour Diet Score. Enter the diet score at the appropriate "meals in progress" item on the homemaker's FOOD AND NUTRITION PROGRESSION RECORD.



0 MILK SERVINGS

0 MEAT SERVINGS			1 MEAT SERVINGS			(2) MEAT SERVINGS		
veg.-fruit	bread-cereal	score	veg.-fruit	bread-cereal	score	veg.-fruit	bread-cereal	score
0	0	4	0	0	7	0	0	8
	1	7		1	10		1	11
	2	8		2	12		2	13
	3	9		3	13		3	15
	(4)	9		(4)	13		(4)	15
1	0	5	1	0	8	1	0	9
	1	8		1	11		1	12
	2	11		2	13		2	14
	3	12		3	14		3	16
	(4)	12		(4)	14		(4)	16
2	0	6	2	0	9	2	0	10
	1	9		1	12		1	13
	2	12		2	14		2	15
	3	13		3	15		3	17
	(4)	13		(4)	15		(4)	17
3	0	7	3	0	10	3	0	11
	1	10		1	13		1	14
	2	13		2	15		2	16
	3	14		3	16		3	18
	(4)	14		(4)	16		(4)	18
(4)	0	8	(4)	0	11	(4)	0	12
	1	11		1	14		1	15
	2	14		2	16		2	17
	3	15		3	17		3	19
	(4)	15		(4)	17		(4)	19

1 MILK SERVING

0 MEAT SERVINGS			1 MEAT SERVINGS			2 MEAT SERVINGS		
veg.-fruit	bread-cereal	score	veg.-fruit	bread-cereal	score	veg.-fruit	bread-cereal	score
0	0	5	0	0	11	0	0	12
	1	8		1	14		1	15
	2	11		2	17		2	18
	3	12		3	18		3	20
	(4)	12		(4)	18		(4)	20
1	0	6	1	0	12	1	0	13
	1	9		1	15		1	16
	2	12		2	17		2	19
	3	13		3	19		3	21
	(4)	13		(4)	19		(4)	21
2	0	7	2	0	13	2	0	14
	1	10		1	16		1	17
	2	13		2	18		2	20
	3	14		3	20		3	22
	(4)	14		(4)	20		(4)	22
3	0	8	3	0	14	3	0	15
	1	11		1	17		1	18
	2	14		2	19		2	21
	3	15		3	21		3	23
	(4)	15		(4)	21		(4)	23
(4)	0	9	(4)	0	15	(4)	0	16
	1	12		1	18		1	19
	2	15		2	20		2	22
	3	16		3	22		3	24
	(4)	16		(4)	22		(4)	24

2 MILK SERVINGS

0 MEAT SERVINGS			1 MEAT SERVINGS			2 MEAT SERVINGS		
veg.-fruit	bread-cereal	score	veg.-fruit	bread-cereal	score	veg.-fruit	bread-cereal	score
0	0	6	0	0	13	0	0	14
	1	9		1	16		1	17
	2	12		2	18		2	20
	3	13		3	20		3	22
	(4)	13		(4)	20		(4)	22
1	0	7	1	0	14	1	0	15
	1	10		1	17		1	18
	2	13		2	19		2	21
	3	14		3	21		3	23
	(4)	14		(4)	21		(4)	23
2	0	8	2	0	15	2	0	16
	1	11		1	18		1	19
	2	14		2	20		2	22
	3	15		3	22		3	24
	(4)	15		(4)	22		(4)	24
3	0	9	3	0	16	3	0	17
	1	12		1	19		1	20
	2	15		2	21		2	23
	3	16		3	23		3	25
	(4)	16		(4)	23		(4)	25
(4)	0	10	(4)	0	17	(4)	0	18
	1	13		1	20		1	21
	2	16		2	22		2	24
	3	17		3	24		3	26
	(4)	17		(4)	24		(4)	26

(3) MILK SERVINGS

0 MEAT SERVINGS			1 MEAT SERVINGS			(2) MEAT SERVINGS		
veg.-fruit	bread-cereal	score	veg.-fruit	bread-cereal	score	veg.-fruit	bread-cereal	score
0	0	7	0	0	15	0	0	16
	1	10		1	18		1	19
	2	13		2	20		2	22
	3	14		3	22		3	24
	(4)	14		(4)	22		(4)	24
1	0	8	1	0	16	1	0	17
	1	11		1	19		1	20
	2	14		2	21		2	23
	3	15		3	23		3	25
	(4)	15		(4)	23		(4)	25
2	0	9	2	0	17	2	0	18
	1	12		1	20		1	21
	2	15		2	22		2	24
	3	16		3	24		3	26
	(4)	16		(4)	24		(4)	26
3	0	10	3	0	18	3	0	19
	1	13		1	21		1	22
	2	16		2	23		2	25
	3	17		3	25		3	27
	(4)	17		(4)	25		(4)	27
(4)	0	11	(4)	0	19	(4)	0	20
	1	14		1	22		1	23
	2	17		2	24		2	26
	3	18		3	26		3	28
	(4)	18		(4)	26		(4)	28

QUANTIFICATION OF THE 24-HOUR FOOD RECALL

The 24-hour food recall originated in the sphere of dietary research where the concern was with aggregate data for a community or subpopulation. Even in the research sphere, the validity of resultant data is the subject of much controversy. There is among experts, however, general agreement that the technique is the best cost-to-benefit tradeoff among available methods for measuring food intake in noninstitutional settings.

A 24-hour food recall procedure has been implemented in EFNEP since its inception and ways were explored to assimilate this information into the progression methodology to provide scores comparable to those achieved through application of the Food Behavior Checklist. That is, to arrive at a set of numerical scores ranging from 0 - 100 and descriptive of the reported diet.

The "objective" or target diet established for the program is:

2 servings of milk or milk products

2 servings of meat or meat substitutes

4 servings of fruits and vegetables

4 servings of breads and cereals

The number of possible dietary patterns which might be elicited within this framework is calculated by:

$$C = d_{mi} \times d_{me} \times d_{fv} \times d_{bc}$$

where: C is the number of combinations,

d_{mi} is the number of servings which discriminate quality of diet in terms of the milk category,

d_{me} is the number of servings which discriminate quality of diet in terms of the meat category,

d_{fv} is the number of servings which discriminate quality of diet in terms of the fruit and vegetable category, and

d_{bc} is the number of servings which discriminate quality of diet in terms of the bread and cereal category.

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[3]Jones, E.M., Munger, S.J., & Altman, J.W. A field guide for evaluation of nutrition education. Allison Park, Pa.: Synectics Corporation, 1975.

Within the milk and meat categories there are three discriminators (0, 1, 2); within the fruit/vegetable and bread/cereal categories there are a possible five discriminators (0, 1, 2, 3, 4). Thus, the number of possible combinations is calculated by:

$$C = 3 \times 3 \times 5 \times 5 = 225 \text{ combinations}$$

Derivation of Food Recall Scores

A quantification scheme which takes into account several nutrition-related factors was devised. The basic assumption is that any one food group, while it contributes in a unique way, has importance in the diet equal to that of any other food group. The factors entering into the scoring scheme and the method of quantification are described below.

Total Number of Servings of Food. Intake of food is essential to life. This factor is included in the quantification with incrementally weighted scores for the number of servings, irrespective of food categories. The weighed scores are:

- 1 to 4 servings = a weight of "1" (number of servings x 1)
- 5 to 8 servings = a weight of "2" (number of servings x 2)
- 9 to 12 servings = a weight of "3" (number of servings x 3)

Number of Food Groups Included. Variety of food in the diet is essential to good health. This factor is included in the quantification with incrementally weighted scores for the number of food groups, irrespective of number of servings. The weighted scores are:

- 1 food group = 0
- 2 food groups = 5
- 3 food groups = 15
- 4 food groups = 30

Percent of Target Diet Achieved. The target diet is: 2 servings in the milk group, 2 servings in the meat gorup, 4 servings in the fruit/vegetable group, and 4 servings in the bread/cereal group. By examining each food category separately for "percent of achievement of target" and combining across all four food groups, a composite "percent of achievement of the target" of "2-2-4-4-" is derived. This factor is included in the quantification by establishing incremental scores for composite percent of target diets, as follows:

25% = 1 point	175% = 10 points	325% = 23 points
50% = 2 points	200% = 12 points	350% = 26 points
75% = 3 points	225% = 14 points	375% = 29 points
100% = 4 points	250% = 16 points	400% = 32 points
125% = 6 points	275% = 18 points	
150% = 8 points	300% = 20 points	

Bonus Points. Since it is possible to have a rather high cumulative composite percentage on the preceding component score basis, but to be severely deficient in one of the food groups, two (2) bonus appoints are awarded when at least 50% of the required number of daily servings is achieved for each food group.

Figure 6 illustrates the derivation of each component score and the resultant diet score for two food recalls.

The quantification technique described above was applied to all possible diet patterns derivable, from 0-0-0-0 to 2-2-4-4. The result was 52 categories of diet patterns and of related scores ordered from 0 to 100. Table 2 presents the scores for each of the 225 possible dietary patterns.

Example A Food Recall = 0-0-2-1		Example B Food Recall = 2-2-3-4	
Score Component	wt'd score	Score Component	wt'd score
Number of Servings 0 + 0 + 2 + 1 = 3 3 x 1 weight = 3	3	Number of Servings 2 + 2 + 3 + 4 = 11 11 x 3 weight of 3 =	33
Number of Food Groups 0 + 0 + 1 + 1 = 2	5	Number of Food Groups 1 + 1 + 1 + 1 = 4	30
Percent of Target Diet (0 divided by 2) + (0 divided by 2) + (2 divided by 4) + (1 divided by 4) = 0% + 0% + 50% = 25% = 75%	3	Percent of Target Diet (2 divided by 2) + (2 divided by 2) + (3 divided by 4) + (4 divided by 4) = 100% + 100% = 75% = 100% = 375%	29
Bonus Only 1 of 4 categories at 50% or greater	0	Bonus 4 of 4 categories at 50% or greater	2
Composite Score Total	11	Composite Score Total	94

Figure 6. Examples of derivation of food recall scores.

Table 2
Summary of Scores for Twenty-four Hour Diet Patterns

(Based on 2-2-4-4 minimum number of daily serving requirements. Order is milk, meat, vegetables and fruit, bread and cereal.)

CATEGORY	SCORE	DIET PATTERNS	NO. OF DIET PATTERNS
A	0	0000	1
B	2	0001, 0010	2
C	3	0100, 1000	2
D	4	0002, 0020	2
E	6	0003, 0030, 0200, 2000	4
F	8	0004, 0040	2
G	9	0011	1
H	10	0101, 0110, 1001, 1010	4
I	11	0012, 0021, 1100	3
J	12	0102, 0120, 1002, 1020	4
K	13	0013, 0022, 0031	3
L	14	0201, 0210, 2001, 2010	4
M	15	0103, 0130, 1003, 1030	4
N	16	1200, 2100	2
O	17	0202, 0220, 2002, 2020	4
P	21	0014, 0023, 0032, 0041, 2200	5
Q	22	0111, 1011	2
R	23	0104, 0140, 1004, 1040	4
S	24	1101, 1110	2
T	25	0024, 0033, 0042, 0112, 0121, 0203, 0230, 1012, 1021, 2003, 2030	11
U	27	0211, 1102, 1120, 2011	4
V	29	0034, 0043, 0204, 0240, 1201, 1210, 2004, 2040, 2101, 2110	10
W	33	0044, 0113, 0122, 0131, 1013, 1022, 1031	7
X	35	0212, 0221, 1103, 1130, 2012, 2021	6
Y	37	0114, 0123, 0132, 0141, 1023, 1032, 1041, 1202, 1220, 2102, 2120	12
Z	39	0213, 0222, 0231, 1104, 1140, 2013, 2022, 2031, 2201, 2210	10
AA	41	0124, 0133, 0142, 1024, 1033, 1042, 1203, 1230, 2103, 2130	10
BB	42	1111	1
CC	43	0214, 0223, 0232, 0241, 2014, 2023, 2032, 2041, 2202, 2220	10
DD	45	0134, 0143, 1034, 1043, 1204, 1240, 2104, 2140	8
EE	47	0224, 0233, 0242, 2024, 2033, 2042, 2203, 2230	8
FF	50	1112, 1121	2
GG	51	2204, 2240	2
HH	52	1211, 2111	2
II	54	1113, 1131	2
JJ	56	1122, 1212, 1221, 2112, 2121	5
KK	58	0144, 1044, 1114, 1141, 2211	5
LL	60	0234, 0243, 1123, 1132, 1213, 2034, 2113, 2131	10
MM	62	1222, 2122, 2212, 2221	4
NN	64	1124, 1133, 1142, 1214, 1241, 2114, 2141	7

CATEGORY	SCORE	DIET PATTERNS	NO. OF DIET PATTERNS
OO	65	0244, 2044	2
PP	66	1223, 1232, 2123, 2132, 2213, 2231	6
QQ	68	2222	1
RR	77	1134, 1143	2
SS	79	1224, 1233, 1242, 2124, 2133, 2142	6
TT	80	2214, 2241	2
UU	82	1144, 2223, 2232	3
VV	85	1234, 1243, 2134, 2143	4
WW	88	2224, 2233, 2242	3
XX	91	1244, 2144	2
YY	94	2234, 2243	2
ZZ	100	2244	1
		Total	226

The Scoring Table for Food Recalls

Looking up a diet score is simplified by design of a scoring table directly related to the information the aide has in the existing program record. The food recall record gives the information in the following pattern:

	MILK	MEAT	FRUIT VEGETABLE	BREAD & CEREAL
Total Number of Servings				

The scoring table is shown in Figure 7.[4] Each food group, in the order in which it appears to the aide, sequentially reduces the area of search. The number of servings in the milk group tells her whether the score is in the right, left, or middle block of the scoring table. For example, if the food recall shows 1 milk servings the diet score is in the middle block of the scores. The number of servings in the second food group tells the aide whether the score is in the first, second, or third column of the larger block. For example, if the food recall shows 1 milk serving and 1 meat serving, the score is somewhere in the middle of the column of the middle block. The scoring table is further subdivided so that the number of servings of fruit/vegetable and bread/cereal sequentially delimit the area of search and identifies the correct score.