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presented by

Katherine Leigh Raphael

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BEHAVIOR CHANGE OF SELECTED DEMOGRAPHIC GROUPS OF MICHIGAN STATE UNIVERSITY EXTENSION'S FAMILY NUTRITION PROGRAM'S ADULT SERIES

By

Katherine Leigh Raphael

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ABSTRACT

BEHAVIOR CHANGE OF SELECTED DEMOGRAPHIC GROUPS OF MICHIGAN STATE UNIVERSITY EXTENSION'S FAMILY NUTRITION PROGRAM'S ADULT SERIES

by

Katherine Leigh Raphael

This study was conducted to note differences in behavior change among selected demographic groups of Michigan State University Extension Family Nutrition Program's Adult Series. Demographic groups of the study included gender, town size, ethnic background, age, and region.

The target population of the study included 2,064 participants who started and finished the Adult Series program between the dates of November 24, 1998 and November 25, 1999. The participants completed a pre and posttest designed to assess behavior change of nutrition education participants.

Findings indicate little difference between the behavior demonstrated by males and females. Those living in towns and cities of 10,000 to 50,000 exhibited higher levels of change than those of central cities and rural areas, who are more at risk for food insecurity. Asians and Hispanics demonstrated marked behavior change; however, African Americans demonstrated less success. Senior citizens and young participants aged 26 through 30 were more likely to change behavior than middle-aged participants were. Finally, most regions in Michigan demonstrated marked change with the exception of the East Central.

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This is dedicated to my parents, Dr. C. Nicholas and Joan Raphael; and to my sister Nicole.

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CHAPTER I

INTRODUCTION OF THE STUDY

Introduction

There is no doubt that poverty is a major global issue. For many citizens of developed countries, it may be surprising that poverty exists in their nations as well. According to the *1999 Kids Count Data Book* (Kids Count, 1999) the U.S. ranks last when compared to seventeen other selected developed countries in terms of percent of children living in poverty. (Table 1.1) It is very likely that people who are poor are also hungry.

Table 1.1. Percentage of Children Living in Poverty in 17 Selected Developed Nations

Country	Year	% Children Living in Poverty
USA	1991	22
Australia	1989	14
Canada	1991	14
Ireland	1987	12
Israel	1986	11
United Kingdom	1991	10
Italy	1991	10
Germany	1989	7
France	1984	7
Netherlands	1991	6
Norway	1991	5
Luxembourg	1985	4
Belgium	1992	4
Denmark	1992	3
Switzerland	1982	3
Sweden	1992	3
Finland	1991	3

Source: Kids Count Data Book 1999

Many private and government programs exist to help alleviate hunger throughout the world. In the United States the federal government funds the Food Stamp Program, which distributes stamps to low income families that may be

used to purchase food. The U.S. government also supports many programs with goals of alleviating hunger through nutrition education. This thesis deals with the Family Nutrition Program (FNP) of Michigan State University's Cooperative Extension Service (MSUE), specifically the Adult Series Program of FNP. The goal of this state program is to educate participants so that they may feed themselves and their families as "economically, as safely, and as healthfully as possible" (Coleman, Haas and Himebauch, 1997).

FNP in Michigan provides programming through nutrition education to food stamp eligible participants in the areas of nutrition, food selection for nutrient density, food safety, and food budgeting and family resource management. The Family Nutrition Program in Michigan was "designed to assist low-income families to increase the adequacy of their daily diets through increased knowledge and skills" (Coleman, Haas and Himebauch, 1997). The planned activities used by FNP programs were developed with the goal of increasing the likelihood of healthy food choices by all food stamp recipients while being economically feasible for low-income audiences. Participants are encouraged to base their diets and nutrition habits on the most recent dietary advice as described in the Dietary Guidelines for Americans and the Food Guide Pyramid (Coleman, Haas and Himebauch, 1997).

The FNP program is maintained in all of the 83 counties in Michigan and serves about 5,000 people annually (Appendix A: County Map of Michigan). It is funded by Food Stamp Dollars sanctioned by the U.S. Department of Agriculture's Food and Nutrition Service (FNS) and passed through the Family

Independence Agency (FIA). The federal funding is matched by funds from Michigan State University Extension and is also matched at the local level in-kind by the counties (MSUE FNP, 2000).

There are five key elements identified by a national panel of experts selected by the Food and Nutrition Service (FNS), which form the fundamental content of the FNP curriculum. In Michigan, those key elements include:

- Dietary Quality
- Food Resource Management and Shopping Behavior
- Food Safety
- Food Security
- Systems Change

These key elements form the base of the FNP curriculum taught to both adults and children.

The Michigan Family Nutrition Program uses curriculum entitled *"Eating Right is Basic (Third Edition)"* (MSUE, 1995), which was developed by MSUE. This curriculum covers the five key elements identified by the U.S. Department of Agriculture's Food and Nutrition Service. Programming relates specifically to basic nutrition, shopping behavior, using food labels, food safety, food security, and food preparation.

The Learning Tool

In 1995, the need for evaluation of FNP programs was addressed by the FNP administration. FNP administrators came together and identified the goals for evaluation. These included an assessment of the effectiveness of the *Eating*

Right is Basic (MSUE, 1995) curriculum, an assessment of the FNP participant satisfaction, and an assessment of the delivery method of the lessons and educational process of the program. In order to meet the needs of evaluation, an instrument entitled *The Learning Tool* was developed. This instrument is used to collect information about participant behavior before and after participation in the program in order to diagnose curriculum needs and assess behavior change (Coleman, Haas and Himebauch, 1997).

The Learning Tool survey consists of 40 questions, each of which corresponds to five different key elements. (Appendix B: The Learning Tool Survey) The format is a pre- and post evaluation with a Likert scale ranging from 0 as "never", 1 as "hardly ever", 2 as "sometimes", 3 as "most of the time" and 4 as "always". The actual tool was designed so people who may have difficulty reading can use it with ease. From November 24th, 1998 through November 24th, 1999, MSUE nutrition instructors collected and tabulated the results in their assigned counties. They reported these data to the FNP administration on a quarterly basis using a computer database program. (Appendix B: UCHRIS Approval of Data Collection)

Nature of the Problem

There has been no formal study, which utilizes The Learning Tool data in terms of the different demographic groups represented in the FNP Adult Series audience. Thus, data collected from participants have not yet been implemented for the benefit of the Family Nutrition Program alone where conclusions could be used to change or modify the program or curriculum according to findings.

Furthermore, the Learning Tool has not been used to provide administration with analysis based on regional and demographic differences among participants.

Need for the Study

The study is needed in order to evaluate program effectiveness among certain demographic groups of the FNP Adult Series audience. Also, by implementing this study, the quantitative instrument may in time be altered and in the future provide an improved image of program effectiveness.

Purpose of the Study

The purpose of the study is to note differences in behavior change among selected demographic groups represented in the Family Nutrition Program's Adult Series. The results of the study are intended for decision-makers in the FNP administration.

Research Questions

Five research questions were designed to evaluate program success according to different demographic groups. The questions are the following:

1. To what extent does gender have an effect on behavior change of Michigan FNP Adult Series participants in terms of the five key elements?

2. To what extent does town size have an effect on behavior change of Michigan FNP Adult Series participants in terms of the five key elements?

3. To what extent does ethnic background have an effect on behavior change of Michigan FNP Adult Series participants in terms of the five key elements?

4. To what extent does age have an effect on behavior change of Michigan FNP Adult Series participants in terms of the five key elements?

5. To what extent does region have an effect on behavior change of Michigan FNP Adult Series participants in terms of the five key elements?

Definitions of Terms

The investigator will use the following definitions within the context of this study:

Adult Series: A nutrition education program provided by the Family Nutrition Program of Michigan, which is intended to educate adults aged 18 and over who are eligible to receive food stamps although in some cases people under the age of 18 may participate.

Dietary Quality: Applies to the nutritional value of food acquired, and how well the overall diet of the food stamp participant's compares to recommended guidelines such as the Food Guide Pyramid and Dietary Guidelines for Americans" (USDA, 1999).

Ethnic Background: The anthropological origin as identified by an Adult Series participant. These include white, African American, Native American/Alaskan, Hispanic and Asian/Pacific Islander.

Family Nutrition Program (FNP): A nutrition education program of Michigan State University Cooperative Extension Service, which is for residents who are food stamp eligible.

Food Safety: "Applies to how food is handled. Specifically it deals with issues such as hand-washing, length of time food is left without refrigeration, the temperature at which food is stored, and whether food is properly cooked or not" (USDA, 2000).

Food Security: "Applies to the general well-being of a food stamp recipient and their family in terms of always having enough to eat without having to seek emergency assistance such as food banks to tide then over through the end of the month" (USDA, 2000).

Nutrition Education: "Any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition related behaviors conducive to health and well-being" (USDA, 1999).

Planned Series: Educational sessions with an individual or group with a planned beginning and end consisting of a minimum of four pre-determined lessons.

Region: Region of residence as identified by FNP Adult Series participants, these include Upper Peninsula, and in the Lower Peninsula North, East Central, West Central, Southeast and Southwest. (Appendix A: Regional Map of Michigan)

Shopping Behavior/Food Resource Management: Applies to the practices related to thrifty shopping for nutritious foods. These include practices related to how and where food is acquired, how often food is purchased, and the types of food purchased. This includes such skills as making shopping lists, reading labels for nutritional values and menu planning" (USDA, 2000).

System and Environmental Change: "Applies to changes in the system or the environment that can enable or facilitate the availability of nutritious diets to FSP participants" (USDA, 2000).

Town Size: Area of residence as identified by FNP Adult Series participants, these include farm, towns under 10,000 persons and rural non-farm, towns and

cities 10,000 to 50,000 persons, suburbs of cities over 50,000 persons, and central cities over 50,000 persons.

Abbreviations

The investigator will use the following abbreviations within the context of this study:

FNP: Family Nutrition Program

FSP: Food Stamp Program

MSUE: Michigan State University Cooperative Extension Service

TFP: Thrifty Food Plan

WIC: Woman, Infants and Children Program

Limitations of the Study

Participants completed the Learning Tool while being directed by county nutrition instructors; hence there is some concern over how this affects scores. The Learning Tool is not an anonymous paper survey distributed through the mail, but rather it is an interactive survey that is completed with the questions being read aloud to the participant by the nutrition instructor. The participant is given a stack of cards with each Learning Tool question written on it along with a picture depicting the behavior referred to in the question (for example, eating green vegetables or washing hands with soap and warm water). The participant holds The Learning Tool as the instructor reads a statement. The participant then slides the card into a slot on The Learning Tool that has one of the five Likert scale measurements on it.

The cards are required to be placed into the slot with the participant's corresponding answer, however this may cause a limitation to the study due to a lack of anonymity. Some instructors may possibly see the answers as the participant responds where others may not; this simply depends on the preference of both parties as well as the setting where the completing The Learning Tool survey takes place. Because of the nature of FNP reporting, the researcher did not collect FNP Learning Tool data during a site visit. Instead it was inputted by the county nutrition instructor into a computer program developed by FNP and sent to the MSUE office for analysis. Finally, some participants are mandated by the court system to participate in the FNP program, which may have an effect on the attitude of the participant towards learning. Information about which participants attend the program by court mandates was not made available.

Assumptions of Procedure and Data Collection

Data collection is a job requirement of FNP nutrition instructors; thus it is assumed that the response rate is 100 percent. The researcher assumes that the data were collected over 12 months between the dates of November 24, 1998 through November 24, 1999. They were obtained within any of the 83 Michigan counties that participated in the FNP Adult Series program during the designated time. Learning Tool data were collected for all 2,064 participants of the FNP Adult Series program using the Learning Tool instrument at the onset and directly after planned Adult Series programming. The data were then collected and input into a computer exactly as it appears in the Learning Tool survey and were submitted to the FNP administration accordingly.

CHAPTER II

REVIEW OF THE LITERATURE

The Literature Review of this thesis is divided into 8 sections. The first examines poverty and hunger in Michigan, the second discusses food stamp programs and food security, and the third discusses nutrition education and the Family Nutrition Program. The remaining four parts discuss different demographic variables and their relation to nutrition. They are gender, town size, ethnic background, and age.

Poverty and Hunger in the State of Michigan

It has been estimated that the 1999 population of Michigan is totaled 9,863,775 persons. This represents 3.26 percent of the total U.S. population, which is estimated at 272,690,813. As noted in Table 2.1, whites make up 83.5 percent of the state population followed by African Americans (14.3 percent) and Hispanics (2.79 percent) (2001 U.S. Census Bureau).

Table 2.1. Estimated Michigan Population Characteristics

Total population (1999*)	9,863,775
Male (1998*)	4,776,586
Female (1998*)	5,040,656
Population under 18 years of age (1998*)	26% (about 2.5 million)
Population 65 or older(1998*)	12.5%
White (1998*)	83.5%
Black (1998*)	14.3%
Asian/Pacific Islander (1998*)	1.6%
Native American (1998*)	0.6%
Hispanic (1998*)	2.7%
White non-Hispanic (1998*)	81.1%

*(Estimated year)
Source: U.S. Census Bureau http://quickfacts.census.gov/qfd/states

Michigan residents below the poverty level have been estimated to represent 12.6 percent (estimated in 1995) of the total Michigan population.

Furthermore, Michigan children living below the poverty level in 1995 totaled 20.1 percent of the state's population. That is, one in five children were poor.

The *Scope of Hunger in Michigan* brochure published by the Food Bank Council of Michigan in 1999 determined that 31 percent of emergency food clients are children under the age of 18 and 50 percent are adults ages ranging from 18 to 64 (Food Bank Council of Michigan, 1999). In 1999 the official government measure of poverty thresholds was an annual income of $13,880 for a family of 3. (Table 2.2) According to the Kids Count Data Book (Kids Count, 1999), public opinion and many researchers suggest that such a figure is unrealistically low. Moreover, figures presented in the Food Bank Council of Michigan's *Improving Michigan's Statewide Response to Hunger* reveal that a large percentage of household residents in Michigan live in a state below the federal measure of poverty are apt to miss meals (Food Bank Council of Michigan, 1998).

Table 2.2. Official Poverty Thresholds of 1998

Size of Family Unit	48 Contiguous States and D.C.	Alaska	Hawaii
1	$8,240	$10,320	$9,490
2	$11,060	$13,840	$12,730
3	$13,880	$17,360	$15,970
4	$16,700	$20,880	$19,210
5	$19,520	$24,400	$22,450
6	$22,340	$27,920	$25,690
7	$25,160	$31,440	$28,930
8	$27,980	$34,960	$32,170
For each additional person, add	$2,820	$3,520	$3,240

Source: U.S. Department of Health and Human Service

Food Stamp Programs and Food Security:

The effects of food insecurity and hunger have been proven to be associated with many negative health risks such as impaired growth and cognitive development in children. Food insecurity is defined as a circumstance where the availability of nutritionally adequate and safe foods and the ability to acquire personally acceptable foods in socially acceptable ways are limited or uncertain. Hunger is defined as "the uneasy or painful sensation caused by a lack of food". Hunger may be experienced at the level of individual family members within families that are experiencing food insecurity (Alaimo, Briefel, Frongillo and Olson, 1998). U.S. citizens living in hunger and experiencing food insecurity was first brought to the public attention in the 1960's.

When John F. Kennedy visited Appalachia in 1960 and returned with a graven portrayal of the existing rural poverty it became clear to the American public that not all U.S. citizens enjoyed the consequences of the economic growth that had flourished after World War II. These images shocked the American public and served as a catalyst to the "War on Poverty" commissioned by Linden B. Johnson in January of 1964 (Shaw 2000).

By the 1970's the U.S. House Select Committee attempted to assure food security as a major policy goal to prevent the negative effects of malnutrition and hunger among U.S. citizens. The institution of the *Food Stamp Act* of 1977 was the result of these efforts and is now the federal government's flagship program to fight and prevent food insecurity (Campdell, Morris and Neuhauser, 1992). The

goals of this program are to "alleviate hunger, improve the level of nutrition among low-income individuals and households, and to strengthen the agriculture economy through normal channels of trade" (Skolnick, 1995). In 1993, the program served 27.3 million Americans and provided low-income households with $22 billion for food (Skolnick, 1995). Although the program provides stamps that can be used to purchase food items, there is criticism that benefit allotments are not enough to purchase a nutritious diet (Campdell, Morris and Neuhauser, 1992). Much of this criticism stems from government's use of the Thrifty Food Plan.

The "Thrifty Food Plan" (TFP) is a rigidly set basic diet that is considered nutritionally adequate at lowest cost as defined by the USDA. It is described by Bradbard, Michaels, Fleming and Campbell, (1997) as a "low-cost food plan designed to provide a nutritionally adequate diet for most households, while conforming as much as possible to the usual diets of low-income households" (Bradbard, Michaels, Fleming and Campbell, 1997). This set of standards for cost and nutrition is used to define the cost, type and amount of food that is needed to meet minimum nutrition standards for males and females of a variety of ages. This plan of the USDA has been found to supply less than the recommended daily allowance for certain nutrients. Also, the amount of food stamps a person receives is adjusted annually according to consumer price indices that are based on consumer shopping means in large supermarkets in major urban areas and not on low income spending averages (Campdell, Morris and Neuhauser, 1992). According to Alaimo, Briefel, Frongillo and Olson (1998), clients who receive

food stamps often run out before the end of the month (i.e. before they receive a new monthly allotment). These conditions are aggravated by the fact that many families wait until they experience severe economic hardships before they apply for food stamps (Alaimo, Briefel, Frongillo and Olson, 1998).

According to Skolnick (1995), the level of poverty food stamp participants endure is extreme as 92 percent of food stamp households have gross incomes that are at or below the poverty line (in this case $14,808 for a family of four). Furthermore, 42 percent of food stamp recipients and their families have incomes below half of the poverty line. "For these families, every dollar makes a difference in food expenditures and in their total budgets", says Robert J. Fersh, President of the Food Research and Action Center, "sometimes we forget how poor food stamp shoppers are." According to Fersh, the Food Stamp Program provides 76 cents per person per meal in food stamps and the result is that families run out of food and must either skip meals or severely cut portions and food choices to remain in their allocated monthly stamp quota (Skolnick, 1995).

Although the Food Stamp Program is not the ultimate solution to hunger alleviation and ending food insecurity, it is proven to have success in increasing nutrient intakes. For example, research reveals that people who receive food stamps are nutritionally better off than if they did not receive assistance. Experimental studies consistently demonstrate that food stamps do increase total food spending of recipient households further than what cash assistance would accomplish. Also, a study conducted by Rose, Habicht and Devarey (1997) shows that intakes of iron, vitamin A, thiamin, niacin and zinc were significantly

related to the amount of food stamp benefits, extending from 0.16 to 0.48 recommended daily allowance (RDA) percentage points per capita dollar of benefit. In the same study, negative nutritional effects such as the intakes of energy, fat, saturated fat and cholesterol were shown not significantly related to receiving food stamps. Other results of the study included average increases of 12.3 RDA percentage points of iron and 9.2 RDA percentage points of zinc for preschooler diets (Rose, Habicht and Devarey, 1997). The correlation of poverty and hunger and malnutrition is well known, but thanks to several food and nutrition programs including food stamps, most of the poor families are less hungry than 30 years ago (Kinsey, 1994).

Nutrition Education and the Family Nutrition Program

A definition of nutrition education is "any set of learning experiences designed to facilitate the voluntary adoption of eating and other nutrition related behaviors conducive to health and well-being"(USDA, 1999). Many experts feel that complimenting the Food Stamp Program with nutrition education helps ensure increased nutrition in participant's diets. Studies conducted by the American Dietetic Association and the Women, Infants and Children (WIC) program have also revealed just as importantly the economic benefits of nutrition education services. The Michigan State University Extension (MSUE) Family Nutrition Program (FNP) strives to advance the USDA's commitment to alleviate hunger in Michigan. FNP in Michigan provides direct programming for food-stamp eligible participants in the areas of nutrition, food selection for nutrient

density, food safety and sanitation, and food budgeting and family resource management (Coleman, Haas and Himebauch, 1997).

FNP is a nutrition education program that has been educating food-stamp participants since it's inception in Wisconsin in 1986. Presently the program functions in 21 states with an estimated federal budget of 23 million dollars (Joy and Doisy, 1996). Joy and Doisy (1996) refer to the FSNEP/FNP as a model example of successful interagency cooperation between the Cooperative Extension Service, the Food Stamp Agency and the USDA. The goal and purpose of FSNEP is to improve the dietary intake of food stamp recipients through nutrition education activities that increase self-sufficiency (Joy and Doisy, 1996).

Parke, Wilde and McNamara (1999) provide an example of the importance of nutrition education to the success of food stamp recipients improving nutrition. In an investigation the researchers contrasted participants in two programs, the Food Stamp Program and the Women, Infants and Children (WIC) program. The researchers noted that a significant effect of the WIC program is decreased intake of added sugars but they found no effect in intake of total fats. They found that the Food Stamp Program contributes significantly to the intake of meats, added sugars and total fats, but not to the intake of fruits. The researchers associate positive effects of WIC with the educational component of the program. The purpose of the Food Stamp Program is to provide resources for food purchases, however it does maintain a small nutrition education element. Alternatively, the Women, Infants and Children (WIC) program is geared to supplement diets of

infants, children and pregnant and postpartum women, and includes a more significant nutrition education component. Parke, Wilde and McNamara (1999) note that a better strategy for reducing malnutrition than increasing income is to provide nutrition education. Specifically, to educate clients on the "dietary value of alternate food sources (including specific combinations of food) and on methods of preparing foods,"(Parke, Wilde and McNamara (1999). This research suggests that even a basic knowledge of nutrition is complimentary to nutrition programs by significantly increasing potential for better nutrition habits.

Gender:

As noted in Table 2.1, the female population in Michigan exceeds the male population (5.0 million to 4.7 million, respectively). An advance report by the USDA for the fiscal year of 1998 described the food stamp recipient population as half (53 percent) children, eight percent were adults aged 60 and over, working-age men represented 11 percent and working-age women represented 28 percent (Castner and Anderson, 1999). (Table 2.3)

Table 2.3. The Food Stamp Recipient Population: 1985 through 1986

Food Stamp Recipients	% of the Food stamp recipient population
Children	53
Adults aged 60 and above	8
Working –aged women	28
Working aged men	11

Source: (Castner and Anderson, 1999)

Single women generally are more economically less independent and if mothers, frequently bear the responsibility of child rearing. Numerous studies

find that women who are single mothers are more likely to experience food insecurity than those who are not. Alaimo, Briefel, Frongillo and Olson (1998) suggest that in "total population" the majority of food insufficient people lived in married-couple families or with families (44.2 percent). Alternatively, 31.5 percent of food insufficient people lived in families headed by a single female with children (Alaimo, Briefel, Frongillo and Olson, 1998). Still, Kinsey (1994) says that in 1986 a larger percentage of women and children in poverty received less than 70 percent of the recommended daily allowances of many nutrients than those whose incomes were above the poverty line. At the same time, women in poverty were much more likely to be obese than those of higher incomes (From Kinsey, 1994: Senaver, Asp and Kinsey, 1991). Analysis by Alaimo, Briefel, Frongillo and Olson (1998) reports results from research done in 1985 and 1986 showing that low-income women with children reported food insufficient had lower mean food and nutrient intakes than women in food sufficient families (Alaimo, Briefel, Frongillo and Olson, 1998).

Town Size:

The major differences in nutrient intakes between town sizes in this literature review were found between urban and rural residents. Both geographical areas had positive attributes as well as drawbacks in terms of nutrient availability and intakes.

Campdell, Morris and Neuhauser (1992) argue that food security in rural America is particularly important where economic hardship exacerbates risk for hunger. They claim that rural poverty has increased more than 25 percent

between 1978 and 1992 and a number of surveys show hunger problems are impacted by relative isolation and lack of emergency food services in rural areas. According to Campdell, Morris and Neuhauser (1992), more than 9.1 million U.S. citizens have incomes below the poverty line. In 1987 the poverty rate in rural America was 16.9 percent. Alternatively, the poverty rate in metropolitan areas was 12.9 percent (Campdell, Morris and Neuhauser, 1992).

According to 1992 research, consumption of certain nutrients was found less adequate in rural areas as compared with urban areas. One-half of rural Americans have intakes of vitamin A, vitamin C, calcium, and iron below two-thirds of the recommended daily allowance. Rural, low-income women have lower intakes of vitamins A and C than urban, low-income women do. The rural poor are 125 percent more likely than the non-rural poor to have low hemoglobin levels and 80 percent are more likely than non-poor nationwide. In the poorest rural counties of the U.S., rates of infant mortality and low birth weight babies are significantly higher than for the nation as a whole (Campdell, Morris, and Neuhauser, 1992).

Substantial evidence indicates that the rural poor have limited access to supermarkets and largely depend on small, independent "mom and pop" type stores. Studies have revealed that food prices are much higher at mom and pop stores than in larger supermarkets, and these small independent stores commonly offer food of inferior quality and less choice (Campdell, Morris, and Neuhauser, 1992). As far as access to the larger supermarkets, the rural poor have fewer store options and have to travel further than the urban poor to reach supermarkets. The

low-income residents of urban areas have access to eight times more supermarkets per county and ten times more per mile squared than the rural poor. In 1988, an average of 3.8 supermarkets per county existed in rural America, or 1 every 265 square miles. Urban counties averaged 29 supermarkets per county or one every 27 square miles. Selection of foodstuffs and competitive pricing also favored low-income persons in urban settings. In terms of Thrifty Food Plan (TFP) Market basket costs, the mean was $102.00 in smaller markets while larger supermarkets averaged $81.00. At this time the UDSA's average TFP cost was $75.00 but it was three percent higher in supermarkets and eight percent higher in smaller sized stores (Campdell, Morris, and Neuhauser, 1992).

In terms of food availability, supermarkets offer a greater diversity of food stuffs such as fresh fruits, vegetables and meats. In contrast, fresh foods tend to be limited in smaller sized stores. According to findings by Campdell, Morris and Neuhauser (1992), 23 percent of small stores did not offer fresh vegetables and 35 percent only stocked between one and four different types. One in three smaller sized markets stocked fresh fruits and 43 percent stocked between one and four types of fruits (Campdell, Morris and Neuhauser, 1992).

There is evidence that the level of urbanization affects intake of several nutrients. Children who live in non-metropolitan areas were found to have the highest intakes of calories, total fat, saturated fat, cholesterol and sodium. Children who had the lowest intakes of these compounds live in central cities (1994, Public Health Reports). Many factors could have an effect on the way a child eats. For example, diets, and influences on diets, have been shown to vary

by socio-economic status, ethnicity, and urban-rural status. This concept is illustrated by children who live in urban areas who generally don't have access to a garden as a source of fresh vegetables and/or fruits. Still, the children who reside in rural areas do not have access to a supply of fresh fruits and vegetables in the smaller grocery stores that are generally nearest to their homes (Kirby, Baranowski, Reynolds, Taylor and Binkley, 1995).

Ethnic Background:

According to Public Health Reports of 1994 ethnic background is indeed related to nutrient consumption. Children of African American descent were found to have the largest intake of total fat, saturated fat, cholesterol and sodium (Public Health Reports, 1994). A study conducted by Alaimo, Briefel, Frongillo and Olson (1998), found that food insufficiency strikes 15.2 percent of Mexican Americans, more than any other race in the U.S. Non-Hispanic African Americans were found to have the second highest population experiencing food insufficiency (7.7 percent of the total population). Food insufficiency was found lowest among non-Hispanic whites (2.5 percent). Approximately a quarter of low-income Mexican Americans (24.8 percent) have reported that they experience food insufficiency. Some 13.5 percent of low-income non-Hispanic African Americans have reported that they are food insufficient. 11.8 percent of low-income non-Hispanic whites reported that they and their families were food insufficient (Alaimo, Briefel, Frongillo and Olson, 1998).

Finally, results from the Third National Health and Nutrition Examination Survey reveal that the energy intake from fat was higher for non-Hispanic,

African American and Mexican-American WIC participants than for non-participants of the same ethnic groups (Rose, Habicht and Devarey, 1997).

Age:

According to Kinsey (1994), the group of people most likely to be impoverished is children. (Table 2.4) This includes over 18 percent of all children in the U.S. When dissected, the data indicate that this group includes over 45 percent of black and Hispanic children, about half of the single mothers and their families, the homeless and about one-fifth of the unemployed.

Alaimo, Briefel, Frongillo and Olson (1998) state that, "at any one time between 1988 and 1994: Approximately 2.4 to 3.2 million children below the age of 12 lived in food insecure families. An additional 0.7 to 1.3 million teens (12 to 16 years) lived in food insufficient families. Between 1992 and 1994 four million low-income children below the age of 12 went hungry" (Alaimo, Briefel, Frongillo and Olson, 1998). In addition, 6.8 percent of children (two months through five years of age) live in families reporting food insufficiency while 1.7 percent were age 60 or above (Alaimo, Briefel, Frongillo and Olson, 1998).

A positive change is that there does exist evidence suggesting that poverty among elderly persons is declining (From Kinsey, 1994: Senaver, Asp and Kinsey, 1991). Olson *et al.* (Alaimo, Briefel, Frongillo and Olson, 1998) have found that the elderly tend to be more hesitant to state that they do not have enough to eat. Thus, it is possible that a number of studies may have underestimated the number of adults aged 60 and above who experienced food insufficiency (Alaimo, Briefel, Frongillo and Olson, 1998).

Conclusion

The information discussed in this literature review presents the definitions of hunger, poverty and food insufficiency. The population characteristics of the state of Michigan are observed as well as the history and development of the Food Stamp Program and complimentary nutrition education programs. A view of the specific circumstances of the different demographic variables that were observed in this study was also presented. These subjects are intended to provide a background into the overall state of Michigan State University Extension's Family Nutrition Program and the participants it serves.

CHAPTER III

METHODOLOGY

Introduction

This chapter examines the methodology used in evaluating the behavior change of different demographic groups of Adult Series participants of the Family Nutrition Program in Michigan. Items discussed include the study design, the variables, validity, reliability and the target population of the study. The chapter also discusses the method of instrument development, data collection and data analysis of the study.

Design of the Study

This study uses the pretest and posttest design as described by Campbell and Stanley (1966). The design exists as follows:

O1 X O2

Variables

For each research question, independent variables and dependent variables were defined. The research questions of this study and the independent and dependent variables were:

1) To what extent does gender have an effect on the behavior change of Michigan FNP Adult Series participants in terms of the five key elements? The independent variables are male and female. The dependent variable is the measure of behavior change in FNP Adult Series participants in terms of the five key elements.

2) To what extent does town size have an effect on the behavior change of Michigan FNP Adult Series participants in terms of the five key elements?

The independent variables are farms, towns under 10,000 and rural non farm areas, towns and cities 10,000 to 50,000, suburbs of cities over 50,000, and central cites over 50,000. The dependent variable is the measure of behavior change in FNP Adult Series participants in terms of the five key elements.

3) To what extent does ethnic background have an effect on the behavior change of Michigan FNP Adult Series participants in terms of the five key elements?

The independent variables are white, African American, Hispanic, Native American/Alaskan, and Asian/Pacific Islander. The dependent variable is the measure of behavior change in FNP Adult Series participants in terms of the five key elements.

4) To what extent does age have an effect on the behavior change of Michigan FNP Adult Series participants in terms of the five key elements?

The independent variables are participants aged 0 to 17, 18 to 25, 26 to 30, 31 to 35, 36 to 40, 41 to 45, 46 to 50, 51 to 55, 56 to 60, 61 to 65 and those aged 66 and above. The dependent variable is the measure of behavior change in FNP Adult Series participants in terms of the five key elements.

5) To what extent does region have an effect on the behavior change of Michigan FNP Adult Series participants in terms of the five key elements?

The independent variables are Upper Peninsula, North, East Central, West Central, Southeast and Southwest regions of Michigan. (Appendix A: Regional

Map of Michigan) The dependent variable is the measure of behavior change in FNP Adult Series participants in terms of the five key elements.

The Program

The FNP Adult Series program consists of at least four planned nutrition education lessons. Nutrition instructors must be high school graduates who are then trained by FNP staff in the content of the *Eating Right Is Basic (3rd Edition)* (MSUE, 1995) curriculum and delivery. Nutrition instructors work with participants in a variety of settings. Often they visit the participant in the home for individual lessons, or they may teach a group of participants in a church social hall or even the county extension office. One county uses a converted mobile home as a "traveling kitchen" to visit communities.

In a planned Adult Series program, the first step is to complete the pretest with the Learning Tool. The Learning Tool is designed to be orated by the nutrition instructor as the participant follows along and slides the cards pertaining to a specific behavior (ex. washing hands, thawing meat in the refrigerator, etc) in the slots that they feel correspond to their behavior (ex. always, never sometimes, etc.). Some nutrition instructors may make photocopies of a paper version of the Learning Tool where the participant actually reads the survey and marks the appropriate number in a slot next to the question. In this case, the nutrition instructor may or may not read the questions aloud.

The Learning Tool pretest serves nutrition instructors both as an icebreaker as well as a diagnostic tool. After completion of the pretest, the data is carried back to the office and input into a computer either by the instructor or by

support staff. Since the curriculum is based on the 5 key elements, the data collected from the pretest tells nutrition instructors which areas the participant excels in and which areas need improvement. The nutrition instructor bases the rest of the Adult Series instruction upon these results. Treatment consists of demonstrations, question and answer sessions and other creative teaching methods the nutrition instructors feel are appropriate to the individual participant's needs.

At the end of the Adult Series (after at least four planned lessons), the participant completes the Learning Tool a second time. This is also orated by the nutrition instructor if the Learning Tool is used. It the paper version is used the nutrition instructor may or not read the questions aloud. The post test data is then input into the database and all data are sent to the FNP administration on a quarterly basis.

Validity

A team of nutrition experts from the Family Nutrition Program and the Expanded Food and Nutrition Education Program established face validity and content validity during development of the Learning Tool pre/post survey. According to Campbell and Stanley (1966) the pretest/posttest design controls for internal invalidity sources of selection and mortality. The pretest/posttest design does not control for internal invalidity sources of history, maturation, testing, instrumentation or interaction of selection and maturation. The pretest posttest design does not control for external invalidity sources of interaction of testing and X and interaction of selection and X. Regression is a possible source of concern

to internal validity and reactive arrangements are a possible source of concern for external validity (Campbell and Stanley, 1966).

Reliability

Reliability of the Learning Tool instrument was calculated using Statistical Package for the Social Sciences (SPSS Inc., 1999). Reliability was measured using Cronbach's Alpha coefficients with Alpha set at 0.05. The resulting reliability coefficients ranged from .28 to .79.

Target Population

The target population for this study includes all participants who started and finished the Michigan FNP Adult Series program between the dates of November 24, 1998 and November 24, 1999. This nutrition education program had a planned beginning and end and consisted of at least 4 educational sessions with a Michigan county FNP nutrition instructor.

Reducing Sampling Bias

Frame Error: Frame error was controlled for this study by double-checking the dates of every participant's data set. The purpose of checking these dates was to assure that the population participated in the FNP program between the prescribed dates (November 24, 1998 to November 24, 1999).

Non-response Error: No follow-up was necessary to control for non-response error since every participant took the pre and posttest as part of the FNP Adult Series program.

Selection Bias: Selection bias was controlled for in this study since the entire population of 2,064 reported answers for both the pre and posttests as part of the FNP Adult Series Program.

Instrument Development

The FNP administration began the development of the evaluation instrument by creating an advisory team of two state staff and 20 county staff persons. All staff were employed in the Food and Nutrition Program and worked either directly in the Family Nutrition Program or with the Expanded Food Nutrition Education Program (EFNEP), which has also utilized the Learning Tool in the 16 Michigan counties where the program operates. The goals of the evaluation were to:

- Describe the population and process
- Diagnose the participant needs
- Assess participant satisfaction
- Evaluate the impact of the program and behavior change among participants
- Evaluate the curriculum (Coleman, Haas and Himebauch, 1997).

The team developed the content and established initial face validity of 37 original behavior statements in the Learning Tool. The team found more than 80 percent agreement in the content and wording of the statements in the Learning Tool and in January of 1996 the first round of testing using the instrument was conducted in three counties where both FNP and EFNEP operate. Each county tested 50 participants.

Results were gathered, summed, and reported to the advisory committee. Based on test findings, the committee altered the Learning Tool items by rewording statements resulting in 40 behavior statements. In the fall of 1996 the second round of testing was conducted with all 83 FNP counties in Michigan and all 16 EFNEP counties. The first quarter data consisted of 250 participants (150 FNP and 100 EFNEP). These data were used to further test the validity and reliability of the Learning Tool instrument and determined that the pilot data reflected the entire population of the state. The data were then used to evaluate the impact of both FNP and EFNEP programs (Coleman, Haas and Himebauch, 1997).

Data Collection

Data were collected and recorded by Michigan county nutrition instructors for each participating county at the beginning and end of every FNP Adult Series program. The data were input into the FNP Learning Tool computer database program and were then mailed to the researcher on a 3.5-inch floppy disk. The researcher merged all county data to analyze the information for the state.

Data Analysis

The survey was analyzed using Statistical Package for the Social Sciences (SPSS Inc. 1999). The data were aggregated by each demographic variable and analyzed using means, frequencies, ANOVAs and mean differences for each group and by each category of individual variables. A post hoc panel of registered dieticians, FNP regional directors, and FNP nutrition instructors was established to determine the description of change relative to the change in mean

from before and after treatment. The measurement descriptors that were instituted are illustrated in Table 3.1.

Table 3.1. Measurement Descriptors Used to Analyze Results from the Adult Series Learning Tool in Michigan

Mean Change	Description
.76 and above	Very strong change
.51 to .75	Substantial change
.26 to .50	Moderate change
.11 to .25	Low change
.01 to .10	Negligible change

(Source: Krueger, 1994)

CHAPTER IV

FINDINGS

Data were collected to examine the behavior change of different demographic groups of Adult Series participants of MSUE's Family Nutrition Program. In all, a questionnaire of 40 questions was presented in a pretest at the onset of nutrition education classes. The same 40 questions were then asked in a posttest at the end of the series.

Demographic Information

The total population that completed FNP Adult Series as well as the Learning Tool Pre and Post evaluation was 2, 064. The majority (74.8 percent or 1,545) was female. Ages ranged from 13 to 98. To provide an understanding and a perspective of the participants in the FNP Adult Series Program, background data were obtained. These data were quantified and are presented in table form. Five population characteristics are documented. These include ethnic background (Table 4.1), town size (rural, urban, etc.) (Table 4.2), monthly income per family (Table 4.3), age (Table 4.4), and region (Table 4.5).

Table 4.1 reveals the ethnic profile of the 2,064 FNP Adult Series participants. The population was divided into 5 different ethnic groups as indicated. White persons clearly demonstrate the ethnic composition of the population. The whites (59 percent) represented more than the total black, Native American, Hispanic and Asian populations combined. Blacks represented the

second highest ethnic group (35 percent) followed by Hispanics (3.6 percent), Native Americans (2 percent), and Asians (0.4 percent).

Table 4.1. Ethnic Composition of MSUE FNP Adult Series Participants

Ethnic Background	Frequency	Percent
White	1,217	59.0
Black	722	35.0
Native American	42	2.0
Hispanic	75	3.6
Asian	8	0.4
Total	2,064	100.0

In terms of environmental setting (Table 4.2) most of the FNP Adult Series participants live in central cities of a population of at least 50,000 persons. However, about a third (34.4 percent) of the population resides in small (under 10,000) rural clusters and rural non-farm isolated homesteads. As might be expected, farmsteads and suburbs have the lowest representation (3.4 percent) of FNP Adult Series participants.

Table 4.2. Residence of MSUE FNP Adult Series participants

Town Size	Frequency	Percent
Farm	71	3.4
Towns under 10,000and rural, non-farm	711	34.4
Towns and cities 10,000 to 50,000	402	19.5
Suburbs of cities 50,000+	70	3.4
Central cities 50,000+	810	39.2

The level of monthly income per family in 1999 (Table 4.3) clearly states the plight of poverty of the population. Ninety-nine percent of the population earns incomes of less than $3,000.00 per month. Almost 85 percent have 3 digit monthly incomes and only about 15 percent earn four digit monthly incomes. The 1999 official poverty threshold is an annual income of $13, 880 for a family of three residing within the 48 contiguous states, and 85 percent of this group clearly falls below this earned income level. (Table 2.3)

Table 4.3. Reported 1998-1999 Monthly Earned Incomes of Michigan FNP Adult Series Participants

Monthly Earned Dollars Per Participant	Frequency	Percent
0 through 200	726	35.2
201 through 400	175	8.5
401 through 600	438	21.2
601 through 800	236	11.4
801 through 1,000	166	8.0
1,001 through 2,000	278	13.5
2,001 through 3,000	31	1.5
3,001 and above	14	0.7

N= 2,064

Age distribution among Michigan FNP Adult Series participants varies greatly. Participants between the age of 18 through 25 make up the largest group (24.7 percent) followed by those between ages 26 through 30. Participants ages 51 through 65 make up the smallest totaled group (N=48, N= 48 and N=29 for a total of 125). There is a sharp distinction between groups aged 61 through 65

who make up 1.4 percent (N=29) and those who are 66 and above who make up 8.6 percent (N=177). (Table 4.4)

Table 4.4. Adult Series Participants Aged Distribution

Age in years	Frequency	Percent
0-17	200	9.7
18-25	510	24.7
26-30	299	14.5
31-35	262	12.7
36-40	245	11.9
41-45	143	6.9
46-50	103	5.0
51-55	48	2.3
56-60	48	2.3
61-65	29	1.4
66 and above	177	8.6

N= 2.064

Based on Table 4.5 it is apparent that FNP Adult Series participants in Michigan resided in 5 of 6 regions between the dates of November 24, 1998 and November 24, 1999. The program was not executed in any West Central Region counties. This could have occurred for a variety of reasons such as lack of funding, holding the program until a larger group of participants are enrolled, or changes in staffing at the regional, administrative or individual county levels. The largest population (961 or 46.6 percent) resides in the Southeast Region, which

includes a highly urbanized and industrialized area of the Detroit Metropolitan area (i.e. Wayne County). The Southwest Region, which is less urban, made up the second largest group (N=451 or 21.9 percent). The third largest group represented was those residing in the Upper Peninsula, one of the least populated regions of the state, yet known to be economically less advantaged and more rural.

Table 4.5. Geographic Distribution by Region of Michigan FNP Adult Series Participants

Michigan Region	Frequency	Percent
Upper Peninsula	325	15.7
North	84	4.1
East Central	243	11.8
West Central	0	0
Southeast	961	46.6
Southwest	451	21.9

N= 2,064

Research Questions

The following section presents the results of the Michigan FNP Adult Series participant responses to the 40 pre- and posttest questions that were presented directly before and after FNP Adult Series nutrition education programming. The data are tabulated and presented by each key element represented in *The Learning Tool* evaluation instrument. (Appendix B: The Learning Tool Survey) The key elements include Dietary Quality, Food Resource

Management and Shopping Behavior, Food Safety, Food Security and System Change. The behavior change is measured in units of very strong change, substantial change, moderate change, low change and negligible change. (Table 3.1)

Research Question 1

The first research question of the study asks to what extent does gender have on behavioral change of FNP Adult Series participants in terms of the five key elements? An ANOVA was computed to locate differences between the five key elements and males and females. (Table 4.7) No significant differences were found between the behavior change between males and females in any of the five key elements.

Table 4.7. Differences Found in an ANOVA Between Males and Females and the 5 Key Elements

Scale	F-value	Significance
Dietary Quality	1.745	.187
Food Resource Management and Shopping Behavior	.637	.425
Food Safety	.113	.113
Food Security/ System Change	.466	.466

Research Question 2

The second research question of this study asks to what extent does town size have on behavior change of FNP Adult Series participants in terms of the five key elements? Grand mean differences were calculated to determine the level of

behavior change exhibited within each key element. Results are illustrated in Table 4.8 through Table 4.11.

Table 4.8. Grand Mean Differences Exhibited by Participants in Town Size in the Dietary Quality Key Element

Dietary Quality	N	Mean Difference
Farm	71	.1198
Central cities of 50,000 and above	809	.1916
Towns and cities under 10,000 and rural non-farm	711	.2054
Suburbs of cities 50,000 and above	70	.2382
Towns and cities 10,000 to 50,000	402	.104

Table 4.9. Grand Mean Differences Exhibited by Participants in Town Size in the Food Resource Management and Shopping Behavior Key Element

Food Resource Management and Shopping Behavior	N	Mean Difference
Farm	70	.2923
Central cities of 50,000 and above	71	.3200
Towns and cities under 10,000 and rural non-farm	807	.3440
Suburbs of cities 50,000 and above	710	.3494
Towns and cities 10,000 to 50,000	401	.4786

Table 4.10. Grand Mean Differences Exhibited by Participants in Town Size in the Food Safety Key Element

Food Safety	N	Mean Difference
Farm	780	-8.70E-04
Central cities of 50,000 and above	69	3.865E-03
Towns and cities under 10,000 and rural non-farm	389	1.964E-02
Suburbs of cities 50,000 and above	698	5.398E-02
Towns and cities 10,000 to 50,000	71	8.387E-02

Table 4.11. Grand Mean Differences Exhibited by Participants in Town Size in the Food Security / System Change Key Elements

Food Security and System Change	N	Mean Difference
Farm	662	1.511E-03
Central cities of 50,000 and above	756	5.952E-03
Towns and cities under 10,000 and rural non-farm	68	7.353E-03
Suburbs of cities 50,000 and above	368	9.511E-03
Towns and cities 10,000 to 50,000	67	2.985E-02

An ANOVA was computed to locate differences between the size of town of residence and the behavior change exhibited by participants in each of the key elements. Results are illustrated in Table 4.12. A significant difference exists for the area of Food Resource Management and Shopping Behavior.

Table 4.12. Differences found in ANOVA Between Town Size and the Five Key Elements

Scale	F-value	Significance
Dietary Quality	1.734	.140
Food Resource Management and Shopping Behavior	4.796	**.001***
Food Safety	1.294	.270
Food Security/ System Change	.242	.915

(*Denotes significance at .05.)

A Tukey post hoc analysis was computed to locate the differences that occurred within the Food Resource Management and Shopping Behavior key element. The results are illustrated in Table 4.13. A significant difference occurred between those living in towns and cities of 10,000 to 50,000 and those living in towns under 10,000 and rural non-farm areas. A significant difference also occurred between those living in central cities of 50,000 and greater and those living in towns and cities of 10,000 to 50,000.

Table 4.13. Location of Differences Between Town Sizes and Key Elements

Towns and cities 10,000 to 50,000	Mean Difference	Significance
Farm	.1585	.191
Towns < 10,000 and rural non-farm	.1292	**.002***
Suburbs of cities 50,000 plus	.1863	.083
Central cities 50,000 plus	.1346	**.001***

(* Denotes significance at .05.)

Research Question 3

The third research question of this study was used to determine what extent ethnic background has on the behavior change of Michigan FNP Adult Series participants in terms of the five key elements. Grand mean differences were calculated to determine the level of behavior change exhibited within each key element. Results are illustrated in Table 4.14 through Table 4.17.

Table 4.14. Grand Mean Differences Exhibited by Participants of Different Ethnic Backgrounds in the Dietary Quality Key Element

Dietary Quality	N	Mean Difference
Black	721	.1879
White	1217	.2081
Native American	42	.2331
Hispanic	75	.2789
Asian	8	.5695

Table 4.15. Grand Mean Differences Exhibited by Participants of Different Ethnic Backgrounds in the Food Resource Management and Shopping Behavior Key Element

Food Systems Management and Shopping Behavior	N	Mean Difference
Black	721	.3292
White	1213	.3984
Native American	42	.5069
Hispanic	75	.5978
Asian	8	1.0103

Table 4.16. Grand Mean Differences Exhibited by Participants of Different Ethnic Backgrounds in the Food Safety Key Element

Food Safety	N	Mean Difference
Black	696	-3.08E-02
White	1187	4.875E-02
Native American	41	.1300
Hispanic	75	.1197
Asian	8	1.994E-02

Table 4.17. Grand Mean Differences Exhibited by Participants of Different Ethnic Backgrounds in the Food Security / System Change Key Elements

Food Security and System Change	N	Mean Difference
Black	682	6.598E-03
White	1121	6.690E-03
Native American	41	.0000
Hispanic	72	-6.94E-03
Asian	5	.0000

An ANOVA was computed to locate differences between the ethnic backgrounds represented by the FNP Adult Series participants and their exhibited behavior change in each of the key elements. Results are illustrated in Table 4.18. Significant differences exist for the areas of Food Resource Management and Shopping Behavior and Food Safety.

Table 4.18. Differences found in ANOVA Between Ethnic Background and the Five Key Elements

Scale	F-value	Significance
Dietary Quality	2.276	.059
Food Resource Management and Shopping Behavior	8.258	**.000***
Food Safety	3.692	**.005***
Food Security/ System Change	.062	.993

(* Denotes significance at .05)

A Tukey post hoc analysis was computed to locate the differences that occurred within the Food Resource Management and Shopping Behavior and the Food Safety key elements. The results are illustrated in Table 4.19 and Table 4.20.

In the Food Resource Management and Shopping Behavior key element, a significant difference also occurred between whites and Hispanics and whites and Asians. Significant differences also occurred between African Americans and Hispanics and African Americans and Asians for this key element. In the Food Safety key element, a significant difference was found between African Americans and whites. (Table 4.19 and Table 4.20)

Table 4.19. Location of Differences Between Ethnic Background the Food Resource Management and Shopping Behavior Key Element

Food Resource Management and Shopping Behavior		
White	**Mean Difference**	**Significance**
African American	-6.9180E-02	.070
Native American	-.1777	.264
Hispanic	-.2686	**.001***
Asian	-.6811	**.006***
African American	**Mean Difference**	**Significance**
White	6.918E-02	.070
Native American	-.1086	.746
Hispanic	-.1995	**.030***
Asian	-.6119	**.020***

(*Denotes significance at .05.)

Table 4.20. Location of Differences Between Ethnic Background the Food Safety Key Element

African Americans	Mean Difference	Significance
White	-7.9595E-02	**.011***
Native American	-.1608	.301
Hispanic	-.1505	.118
Asian	-5.0787E-02	.999

(*Denotes significance at .05.)

Research Question 4

The fourth research question of this study asks to what extent does age have on behavior change of FNP Adult Series participants in terms of the five key elements? Grand mean differences were calculated to determine the level of behavior change exhibited within each key element. Results are illustrated in Table 4.21 through Table 4.24.

Table 4.21. Grand Mean Differences Exhibited by Participants of Different Age Groups in the Dietary Quality Key Element

Dietary Quality	N	Mean Difference
0 to 17	200	.2231
18 to 25	510	.2413
26 to 30	299	.2491
31 to 35	261	.1690
36 to 40	245	.1997
41 to 45	143	.1651
46 to 50	103	.2092
51 to 55	48	.2683
56 to 60	48	.1289
61 to 65	29	8.448E-02
66+	177	.1245

Table 4.22. Grand Mean Differences Exhibited by Participants of Different Age Groups in the Food Resource Management and Shopping Behavior Key Element

Food Resource Management and Shopping Behavior	N	Mean Difference
0 to 17	199	.2668
18 to 25	510	.4370
26 to 30	299	.4370
31 to 35	261	.3344
36 to 40	244	.3701
41 to 45	142	.2652
46 to 50	102	.2935
51 to 55	48	.3492
56 to 60	48	.2506
61 to 65	29	.4218
66+	177	.4046

Table 4.23. Grand Mean Differences Exhibited by Participants of Different Age Groups in the Food Safety Key Element

Food Safety	N	Mean Difference
0 to 17	187	.1602
18 to 25	500	4.399E.02
26 to 30	294	5.906E-02
31 to 35	251	1.737E-02
36 to 40	236	2.303E-02
41 to 45	137	-3.67E-02
46 to 50	101	-9.62E-03
51 to 55	48	-4.47E-02
56 to 60	48	-5.31E-02
61 to 65	29	3.112E-02
66+	176	-.1049

Table 4.24. Grand Mean Differences Exhibited by Participants of Different Age Groups in the Food Security and System Change Key Elements

Food Security/ System Change	N	Mean Difference
0 to 17	171	2.047E-02
18 to 25	483	1.242E-02
26 to 30	283	5.300E-03
31 to 35	242	4.132E-03
36 to 40	226	-4.42E-03
41 to 45	134	.0000
46 to 50	95	2.105E-02
51 to 55	45	.000
56 to 60	47	-4.26E-02
61 to 65	26	.0000
66+	169	2.959E-03

An ANOVA was computed to locate differences between the age groups represented by the FNP Adult Series participants and their exhibited behavior change in each of the key elements. Results are illustrated in Table 4.25. Significant differences exist for the areas of Dietary Quality, Food Resource Management and Shopping Behavior, and Food Safety.

Table 4.25. Differences found in ANOVA Between Age Groups and the Five Key Elements

Scale	F-value	Significance
Dietary Quality	2.077	**.023***
Food Resource Management and Shopping Behavior	2.725	**.002***
Food Safety	3.031	**.001***
Food Security/ System Change	.383	.954

(* Denotes significance at .05.)

A Tukey post hoc analysis was computed to locate the differences that occurred within the Dietary Quality, Food Resource Management and Shopping Behavior and the Food Safety key elements. The results are illustrated in Table 4.26, Table 4.27 and Table 4.28.

In the Dietary Quality key element, there is borderline significant difference between those aged 66 and above and those aged 18 to 25. There is also borderline significant difference between those aged 66 and above and those aged 26 through 30. (Table 4.26) In the Food Resource Management and Shopping Behavior key element, significant differences were found between those who were aged 0 to 17 and those aged 18 to 25. Significant difference was also found between those aged 0 to 17 and those aged 26 through 30 years. (Table 4.27) In the Food Safety key element, significant difference was found between those aged 0 to 17 and those aged 41 to 45, 66 and above. Significant difference was also found between those aged 66 and above and participants aged 18 to 25, 26 to 30, and 0 to17. (Table 4.28)

Table 4.26. Location of Differences Between Age Groups and the Dietary Quality Key Element

Dietary Quality		
Age 66+	**Mean Difference**	**Significance**
0 to 17	-9.8595E-02	.508
18 to 25	-.1168	**.076***
26 to 30	-.1246	**.089***
31 to 35	-4.4539E-02	.994
36 t0 40	-7.5161E-02	.809
41 to 45	-4.0584E-02	.999
46 to 50	-8.4683E-02	.895
51 to 55	-.1438	.628
56 to 60	-4.3548E-03	1.000
61 to 65	4.003E-02	1.000

(*Denotes significance at .05)

Table 4.27. Location of Differences Between Age Groups and the Food Resource Management and Shopping Behavior Key Element

Food Resource Management and Shopping Behavior		
Ages 0 to 17	**Mean Difference**	**Significance**
18 to 25	-.1629	**.025***
26 to 30	-.1702	**.041***
31 to 35	-6.7615E-02	.974
36 t0 40	-.1033	.713
41 to 45	1.614E-03	1.000
46 to 50	-2.6745E-02	1.000
51 to 55	-8.2424E-02	.998
56 to 60	1.622E-02	1.000
61 to 65	-.1549	.955
66+	-.1378	.398

(*Denotes significance at .05)

Table 4.28. Location of Differences Between Age Groups and the Food Safety Key Element

Ages 0 to 17	Mean Difference	Significance
18 to 25	.1163	.236
26 to 30	.1012	.583
31 to 35	.1429	.136
36 t0 40	.1372	.194
41 to 45	.1969	**.029***
46 to 50	.1699	.218
51 to 55	.2050	.334
56 to 60	.2133	.275
61 to 65	.1291	.976
66+	.2652	**.000***
Age 66+	**Mean Difference**	**Significance**
0 to 17	-.2652	**.000***
18 to 25	-.1489	**.040***
26 to 30	-.1640	**.035***
31 to 35	-.1223	.362
36 t0 40	-.1280	.313
41 to 45	-6.8219E-02	.987
46 to 50	-9.5306E-02	.928
51 to 55	-6.0182E-02	1.000
56 to 60	-5.1849E-02	1.000
61 to 65	-.1360	.967

(*Denotes significance at .05)

Research Question 5

The fifth research question of this study asks to what extent does region of residence have on behavior change of Michigan FNP Adult Series participants in terms of the five key elements? Grand mean differences were calculated to determine the level of behavior change exhibited within each key element. Results are illustrated in Table 4.29 to Table 4.32.

Table 4.29. Grand Mean Differences Exhibited by Participants of Different Region of Residence in the Dietary Quality Key Element

Dietary Quality	N	Mean Difference
Upper Peninsula	325	.2300
North	84	.1871
East Central	243	.1233
Southeast	960	.1981
Southwest	451	.2513

Table 4.30. Grand Mean Differences Exhibited by Participants of Different Region of Residence in the Food Resource Management and Shopping Behavior Key Element

Food Resource Management and Shopping Behavior	N	Mean Difference
Upper Peninsula	325	.4329
North	84	.2808
East Central	243	.2728
Southeast	959	.3611
Southwest	448	.4105

Table 4.31. Grand Mean Differences Exhibited by Participants of Different Region of Residence in the Food Safety Key Element

Food Safety	N	Mean Difference
Upper Peninsula	324	1.527E-02
North	84	8.095E-02
East Central	240	1.630E-02
Southeast	926	1.926E-02
Southwest	433	4.010E-02

Table 4.32. Grand Mean Differences Exhibited by Participants of Different Region of Residence in the Food Safety Key Element

Food Security/ System Change	N	Mean Difference
Upper Peninsula	317	-2.05E-02
North	82	-1.22E-02
East Central	219	-1.37E-02
Southeast	896	6.138E-03
Southwest	407	4.054E-02

An ANOVA was computed to locate differences between the regions of residence represented by the FNP Adult Series participants and their exhibited behavior change in each of the key elements. Results are illustrated in Table 4.33. Significant differences exist for the areas of Dietary Quality, Food Resource Management and Shopping Behavior and Food Security/ System Change.

Table 4.33. Differences found in ANOVA Between Region of Residence and the Five Key Elements

Scale	F-value	Significance
Dietary Quality	3.780	**.005***
Food Resource Management and Shopping Behavior	3.924	**.004***
Food Safety	.408	.803
Food Security/ System Change	3.561	**.007***

(* Denotes significance at .05)

A Tukey post hoc analysis was computed to locate the differences that occurred within the Dietary Quality, Food Resource Management and Shopping Behavior, and Food Security /System Change key elements. In the Dietary Quality key element a significant difference was found between the East Central region and the Upper Peninsula. A significant difference was also found between the East Central region and the Southwest. (Table 4.34)

Table 4.34. Location of Differences Between Region of Residence and the Dietary Quality Key Element

East Central	Mean Difference	Significance
North	-6.3797E-02	.775
Upper Peninsula	-.1067	**.031***
Southwest	-.1280	**.002***
Southeast	-7.4797E-02	.117

(*Denotes significance at .05)

In the Food Resource Management and Shopping Behavior key element, a significant difference was found between the East Central region and the Upper

Peninsula. There was also a significant difference between the East Central region and the Southwest. (Table 4.35)

Table 4.35. Location of Differences Between Region of Residence and the Food Resource Management and Shopping Behavior Key Element

East Central	Mean Difference	Significance
North	-8.0042E-02	1.000
Upper Peninsula	-.1601	**.008***
Southwest	-.1377	**.020***
Southeast	-8.8324E-02	.193

(*Denotes significance at .05)

In the Food Security/System Change key elements, a significant difference was found between the Southwest region and the Upper Peninsula. There was also a borderline significant difference between the Southwest region and the East Central. (Table 4.36)

Table 4.36. Location of Differences Between Region of Residence and the Food Security/ System Change Key Elements

East Central	Mean Difference	Significance
North	5.274E-02	.365
Upper Peninsula	6.105E-02	**.006***
Southwest	5.424E-02	**.054***
Southeast	3.440E-02	.116

(*Denotes significance at .05)

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Summary

The purpose of the study was to investigate differences in levels of behavior change among demographic groups represented in the Michigan Family Nutrition Program's Adult Series in Michigan. Specifically, the demographic groups studied were gender, age, ethnic background, town size, and geographical region. The research questions of this study were:

1) To what extent does gender have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

2) To what extent does town size have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

3) To what extent does ethnic background have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

4) To what extent does age have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

5) To what extent does geographical region have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

The target population of the study was comprised of 2, 064 participants of the Family Nutrition Program of Michigan State University Cooperative Extension Service Adult Series Program. The respondents participated in the program between the dates of November 24th 1998 and November 24th 1999. The nutrition education program had a planned beginning and end and consisted of at least four educational sessions with a Michigan county FNP nutrition instructor.

The instrumentation of the study was a pre-post survey administered before a set of FNP Adult Series nutrition education sessions and immediately upon completion of the series. The survey was administered aloud by a Michigan FNP nutrition instructor as participants followed along using The Learning Tool to answer the questions presented. The instrument utilized multiple-choice questions with a Likert-type scale. Five possible responses included: 0= "never", 1 = "hardly ever", 2 = "sometimes", 3 = "most of the time", and 4 = "always". (Appendix B: The Learning Tool Survey) A committee of FNP administrative personnel comprised of two state staff and 20 county level staff persons developed the instrument. The validity of the instrument was established through pilot testing in 3 counties with 50 participants per county. Reliability was tested using Chronbach's Alpha.

Data collection is an employment requirement of FNP nutrition instructors; thus it is assumed that this study utilized a response rate of 100 percent and this was a census study. All together pre-posttest surveys were reported for 2, 064 participants who completed FNP Adult Series. This

information was administered and collected by Michigan FNP nutrition instructors and delivered to the researcher.

Conclusions and Implications

Conclusions drawn from this study are limited to FNP participants who completed FNP Adult Series between the dates of November 24th 1998 through November 24th 1999. These findings are based only upon this study.

Research Question 1: To what extent does gender have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

Overall there was little difference between the performance of males and females in every key element observed. Although the results of the ANOVA indicated no significant difference between the performance of males and females in terms of all key elements, the scale measurement determined by the post-hoc committee of experts found a slight difference. (Appendix C: Table C.1 to C.4) In this case, it was females who exhibited slightly more change than males. As women tend to be more at risk for food insecurity, even a slightly higher change than males can be considered a step in the right direction. As single women are more likely to have the custody of children than men, this small success could possibly have a positive effect on the nutrient intakes of children as well.

Research Question 2: To what extent does town size have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

As indicated in the Literature Review, low-income urban dwellers and rural poor are at risk for hunger and food insecurity. Unfortunately, the results indicated that the group that was most successful in changing behavior was those living in towns and cities of 10,000 to 50,000, which is not a group who is as likely to be at risk for food insecurity and hunger. In the scale created by the post-hoc committee of experts, there was not one case where those living in central cities exhibited a higher level of change than the rest of the groups. (Appendix C: Table C.5 to Table C.8) This demonstrates a genuine need for increased focus on urban populations and those in rural areas who's poverty is augmented by many factors due to their locations such as lack of access to social services or fresh fruits and vegetables.

Research Question 3: To what extent does ethnic background have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

The most notable findings in the measurements of behavior change exhibited by FNP participants in terms of ethnic background is the extremely high level of behavior change exhibited by the Asian population and very low change by the African American population. The Asian group who demonstrated such strong change represents the smallest minority population of the Michigan FNP

Adult Series program 0.4 percent (Table 4.1). On the other hand, the African American participants represented some of the lowest change, yet they make up the largest minority population in the state of Michigan. As noted in the Literature Review, African Americans are at a very high-risk for food insecurity and hunger than other minorities. This is augmented further by the fact that the African American population in Michigan is relatively large. Another minority group in Michigan, Hispanics, exhibited much higher change than the African American populations. This implies that something is being done effectively to educate the Hispanic population but there is a barrier for the African American group. Results were similar using the scale determined by the post-hoc committee of experts. (Appendix C: Table C.9 to C. 12)

Research Question 4: To what extent does age have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

Participants aged 66 and above represented some of the most successful behavior change measured. Other age groups that exhibited notable behavior change were those aged 26 to 30. The ages in between these young and older ages did not perform as well as these groups. This implies that senior citizens and younger participants are more likely to change behavior. As indicated in the Literature Review, low-income children and elderly are more at risk for food insecurity and hunger than other age groups, thus the changes indicated in this study represent a positive effect on these higher-risk participants. Results were

similar using the scale determined by the post-hoc committee of experts. (Appendix C: Table C.13 to C. 16)

Research Question 5: To what extent does region of residence have an effect on behavior change of Michigan FNP Adult Series Participants in terms of the five key elements?

The region that is struggling more than any of its neighbors that also ran the FNP Adult Series when the data was collected the most is the East Central. This demonstrates a barrier to the success of the participants in the FNP Adult Series program who reside in the counties of the East Central region. The Upper Peninsula and the Southeast and Southwest exhibited more positive changes. The Southeast contains the Detroit Metropolitan Area, which is highly urban, and the Upper Peninsula is rural. This implies the possibility that populations that are at higher risk for hunger and food insecurity (rural and central cities) are being reached by the FNP program. Results were similar using the scale determined by the post-hoc committee of experts. (Table C.17to C. 20)

Recommendations

In this study, a large amount of change was found in towns and cities with a population of 10,000 to 50,000 with little in central cities with a population exceeding 50,000. This suggests that participants who live in rural and urban areas (and are more at risk for food insecurity and hunger) could benefit from

direct programming focused for their populations. It is recommended that more efforts are instituted to reach these higher-risk populations.

In terms of ethnic background, there is a great need for more effective programming among African American participants. A needs assessment could help FNP determine what those barriers are and how to better reach and serve this population.

In terms of the evaluation instrument, it is recommended that a nutrition instructor who does not do programming with clients administer the Learning Tool. This is to facilitate more anonymity among participants, as they could be hesitant to be fully honest in their responses given the relationship they may have built with the instructor they have worked with through the treatment. It may also be beneficial to use it as a diagnostic tool only at the start of a planned series. The instrument is quite long, is repetitive, and takes a great deal of time to complete. Nutrition instructors may use the tool as an indicator of the participant's awareness, but a more condensed tool is preferable for program evaluation. Of the 40 questions, there are questions that seem to cover the same type of information. It would be beneficial to both the nutrition instructors as well as their clients to condense the Learning Tool Survey in order to prevent users from growing tired of completing the survey and acquire more accurate data.

County staff that use the Learning Tool are not trained in how to analyze the results. Instead they are instructed to send in the data they collect to the administration after reading the pre test to diagnose the needs of their clients. It

would be beneficial to the moral of the nutrition instructors to train them in how to read the pre and post results to determine what change occurred in their specific programs. These results could be used directly at the county level to improve programs or to report successes as well. With the improved knowledge of the tools capabilities for the nutrition instructor, there is a potential for the reporting to become more accurate, more enjoyable for those handling the data, and more useful at both the county and the administrative levels.

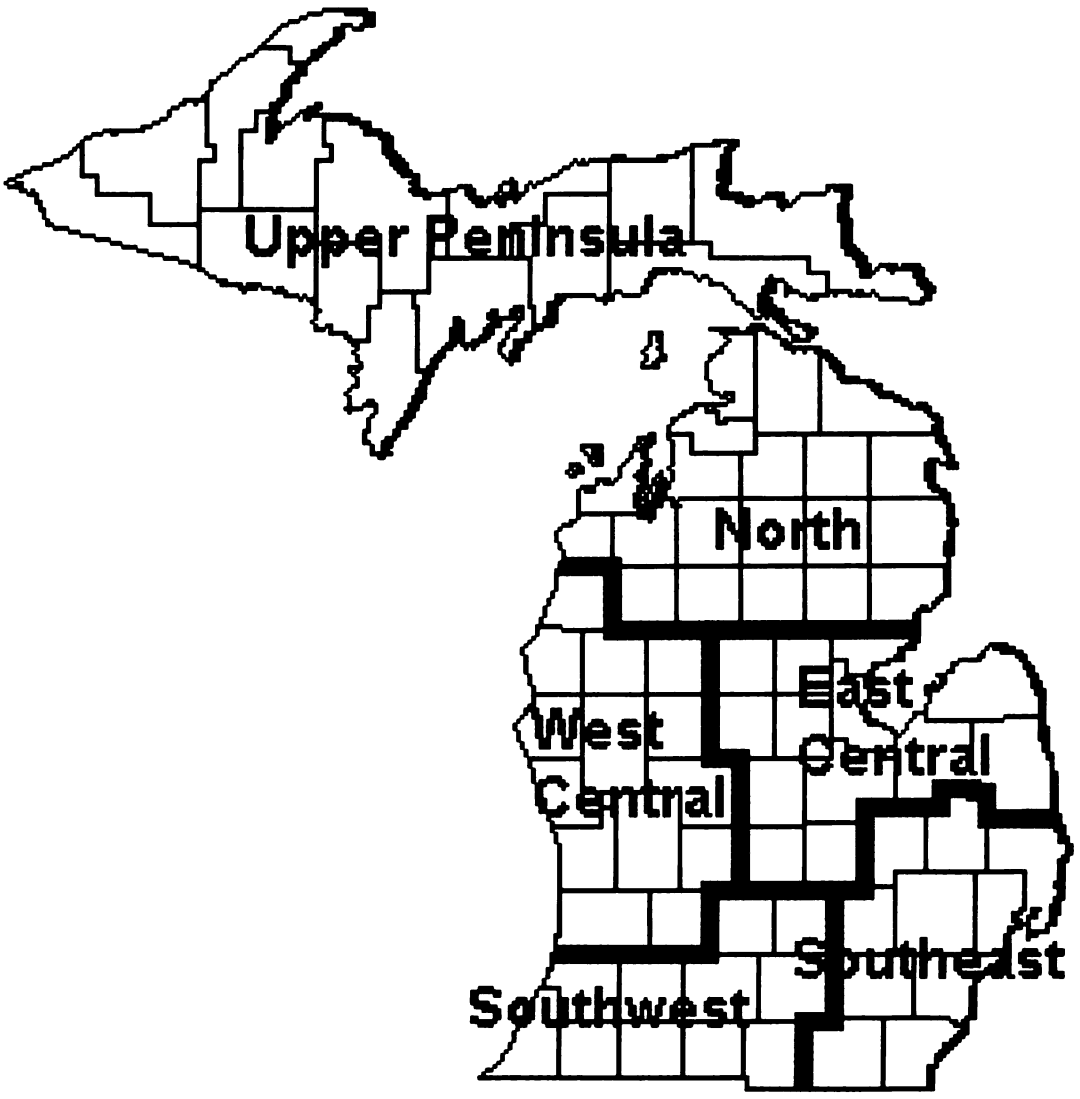
Recommendations for Further Research

This thesis only began the study of different low-income populations represented in the Michigan FNP Adult Series program. A greater understanding of the populations could be gained by a variety of more extensive research. For example, extensive cross-tabulations between different demographic groups (i.e. Hispanics in central cities compared with African Americans in central cities) could dramatically influence the FNP curriculum as well as the teaching methodology nutrition instructors are trained to use.

This study briefly examined the differences between Michigan regions. Research that focuses on the demographics used in this study (and others considered important) coupled with a direct focus on only regions rather than a state could be useful to many. This sort of study could also delve into the characteristics of the region (rural, large metropolitan area, etc.) and apply them to the findings. Further breakdowns to the county level have the potential to be of great importance to local communities. Finally, the use of qualitative data

collected among focus groups would greatly enhance any of these studies. A study that utilizes a control group could help to determine results more effectively.

Appendix A: Regional Map of Michigan
Source: http://www.msue.msu.edu/msue/ctyentpg/



Eating Right is Basic (3rd Edition)
LEARNING TOOL
Michigan State University Extension – August 1996

1= "I never do", 2 = "I seldom do", 3 = "I sometimes do", 4 = "I usually do", and 5 = "I always do"

1. I use foods I have "on-hand" when I make a meal.
2. I check what foods I have "on-hand" before going grocery shopping.
3. I budget money for food expenses.
4. I plan meals for a few days ahead of time before going grocery shopping.
5. I plan meals to include a variety of foods from different food groups in the Food Guide Pyramid.
6. I plan for leftovers and use them later.
7. I use a shopping list when I shop for food.
8. I use store specials when buying my meals.
9. I compare prices when I shop to find the best buy.
10. I buy store-brand food instead of name-brand foods, unless the name brands cost less.
11. I buy convenience foods, such as frozen dinners or a "helper" mix, each week.
12. I use the information on food labels to compare fat or other nutrients in foods.
13. I eat dark green, orange or dark yellow vegetables at least once a week.
14. I eat cabbage, cauliflower, broccoli or green/red peppers at least once a week.
15. I eat citrus fruits, strawberries, or drink citrus fruits at least three times a week.
16. I drink milk at least once a day.
17. I eat cheese or yogurt at least once a day.
18. I drink soda pop or fruit-flavored drinks at least once a day.

19. I eat candy or chips, such as potato chips, tortilla chips or corn chips, at least once a day.
20. I cook meals using dry beans of peas at least once a week.
21. I steam or microwave my vegetables with a little water when I cook them.
22. I buy lean cuts of meat, like round steak or stew meat, when I buy meat.
23. I fry chicken and other meats for meals.
24. I pour the fat off meat after cooking and throw the fat away.
25. I bake, boil or microwave my potatoes when I cook them.
26. I thaw frozen meat by letting it sit out on the counter or another space outside of the refrigerator.
27. Before I eat or prepare food, I remember to do both these things; wash my hands for at least 20 seconds; use warm, soapy water.
28. I scrub raw, tough-skinned vegetables or fruits before I serve or eat them.
29. I store uncooked cereal products, such as cornmeal and rice, in tightly closed containers.
30. I use hot soapy water to wash dishes and countertops every time I prepare food.
31. I keep raw meat, such as hamburger, in the refrigerator for more than 2 days.
32. I eat breakfast.
33. I run out of food at the end of the month.
34. I use emergency food services, such as a food pantry or church pantry, or participate in a free meal program, such as a soup kitchen.
35. I enjoy cooking and preparing food.

36. For Participants with children

37. My children get me to buy candy, sweet cereals, and other things that I wouldn't otherwise buy.

38. I plan snacks for my children.

39. My children eat breakfast.

40. My children wash their hands with warn, soapy water before eating.

41. My children help me decide what fruits, vegetables and other healthy foods to buy.

Appendix C: Results in Terms of the Post-Hoc Committee of Expert's Scale of Measurement

Table C.1. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Gender and Dietary Quality

Dietary Quality	Negligible	Low	Moderate	Substantial	Very Strong	No Change
Female	1	4	12	1		
Male		9	8	1		

Table C.2. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Gender and Food Resource Management/ Shopping Behavior

Food Resource Management/ Shopping Behavior	Negligible	Low	Moderate	Substantial	Very Strong	No Change
Female		2	9	1	1	
Male	1 (-)	3	7	1	1	

Table C.3. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Gender and Food Safety

Food Safety	Negligible	Low	Moderate	Substantial	Very Strong	No Change
Female	1 (-)	2	3	1		
Male		4 (-)	2	1		

Table C.4. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Gender and Food Security and System Change

Food Security/ System Change	Negligible	Low	Moderate	Substantial	Very Strong	No Change
Female	1 (-)		1			
Male	1 (-)	1				

Table C.5. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Town Size and Dietary Quality

Dietary Quality	Negligible	Low	Moderate	Substantial	Very Strong
Farm	2 (-)	7	9		
Towns less than 10,000 and rural non-farm		3	14	1	
Town/City 10,000 to 50,000		3	13	1	1
Suburbs 50,000+	3 (-)	5	6	4	
Central Cities 50,000+	1	8	8	1	

Table C.6. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Town Size and Food Resource Management/ Shopping Behavior

Food Resource Management/ Shopping Behavior	Negligible	Low	Moderate	Substantial	Very Strong
Farm		3	6		1
Towns less than 10,000 and rural non-farm		1	8	1	
Town/City 10,000/ 50,000			6	3	1
Suburbs 50,000+	2 (-)	2		1	
Central Cities 50,000+	1 (-)	1	7	1	

Table C.7. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Town Size and Food Safety

Food Safety	Negligible	Low	Moderate	Substantial	Very Strong	No Change
Farm	1	2	3	1		
Towns less than 10,000 and rural non-farm		3	3	1		
Town/City 10,000/ 50,000	1	1	4		1	
Suburbs 50,000+	1	3	2			1
Central Cities 50,000+	1	4	1	1		

Table C.8. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Town Size and Food Security/System Change

Food Security/System Change	Negligible	Low	Moderate	Substantial	Very Strong	No Change
Farm	2					
Towns less than 10,000 and rural non-farm	1 (-)		1			
Town/City 10,000 to 50,000	1 (-)	1				
Suburbs 50,000+	1		1			
Central Cities 50,000+	1 (-)	1				

Table C.9. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Ethnic Background and Dietary Quality

Dietary Quality	Negligible	Low	Moderate	Substantial	Very Strong	No Change
White		6	11	1		
African American	1	5	11	1		
Native American	1	6	8	3		
Hispanic		2	12	2	2	
Asian		1	1	5	10	1

Table C.10. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Ethnic Background and Food Resource Management/ Shopping Behavior

Food Resource Management/ Shopping Behavior	Negligible	Low	Moderate	Substantial	Very Strong	No Change
White		2	9			
African American	1	1	8	1		
Native American	1		7	1		
Hispanic	1	2	4	3		
Asian		2	4	7		

Table C.11. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Ethnic Background and Food Safety

Food Safety	Negligible	Low	Moderate	Substantial	Very Strong	No Change
White	1	2	3	1		
African American	2	2	2	1		
Native American	2	2	3	1		
Hispanic		3	2	1	1	
Asian			1	1	5	

Table C.12. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Ethnic Background and Food Security/System Change

Food Security/ System Change	Negligible	Low	Moderate	Substantial	Very Strong	No Change
White	1 (-)		1 (-)			
African American	1 (-)	1 (-)				
Native American	1 (-)			1 (-)		
Hispanic		2 (-)				
Asian			1 (-)			1

Table C.13. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Age and Dietary Quality

Dietary Quality	Negligible	Low	Moderate	Substantial	Very Strong	No Change
0-17	3 (-)	8	5 (-)	2		
18-25	1	6	10		1	
26-30	1		15	2		
31-35	2	8	7	1		
36-40	1	4	12	1		
41-45	2	6	9	1		
46-50	3	6	8	1		
51-55	4	2	10	2		
56-60	2	4	9	2		1
61-65	1	4 (-)	7	2	3 (-)	1
66+	1	7	7 (-)	1	1	

Table C.14. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Age and Food Resource Management/Shopping Behavior

Food Resource Management/ Shopping Behavior	Negligible	Low	Moderate	Substantial	Very Strong	No Change
0-17	2 (-)	4	7			
18-25	1	1	6	3	2	
26-30		3	5	3	2	
31-35	1	5	5	1	1	
36-40	1	3	6	2	1	
41-45		7	5		1	
46-50		7	4	2		
51-55		5 (-)	6	1	1	
56-60	3 (-)	3	4	2		1
61-65		3	8	2		
66+		1	7	5		

Table C.15. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Age and Food Safety

Food Safety	Negligible	Low	Moderate	Substantial	Very Strong	No Change
0-17	3 (-)		4			
18-25		3	3	1		
26-30		2	4		1	
31-35	1	4	1	1		
36-40	2	1	3	1		
41-45	1	2	3	1		
46-50	3 (-)	1	2	1		
51-55	1	4	1		1	
56-60	4 (-,-,-)	1		1		1
61-65	1 (-)	3 (-)	2	1		
66+		3 (-)	1	1	2	

Table C.16. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Age and Food Security/System Change

Food Security/System Change	Negligible	Low	Moderate	Substantial	Very Strong	No Change
0-17	1	1				
18-25	1		1			
26-30	1	1				
31-35	1	1				
36-40	1 (-)	1				
41-45	1 (-)		1			
46-50		2 (-)				
51-55			1	1 (-)		
56-60			2 (-)			
61-65	1 (-)	1				
66+			2 (-)			

Table C.17. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Geographic Region and Dietary Quality

Dietary Quality	Negligible	Low	Moderate	Substantial	Very Strong	No Change
North	2	5	9	2		
Upper Peninsula		1	12	5		
East Central	5	9	4			
Southeast	1	5	10	1	1	
Southwest	1	5	11	1		

Table C.18. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Geographic Region and Food Resource Management/Shopping Behavior

Food Resource Management/ Shopping Behavior	Negligible	Low	Moderate	Substantial	Very Strong	No Change
North		6	5	1	1	
Upper Peninsula		1	9	3		
East Central	2	6	3	1	1	
Southeast	1	1	8	2	1	
Southwest	1	2	7	2	1	

Table C.19. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Geographic Region and Food Safety

Food Safety	Negligible	Low	Moderate	Substantial	Very Strong	No Change
North	2	1	3	1		
Upper Peninsula		1	4	1	1	
East Central	2	4		1		
Southeast	1	1	4	1		
Southwest	1	3	2	1		

Table C.20. Measurement of Behavior Change exhibited by FNP Adult Series Participants in Terms of Geographic Region and Food Security/System Change

Food Security/ System Change	Negligible	Low	Moderate	Substantial	Very Strong	No Change
North	1	1				
Upper Peninsula			1 (-)	1 (-)		
East Central	1	1 (-)				
Southeast	1 (-)	1 (-)				
Southwest	1	1 (-)				

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