GROWTH STATUS OF PRESCHOOL CHILDREN IN THE EXPANDED NUTRITION AND FAMILY PROGRAM

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ABSTRACT

GROWTH STATUS OF PRESCHOOL CHILDREN IN THE EXPANDED NUTRITION AND FAMILY PROGRAM

by

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Growth status, defined as a child's accomplishment in height and weight compared to standards for his age, was surveyed in a population of preschool children. Data were obtained as a part of a larger study, namely, an evaluation of the Expanded Nutrition and Family Program (ENFP).

The first interview, conducted upon the homemaker's enrollment in the program, consisted of gathering information of a biological-consumer nature. At this time each child was weighed and measured and urine samples were collected from all available family members. Urine samples were analyzed for thiamin, riboflavin and creatinine. Demographic data on the family and a twenty-four hour food recall on the homemaker, herself, were also obtained. Nutrition knowledge and attitude toward food and nutrition

were obtained at the second interview conducted with the homemaker.

Measurements made on 149 preschool children, aged 15 months to 65 months, were compared to national norms for height and weight. A clustering of values was observed at the lower percentiles. Twenty-five percent of the children measured were below the third percentile for height, according to Stuart and Meredith standards; 13 percent were below the third percentile for weight when analyzed according to the above standards.

Analysis of data according to race revealed significantly ($p=.025$) more non-Black than Black children at the lower percentiles for both height and weight. The racial difference in growth status was most pronounced for height. Thirty percent of the non-Black children were below the third percentile for height while 13 percent of the Black children fell into this category. Comparison of data from this study with means established by research on racial differences in stature (Garn, 1973) support the conclusion that Black children are taller than non-Black children ($p=.003$).

Stuart and Meredith standards are based on data from children of Northern European parentage; this set of

standards was compiled 30 - 45 years ago. This may preclude the acceptability of these standards for present children. Data obtained from the children in this study were compared with standards developed by Robson (in press) from the study of low income children in Michigan. A traditional bell-shaped distribution of subjects over a range of values for height and weight according to race and sex resulted.

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DEDICATION

To my Mother and Father

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CHAPTER I

INTRODUCTION

The synergism between nature and nurture continues to be of interest. Growth serves as an example of the interplay between these two forces. "Growth" and "development" are often used interchangeably. "Growth", however, is concerned with increase in size while "development" denotes integration and increasing complexity of function. It is the area of physical growth or increase in size which is of concern here.

Environmental factors influence the extent of genetic expression (Garn, 1972). Depressed socioeconomic conditions and the concomitant factors of this situation cannot help but lower the quality of life experienced by the growing child. The Ten State Nutrition Survey (1972) found that decreased growth achievement correlated with decreased income. Growth retardation was more prevalent in low income states and growth was less adequate in low income groups. Larken (1974) listed such correlates of growth failure as: children of lower birthweights, coming from families with

more siblings and whose parents had higher credit payments, hence, less money for food. Research supports the important role played by the environment in the growth of the child.

In addition to the environmental factors affecting the child's growth status are genetic dispositions for varying degrees of growth. A tremendous range of normal values for a physical characteristic exist. An Eskimo child, for example, would tend toward a shorter, stouter stature. A descendent of the Masai tribe of Africa would be noticeably tall. Other ethnic groups would fall some where between the two extremes. Application of standards for growth based on children of one particular ethnic background of 30 to 45 years ago may be undesireable.

A one-to-one contact system maximizes the possibility of the homemaker's exposure to and adoption of nutrition messages (Davis, 1968). The Expanded Nutrition and Family Programs (ENFP) were established on such a premise. Homemakers indigenous to the community endeavored to present nutrition information to other homemakers in the community according to the guidelines established by the county extension office. The nutrition aide contacted each enrolled member in her respective home.

Reports on the progress of the ENFP were subjective.

In 1972, Michigan State University undertook an appraisal of the ENFP utilizing an experimental group in a pre- and post-test design. Change data generated by this research is reported elsewhere (Duff, 1974). The time lapse between the two phases of the study was not considered sufficient for significant physical growth to occur, thus, this report is concerned with growth data obtained in the initial phase of the study only.

Objectives

Specific research questions addressed in this report are: what is the growth status of a population of socioeconomically depressed preschool children, do racial differences occur in the growth status of this same population; should growth standards be adjusted for the ethnic background of the child.

CHAPTER II

LITERATURE REVIEW

Growth Status and Growth Standards

Growth has long been accepted as an index of nutritional status. Growth status, defined as a child's accomplishment in height and weight with respect to standards, will be satisfactory under conditions of optimum nutrition, barring the existence of any physical dysfunction. Conversely, growth status will most likely be impaired when suboptimum nutrition is provided. Dugdale (1972) stated that:

> Growth achievement...is a reliable guide to the health and nutrition of the child, i.e., those who do not measure up are most likely to be suffering.

Rate and quality of growth are important correlates of general health. A child may have attained a height appropriate for his age but be retarded in weight gain. Skeletal development may be lagging though the weight of the child falls into an acceptable range for his age. Unsatisfactory progress in height and weight for age may

indicate unsatisfactory nutrition, according to (Jackson and Kelly, 1945).

Driezen et al. (1953) examined 2,965 children, aged two years, eleven months to fifteen years, eleven months, from 1942 to 1952 and commented that the children with nutritive failure lagged substantially in height and weight by the third year of life and that that lag increased progressively thereafter.

Measurements of height and weight are considered most valid when taken under standard conditions. For height these conditions specify that the child stand, if older than 36 months, barefooted on a floor; the heels, buttocks and shoulders of the child should touch the wall. A right angle should extend from the crown of the head to the wall. Knees should not be flexed nor heels lifted from the floor. Weight is to be measured on a beam or balance scale, calibrated two to three times each year, with the child naked or in light underclothes. The height and weight of a child less than three years of age is to be measured while the child is in the recumbent state (Committee on Nutrition Advisory, 1974). In order to assess the growth status of a child standards have been developed. The most widely accepted and used standards for height and weight are those of Stuart and Meredith (Lowrey, 1973, p. 79-80). Meredith

weighed and measured children of Northern European ancestry from a high socioeconomic background in Iowa. Stuart obtained his data from a similar group of children in Boston. Compilation of these data resulted in a smooth curve of values for height and weight for age. The data obtained from weighing and measuring one child can be plotted against the curve in order to ascertain the growth status of the child relative to a large group of other children his own age (Falkner, 1962a, 1962b).

Racial Differences in Growth

Research on the subject of growth and race tends to support a genetic disposition among Black children for greater stature. Barr et al. (1972), measured 7,500 children of three colors, ages five to fourteen years. Black children were, on the average, 2.3 cm taller and 2 kg. heavier than White children.

Referring to the Ten State Nutrition Survey (1972), the American Academy of Pediatrics (1973) suggested a genetic factor outweighing the influence of economic factors as Blacks were found to be advanced skeletally, tending toward greater size while maintaining less fat when at the same or even lower economic level. In spite of generally retarded growth status in poor families, one

and one-half times as many White children as Black were below the fifteenth percentile for height when all children measured were at the same poverty level.

Verghese, Scott, Teireira and Ferguson (1969) concluded that the Black children of the population in their study were taller than the White children in the Harvard study of Stuart (1943). These researchers weighed and measured 1,400 Black boys and 1,200 Black girls, aged three months to seventeen years, from low income families in Washington, D.C.

In an earlier report by Scott et al. (1962) birth weights and lengths were recorded for forty-seven Black boys and sixty-four Black girls. These children were from a lower-middle class background and had birth weights and lengths less than those for white children. The Black infants, however, exhibited greater annual growth velocity.

Differences between Black and White children were cited by Owen and Lubin (1973). They stated that Black children are smaller at birth than White children, at equal developmental levels as White children at one year of age, and taller and heavier thereafter.

Garn (1972) examined American Negro children and American children of European ancestry and found that Black males average .77 cm taller than White males; Black

females averaged 1.20 cm taller than White female children. Utilizing data from 10,958 Black and White, low income boys and girls from eight of the ten states in the National Nutrition Survey (NNS, 1972), Garn found Black children to average 2.5 cm taller than White children up to the age of twelve years.

Growth Under Depressed Socioeconomic Conditions

Retardation in height and weight has been found repeatedly under adverse socioeconomic conditions. Schaefer (1969), commented on the establishment of the National Nutrition Survey, and hypothesized that the greatest prevalence of malnutrition would be among those segments of the population with the lowest income. Results of the NNS included decreased intakes of vitamin A and vitamin C, inadequate urinary riboflavin, prevalent dental carries, the presence of intestinal parasites and obesity in mature women, most commonly among families whose annual income was less than $5,000. The children in these families were the ones most often at or below the sixteenth percentile for height and weight from birth to six years of age. Data from the Michigan portion of the NNS (1971) revealed that 46.5 percent of children below poverty level were one or more standard deviations from the Stuart and

Meredith means for height.

Chase et al. (1973) examined preschool children of Mexican-American migrant farm workers and found 30 percent of the children to be below the third percentile for weight and 25 percent to be below the third percentile for height.

McGanity (1969) reported Texas NNS data and stated that among those families whose incomes fell into the lowest twenty-five percent of the economic scale the curve of the mean values for height and weight of children followed the curve for the sixteenth percentile of the standards of Stuart and Meredith.

Meredith (1941) observed the sons of men belonging to "managerial" or "professional" classes. These boys were taller and heavier than boys from lower socioeconomic classes though not by more than three percent for height and six percent for weight.

The American Academy of Pediatrics (1973) commenting on growth under depressed socioeconomic conditions stated that "...to a significant degree malnutrition in children appears to be a consequence of both the quality of life and the economic status of the family..." (1973).

Sandstead et al. (1971) observed 100 preschool children living under adverse socioeconomic conditions. The findings from this study include 24.7 percent of the sample to be

below the tenth percentile for height.

Another study in which 18 percent of the preschool children were found to be below the third percentile for height was performed by Chase (1971) on the preschool children of Migrant workers. The mean annual income for these families was $1,885; the average family size was 6.6 persons.

After collecting heights and weights of preschoolers in a North Central Regional Study and finding heights to be more deviant from the Iowa standards than weights, Fryer and co-workers (1972) commented that perhaps foods eaten by the poor contribute more to weight than to height.

Growth and Income

Retarded growth status under depressed socioeconomic conditions has been mentioned. Specific studies have been conducted in order to assess the correlation between growth status and income. Fryer et al. (1972) noted that height of preschoolers in a North Central Regional Study was more adversely affected by income than weight. A finding of a study by Furtel et al. (1971), of Negro preschool children in Mississippi, was a relationship between income per capita and nutritional status; those families possessing incomes above $500/capita/annum had significantly better

intakes of calories, protein, calcium, iron, vitamin A and vitamin C. Graham (1972) reported increased stature to be positively correlated with increased disposable income after a study done in a socioeconomically depressed area of Lima, Peru.

In an evaluation of the nutritional status of Mississippi preschool children, Owen et al. (1969) determined a minimum income per person per annum to maintain satisfactory nutritional status to be $500. Sixteen percent of the children from families in which the per person per annum income was less than this figure fell below the third percentile for height.

Growth Status and Food Expenditure

The family income and size are the two most important determinants of the amount of money spent for food (Feaster and Perkins, 1973). The USDA Economic Research Service, evaluating the impact of the Expanded Food and Nutrition Education Program (EFNEP) on low income families, stated that among families earning less than $2,700 per annum, one third of that income was spent on food. Families with an annual income of less than $1,200 had to spend one half of their annual income on food. These figures are based on a family of approximately 5 persons.

A study by Sandstead et al. (1971) correlated height and average weekly expenditure for food. The United States Department of Agriculture (USDA) average expenditure per person, per week for food at this time was $6.25. About 25 percent of the children for whom this figure averaged $4.05 fell below the tenth percentile for height.

An investigation of growth failure by Larkin (1974) at the Ypsilanti Well Child Clinic, Ypsilanti, Michigan, suggested that a decreased amount of money spent for Food and Food Stamps was a correlate of inferior growth status among low income children.

Growth Status and Maternal Age

Another correlate of poor growth mentioned in Larkin's study was the age of the mother. Larkin noted that older mothers are more likely to have babies of lower birth-weights which may result in children with inferior growth accomplishment. A study of homemakers up to the age of 60 revealed that not only did homemakers under 40 years feed their families better than older homemakers but a negative correlation existed between the age of the homemaker and her use of the milk group (Young et al., 1956).

Growth Status and Educational Level of the Mother

Inferior growth status among children of older mothers may be the result of decreased educational achievement among older homemakers. Furtell, Kilgore and Windham (1971) examined the nutritional status of preschool children in Mississippi. Among their findings was a positive correlation between the dietary intake of nutrients and the educational level of the mother; daily intakes of calcium, iron, vitamin A and vitamin C parallelled her education.

Young, Berresford and Waldner (1956) investigated the nutrition knowledge possessed by the homemaker and showed as the educational level of the homemaker increased so did her utilization of seven food groups, keeping income level stable.

One of the conclusions of an analysis of the ENFP (USDA, 1972) was that more educated homemakers from higher income backgrounds had higher food expenditures and generally had better diets.

In a study in Peru (Graham, 1972) greater stature was seen among children whose mothers had five or more years of schooling compared with those children whose mothers had less than five years of schooling.

Growth Status, Nutrition Knowledge and Dietary Intake

A strong interrelationship exists among the age of the homemaker, her educational achievement, income level, amount spent for food and food stamps, nutrition knowledge, dietary intake and urinary nutrient excretion. Young et al. (1956) noted that the educational level of the homemaker was positively related to nutrition knowledge and that nutrition knowledge does increase the efficiency of the homemaker in feeding her family. Increased nutrient intake would make satisfactory growth status possible. Nutrition knowledge was positively and significantly correlated with education in a study of the homemaker's nutrition knowledge (Bass, 1969).

A portion of the North Central Regional Study (1971) assessed the nutrition knowledge of the homemaker in relation to her attitude toward food and nutrition. Mothers of preschool children were requested to keep a three day food intake record for herself and her child. The mother was interviewed regarding meal planning and food preparation practices and permissiveness toward child feeding. The findings of Eppright and co-workers follow. The amount of money spent for food was highly and positively correlated with energy and nutrient intake. Increasing educational level of the homemaker related to increased intakes of

calcium, iron, thiamin, roboflavin and vitamin C. The more educated the homemaker, the less permissive her attitude towards child feeding and a high negative correlation was determined between permissiveness and attitude toward nutrition, meal planning and food preparation.

Eppright et al. (1969) evaluated the eating behavior of preschool children and found that children by the age of three years have developed negative attitudes towards certain foods, especially vegetables, based on the attitude manifested by a mother or a father. Research by Kerry et al. (1968) also supported the concept that the attitude of family members towards food items by young children is important. A negative orientation towards nutrient rich foods can result in decreased nutrient intake with subsequent decrease in achievement of maximum growth status.

Growth Status and Nutrient Excretion

Nutritional status is reflected in biochemical as well as dietary and anthropometric measures. Urine composition and urinary nutrient excretion can serve to indicate the level of nutrient intake. Kerry et al. (1968) conducted a study in which dietary records of 40 preschool children were kept for three days. Twenty children were of a high socioeconomic background and 20 were from a low socioeconomic

background. Biochemical measurements were made; urinary nutrient excretion was found to be higher among the preschool children of high socioeconomic background whose dietary records were more satisfactory also.

Owen et al. (1969) suggested a relationship among not only nutrient intake, nutrient excretion and growth achievement but also intestinal parasites and poverty in the interplaying factors combining to reduce possibilities for optimum growth status.

McGanity (1969) reported that in the Texas portion of the NSS, unacceptable levels for thiamin and riboflavin excretion were found to be twice as prevalent among the poor as for the population in general. The NNS in Michigan found unacceptable thiamin excretion levels in 6 percent of the population being investigated; 14 percent of this same low income population demonstrated riboflavin excretion levels unacceptable according to standards set by the Interdepartmental Committee on Nutrition for National Defense (ICNND, 1963). Data from the entire Ten State Nutrition Survey (1972) reveal riboflavin excretion levels to be inadequate according to ICNND standards particularly for children under seventeen years and for some Blacks; thiamin excretion was not indicative of any significant health problem.

CHAPTER III

METHODOLOGY

Weight, in pounds, and height, in inches, were the criteria utilized to assess the growth status of the preschool children in this study. Sample selection, instrument design, data collection and analysis procedures will be discussed in this chapter.

Sample Selection

Data on 149 preschool children were collected from selected counties in Michigan: Jackson, Kent, Lenawee, Saginaw, St. Joseph and Wayne. Randomization of the sample was performed by the establishment of a quota of homemakers for each county equal to six times the number of full-time Expanded Nutrition and Family Program (ENFP) aides. Each family consecutively enrolled, within certain time constraints, was deemed randomly selected for the purpose of this study. Commencement of data collection by the research team in a particular county and the enrollment of the last of the quota of homemakers for that county constituted the

the time constraints.

A portion of the sample was also derived from Ingham county, Michigan. The sample selection in Ingham county was carried out by requesting participation of families who had children in the Head Start program. Other low income families also participated. Project families from Jackson, Kent, Lenawee, Saginaw, St. Joseph and Wayne counties belonged to the ENFP; Ingham county families did not. This established a treatment and control group for the purpose of generating change data according to the pre- and post-test design. All preschoolers at the beginning of the study were considered experimentally similar. Data will be presented on the entire group of preschool children.

From the seven counties, data were obtained on 149 preschool children from 108 families. "Preschool" is defined in age as 15 months to 65 months.

Instrument

The research instrument was divided into two parts. Upon initial contact with the homemaker, the ENFP aide routinely collects information regarding family residence, size, monthly income, assistance received by the family, educational level of the homemaker and food consumption by the homemaker within the last twenty-four hours. The

research team copied this information from the aide's enrollment form in order to avoid needless repetition of questioning the homemaker. The interviewer requested information from the homemaker regarding family characteristics in addition to those obtained from the aide's enrollment form. This interview also consisted of collecting urine samples from all willing and able family members and weighing and measuring all available children. These data were recorded on the biological-consumer questionnaire (Appendix A).

The second interview required the homemaker's response to various statements pertaining to four categories: food and nutrition attitudes, child rearing attitudes, general social and educational attitudes and nutrition knowledge. Only parts I and IV are appropriate to this study (Appendices B-1 and B-2).

Prior to actual data collection the questionnaires were pretested on a group of low income homemakers. The instrument was translated into Spanish due to the large number of homemakers of this particular ethnic background in the study.

Preparation for Data Collection

Interviewing technique employed by the research team was standardized (Appendix C). The county extension offices were visited by the research team prior to data collection to acquaint the staff with the procedures to be utilized. Role playing involving the county Home Economist and aides facilitated in-depth explanation of the project methods.

Nutrition aides were requested to enroll the study families in the regular manner and, in addition, to ascertain whether the homemaker would agree to an additional person upon the occasion of the aide's next visit. The aide was instructed not to explain details of the evaluation project and to minimize contact with the homemaker between her enrollment and the arrival of the first member of the research team.

Data Collection

Collection of data from the seven counties continued from November, 1972 to August, 1973.

The member of the research team administering the biological-consumer questionnaire accompanied the nutrition aide on her second visit to the homemaker. The researcher explained the evaluation project to her at this time and requested her co-operation. The homemaker confirmed her

intent to be included in the project by her signature on a consent form (Appendix D).

Urine samples were collected in individual plastic cups provided by the researcher. Specimens were checked immediately for hemoglobin, ketones, glucose, albumin and pH by using Labstix Reagent Strips, from the Ames Company, a division of Miles Laboratories. Results were recorded. When abnormal results were obtained researchers provided slips indicating the specific results which the homemaker could take to her physician (Appendix E). This routine check was performed in part as a service to the family and also to encourage participation from all possible family members by providing immediate feedback. Storage of the specimens in individual brown bottles and acidification with 1 N HCl at 5 mls. HCl per 50 mls. urine stabilized vitamin content. Upon returning to the university, researchers deposited the specimens in a freezing unit where they remained until analysis.

The researcher questioned the homemaker concerning resources available in the home for food preparation, shopping practices, use of vitamin supplements by family members, availability and participation in the School Lunch Program, when applicable. Demographic data pertaining to the family were obtained from the aide's

enrollment form.

As part of the biological-consumer interview the researcher weighed and measured all available children of the homemaker. Weight was measured on a portable bathroom scale with the child in light indoor clothing, no shoes, and recorded to the nearest half pound. Height was measured by having the child stand in stocking feet on a bare floor with shoulders and heels in contact with a flat, vertical surface, such as a wall, and a right angle extending from the crown of the child's head to the wall. The measurement was taken in inches and recorded to the nearest quarter inch. The first interview was concluded by setting up an appointment with the homemaker approximately one week later for the second interviewer's visit to the homemaker.

The second interview consisted of presenting the homemaker with a set of statements pertaining to four categories: food and nutrition attitudes, child rearing attitudes, general social and educational attitudes and nutrition knowledge. The statements were read to the homemaker by the interviewer and the homemaker was requested to give her response verbally, either mild or strong agreement or mild or strong disagreement. The researcher circled the given response on her copy of the questionnaire.

Analysis of Data

Height and weight data from 149 preschool children were analyzed. A ceiling age of 55 months, rather than 65 months for a particular set of standards caused a variation of the number of subjects in one analysis.

Demographic characteristics obtained from the families included residence, urban, farm, or rural-non-farm; ethnic background of the family; family size; family income per month; financial assistance received by the family; ages of family members and educational level achieved by the homemaker. Recipients of the Graduate Equivalent Diploma (GED) were credited with a twelfth grade education. Consumer oriented data were as follows: food preparation equipment available in the home, shopping habits of the homemaker, reasons for food purchases in the market and vitamin supplements taken by family members.

The adequacy of the homemaker's diet was analyzed with reference to the Basic Four Food Groups. For adults this standard specifies two servings each from the meat and milk group and four servings from each of the breads and cereals group and fruits and vegetables group. Each of the four food groups was assigned a maximum value of four. Every serving met in the meat or milk group had a potential value of two while each component of the breads

and cereals and fruits and vegetables groups was awarded one point. The score on a particular homemaker's food recall, then, could range from zero for no items met in any of the groups of the Basic Four to sixteen for all items met in all of the groups. No points were awarded for servings above the requirement in any of the groups.

Urinalyses were performed by a Michigan State University technician who utilized the Technicon Auto-Analyser. Creatinine determination employed Technicon Auto-Analyser method n-11b I/II. Thiamin analysis was carried out by the method developed by Leveille (1972) and automated by Romsos and Kirk (1973). Riboflavin content of the sample was assessed according to the method of Kirk (1973). Thiamin and riboflavin were expressed as micrograms of vitamin per gram of creatinine. In order to categorize results, excretion data were classified according to age and compared to standards established by the ICNND (1963).

Evaluation of growth status consisted of a comparison on the child's achievements in height and weight for his age and sex to standards. Eight categories were generated for both height and weight by the standards established by Stuart and Meredith (Lowrey, 1973, p. 79-80) first category included those subjects falling below the third percentile for height or weight, the second category consisted of the

subjects ranging from the third to the tenth percentiles for height or weight and so on. The frequency and percentage of subjects falling into each of the categories were analyzed. Standards resulting from the research of Robson (in press) enabled the division of the sample into four categories for height and four for weight. Research conducted by Garn (1973) on stature of low income children of different ethnic backgrounds provided arithmetic means from which were computed deviations for this study sample. In addition to the evaluation for height and weight in regards to age, racial differences were assessed. The proportion of the sample in each category was observed for Black and non-Black children.

Analysis of nutrition attitude resulted in a score reflecting a continuum for laissez-faire to planning. The response indicating the most extensive planning was given a value of four, the response indicating the next most extensive planning was given a value of three and so on for the remaining two responses. The sum was then divided by the number of questions to determine a score ranging from four to one indicating a homemaker who favored careful control of nutrient intake and meal planning (four) to one who took for granted that her family would be getting sufficient nutrients from the foods they ate (one).

Nutrition knowledge was analyzed in a similar manner. The most appropriate response, determined by a group of professional nutritionists and graduate students, was given a value of four. Decreasing values were given to decreasingly appropriate responses.

A correlation matrix was devised from all possible combinations of the following variables: height and weight mean height, urinary thiamin excretion, urinary riboflavin excretion, homemaker's attitude towards food and nutrition homemaker's nutrition knowledge, twenty-four food recall of the homemaker, family income and age and educational level of the homemaker. A scattergram was constructed from height and weight scores of the child and the mother's food recall score.

Analyses were run on the Control Data Corporation (CDC) 6500 model computer. Multianalysis of variance (Schiefley and Schmidt, 1973) was used to test the relationship between growth status and race; correlation testing was used on the relationship between growth status and the other parameters investigated.

CHAPTER IV

RESULTS

Demographic Data

Urban dwellers comprised 81.5 percent of the sample in this study. Homemakers classified as rural-non-farm dwellers were 18.5 percent of the population. Ethnic distribution consisted of 54.6 percent. White homemakers, 32.4 percent. Black homemakers and 12.0 percent Spanish American.

TABLE 1

PLACE OF DWELLING AND ETHNIC BACKGROUND
OF PROJECT HOMEMAKERS
(N=108)

Place of Dwelling	Percent of Homemakers
Urban	81.5
Rural-Non-Farm	18.5
Ethnic Background	**Percent of Homemakers**
White	54.6
Black	32.4
Spanish American	12.0

Families ranged in size from two to sixteen members. The mean family size was 4.7 persons with a standard deviation of 1.9 persons. The monthly income for project families ranged from $20 to $990 with a mean of $370 and a standard deviation of $144. The average homemaker was 27.4 years of age and had completed 10.2 years of school.

TABLE 2

FAMILY SIZE, MONTHLY INCOME, HOMEMAKER AGE AND EDUCATIONAL LEVEL (N=108)

	Mean	S.D.	Range
Family Size	4.7	1.9	2-16
Monthly Income	370.4	144.2	20-990
Homemaker Age	27.4	6.4	18-59
Homemaker Education	10.2	2.7	0 - Beyond High School

Food Recall Scores, Nutrition Attitude, Nutrition Knowledge and Nutrient Excretion Levels

Adequacy of food intake was measured by the homemaker's 24 hour food recall. A detailed explanation of the scoring system is found in Chapter III. The mean food recall score was 9.1 food items, out of a possible score of 16 food items. Of the Four Food Groups, homemakers met, on the average, 1.3 food groups each day. The average homemaker consumed

2.0 servings each day from the meat group, 2.7 servings from the breads and cereals group, 1.7 servings of fruits and vegetables and 1.0 servings of milk.

TABLE 3

FOOD RECALL SCORE, NUMBER OF FOOD GROUPS MET, NUMBER OF SERVINGS MET IN FOOD GROUPS (N=108)

	Mean	S.D.	Range
Food Recall Score	9.1	3.2	2.0-16.0
Number of Food Groups Met	1.3	1.1	0.0-4.0
Number of Servings Met in Food Groups			
Meat	2.0	1.0	0.0-2.0
Breads/Cereals	2.7	1.7	0.0-4.0
Fruits/Vegetables	1.7	1.3	0.0-4.0
Milk	1.0	1.1	0.0-2.0

Nutrient excretion levels were classified according to ICNND standards (1963). A mean score for thiamin excretion and standard deviation were 3.8 and 0.5. Riboflavin excretion averaged 2.9 ± .8.

TABLE 4

NUTRIENT EXCRETION LEVEL, NUTRITION ATTITUDE SCORE AND NUTRITION KNOWLEDGE SCORE (N=108)

	Mean	S.D.	Range
Nutrient Excretion Level			
Thiamin	3.8	0.5	1.0-4.0
Riboflavin	2.9	0.8	1.0-4.0
Nutrition Attitude Score	3.2	0.4	1.0-4.0
Nutrition Knowledge Score	2.8	0.4	1.0-4.0

The homemaker's attitude toward food and nutrition, reflected in a score ranging from one, laissez-faire, to four, planning, averaged 3.2 ± 0.4. Nutrition knowledge possessed by the homemaker, also expressed on the basis of four appropriate responses indicating incorrect to correct knowledge averaged 2.8 ± 0.4.

Height and Weight Data

Data from height and weight measurements made on 149 preschool children were compared to standards established by Stuart and Meredith (Lowrey, 1973) and also to standards resulting from research on stature (Robson, in press). Means for stature resulting from research by Garn (1973) were utilized to assess growth status.

Stuart and Meredith (Lowrey, 1973) data were divided into eight categories for both height and weight. The mean height category attained by the preschool children in this study was 3.2; the mean weight category: 3.7. Height and weight means both had standard deviations of 1.8.

TABLE 5

PERCENTAGES OF SUBJECTS IN DIFFERENT HEIGHT AND WEIGHT CATEGORIES ACCORDING TO STUART AND MEREDITH STANDARDS (N=149)

Percentile	Category	Height		Weight	
		N	%	N	%
<3	1	37	12.8	19	12.8
3-10	2	17	11.4	23	15.4
11-25	3	32	21.5	30	20.1
26-50	4	28	18.8	30	20.1
51-75	5	19	12.8	20	13.4
76-90	6	8	5.4	15	10.0
91-97	7	4	2.7	8	5.4
>97	8	4	2.7	4	2.7
Mean Category		3.2		3.7	
S.D.		1.8		1.8	

Four categories resulted from research by Robson (in press). According to Robson's standards the preschool children attained a mean height category of 2.5 (S.D. = 0.6) while mean weight category was 2.4 (S.D. = 0.6).

TABLE 6

PERCENTAGES OF SUBJECTS IN DIFFERENT HEIGHT AND WEIGHT CATEGORIES ACCORDING TO ROBSON STANDARDS (N=121)

Percentile	Category	Height		Weight	
		N	%	N	%
<3	1	2	1.7	2	1.7
3-50	2	60	50.0	73	60.3
51-97	3	52	43.0	42	34.7
>97	4	7	5.8	4	3.3
Mean Category		2.5		2.4	
S.D.		0.6		0.6	

The data were analyzed for racial differences in growth status. According to Stuart and Meredith (Lowrey, 1973) the mean height category for Black children was 3.9 ± 2.0 while the value of this parameter for non-Black children was 2.9 ± 1.7. Chi square testing showed that H_o may be rejected at the .025 level of confidence.

TABLE 7

PERCENTAGES OF CHILDREN, BLACK AND NON-BLACK, IN DIFFERENT HEIGHT CATEGORIES ACCORDING TO STUART AND MEREDITH STANDARDS (N=149)

Percentile	Category	Black (N=47) N	Black (N=47) %	Non-Black (N=102) N	Non-Black (N=102) %
<3	1	6	12.8	31	30.4
3-10	2	3	6.4	14	13.7
11-25	3	13	27.7	19	18.6
26-50	4	9	19.2	19	18.6
51-75	5	8	17.0	11	10.8
76-90	6	2	4.3	6	5.9
91-97	7	2	4.3	2	2.0
>97	8	4	8.5	0	0.0
Mean Category		3.9		2.9	
S.D.		2.0		1.7	
Chi Square	17.2	degrees of freedom = 7		p=.025	

Weight data indicate mean categories of 4.3 ± 2.0 and 3.4 ± 1.2 for Blacks and non-Blacks, respectively. The null hypothesis may be rejected for weight also (p=0.025).

TABLE 8

PERCENTAGES OF CHILDREN, BLACK AND NON-BLACK, IN DIFFERENT WEIGHT CATEGORIES ACCORDING TO STUART AND MEREDITH STANDARDS (N=149)

Percentile	Category	Black (N=47) N	Black (N=47) %	Non-Black (N=102) N	Non-Black (N=102) %
<3	1	6	12.8	13	12.8
3-10	2	3	6.4	20	19.6
11-25	3	4	8.5	26	25.5
26-50	4	12	25.5	18	17.7
51-75	5	10	12.3	10	9.8
76-90	6	6	12.8	9	8.8
91-97	7	3	6.4	5	4.9
>97	8	3	6.4	1	1.0
Mean Category		4.3		3.4	
S.D.		2.0		1.7	
Chi Square	16.5	degrees of freedom = 7		p=.025	

Analysis of growth data according to standards supplied by Robson (in press) showed similar trends. Mean height categories were 2.7 ± 0.6 and 2.4 ± 0.7 for Black and non-Black children, respectively. (H_o rejected at .05 level of confidence.)

TABLE 9

PERCENTAGES OF CHILDREN, BLACK AND NON-BLACK, IN DIFFERENT HEIGHT CATEGORIES ACCORDING TO ROBSON STANDARDS (N=121)

Percentile	Category	Black (N=39) N	Black (N=39) %	Non-Black (N=82) N	Non-Black (N=82) %
< 3	1	0	0.0	2	2.4
3-50	2	13	33.3	47	57.3
51-97	3	24	61.5	28	34.2
>97	4	2	5.1	5	6.1
Mean Category		2.7		2.4	
S.D.		0.6		0.7	
Chi Square	10.2	degrees of freedom = 3		p=.025	

Weight means were 2.6 ± 0.6 and 2.3 ± 0.5 for Black and non-Black preschool children, respectively. The null hypothesis for weight can be rejected at the .025 level of confidence.

TABLE 10

PERCENTAGES OF CHILDREN, BLACK AND NON-BLACK, IN DIFFERENT WEIGHT CATEGORIES ACCORDING TO ROBSON STANDARDS (N=121)

Percentile	Category	Black (N=39) N	Black (N=39) %	Non-Black (N=82) N	Non-Black (N=82) %
<3	1	0	0.0	2	2.4
3-50	2	17	43.6	56	68.3
51-97	3	19	48.7	23	28.1
>97	4	3	7.7	1	1.2
Mean Category		2.6		2.3	
S.D.		0.6		0.5	
Chi Square	10.2	degrees of freedom = 3		p=.025	

An investigation of the proportion of subjects in each category was carried out to determine at exactly which percentiles racial differences in growth were significant. Expected and observed values for each category for height and weight were compared. A significant racial difference in height was observed in the first category only when comparisons were made according to Stuart and Meredith standards (Lowrey, 1973).

TABLE 11

INVESTIGATION OF PROPORTION OF SUBJECTS IN HEIGHT CATEGORIES ACCORDING TO STUART AND MEREDITH STANDARDS (N=149)

Percentile	Category	Black (N=47) Expected	Black (N=47) Observed	Non-Black (N=102) Expected	Non-Black (N=102) Observed	Significance
<3	1	11.7	6	25.3	31	.025
3-10	2	5.4	3	11.6	14	ø
11-25	3	10.1	13	21.9	19	ø
26-50	4	8.8	9	19.2	19	ø
51-75	5	6.0	8	13.0	11	ø
76-90	6	2.5	2	5.5	6	ø
91-97	7	1.3	2	2.7	2	ø
> 97	8	1.3	4	2.7	0	ø

Significant weight differences between Black and non-Black preschool children were seen in the second and third categories.

TABLE 12

INVESTIGATION OF PROPORTION OF SUBJECTS IN WEIGHT CATEGORIES ACCORDING TO STUART AND MEREDITH STANDARDS (N=149)

Percentile	Category	Black (N=47) Expected	Black (N=47) Observed	Non-Black (N=102) Expected	Non-Black (N=102) Observed	Significance
<3	1	6.0	6	13.0	13	ø
3-10	2	7.3	3	15.7	20	.025
11-25	3	9.5	4	20.5	26	.025
26-50	4	9.5	12	20.5	18	ø
51-75	5	6.3	10	13.7	10	ø
76-90	6	4.7	6	10.3	9	ø
91-97	7	2.5	3	5.5	5	ø
>97	8	1.3	3	2.7	1	ø

Analysis of height data according to Robson's standards (in press) revealed a significant difference between expected and observed values in the second and third categories for height.

TABLE 13

INVESTIGATION OF PROPORTION OF SUBJECTS IN HEIGHT CATEGORIES ACCORDING TO ROBSON STANDARDS (N=121)

Percentile	Category	Black (N=39) Expected	Black (N=39) Observed	Non-Black (N=82) Expected	Non-Black (N=82) Observed	Significance
<3	1	.6	0	1.4	2	Ø
3-50	2	19.3	13	40.7	47	.05
51-97	3	16.8	24	35.2	28	.05
> 97	4	2.4	2	4.7	5	Ø

Weight data was significantly different between blacks and non-Blacks in the second category only.

TABLE 14

INVESTIGATION OF PROPORTION OF SUBJECTS IN WEIGHT CATEGORIES ACCORDING TO ROBSON STANDARDS (N=121)

Percentile	Category	Black (N=39) Expected	Black (N=39) Observed	Non-Black (N=82) Expected	Non-Black (N=82) Observed	Significance
<3	1	.6	0	1.4	2	Ø
3-50	2	23.6	17	49.5	56	.025
51-97	3	13.5	19	28.5	23	Ø
>97	4	1.3	3	2.7	1	Ø

Garn (1973) computed means for stature with reference to age and race from children in the Ten State Nutrition Survey (1972). These means were used to evaluate racial differences in the growth status of the preschool children in this study. A grand mean of zero was formed from Garn's means. The height mean for Black children in this study was greater than the grand mean by 0.8 ± 1.9 cm. The difference between the grand mean and the mean for non-Black children was 0.3 ± 1.7 cm. Analysis of variance testing of these two values revealed a significant racial difference in stature ($p \leq 0.003$).

Relationships were observed among various parameters in the correlation matrix. Heights and weights correlated at the 0.01 level. Positive correlations ($p \leq 0.01$) were observed between the age of the homemaker and family income; between riboflavin and thiamin excretion; between the educational level of the homemaker, her nutrition attitude and nutrition knowledge; between her nutrition knowledge and food recall. Positive correlations at the .05 level were observed for some growth status parameters: Homemakers age and height and weight according to Stuart and Meredith standards (Lowrey, 1973) and nutrition knowledge of the homemaker and weight according to Robson standards (in press) and height according to Stuart and Meredith

standards (Lowrey, 1973).

A scattergram constructed from the height and weight score of the child and the mother's food recall score revealed no consistent pattern.

FIGURE 1

FOOD RECALL SCORE OF HOMEMAKER - HEIGHT CATEGORY OF CHILD

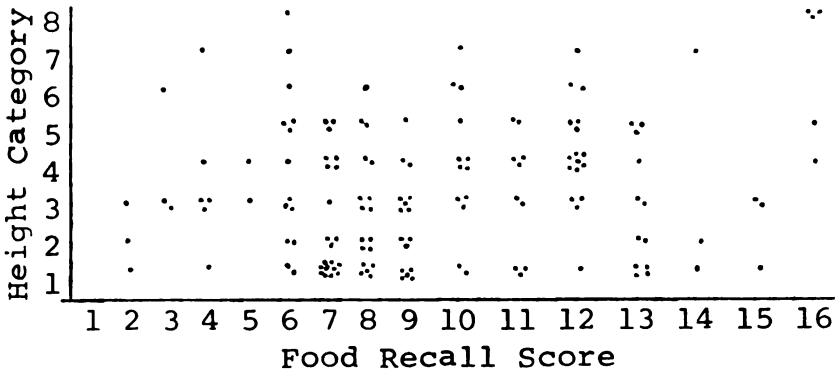

FIGURE 2

FOOD RECALL SCORE OF HOMEMAKER - WEIGHT CATEGORY OF CHILD

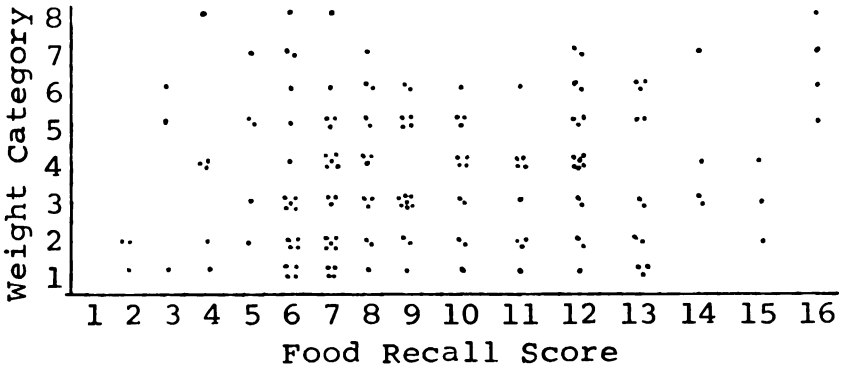

TABLE 15

CORRELATION MATRIX BETWEEN THIRTEEN VARIABLES

	Weight-Robson	Height-Robson	Mean Height-Garn	Weight Stuart-Meredith	Height Stuart-Meredith	Income	Homemaker Age	Food Recall	Thiamin Excretion	Riboflavin Excretion	Nutrition Attitude	Homemaker Education	Nutrition Knowledge
Weight-Robson	1.000												
Height-Robson	.427[a]	1.000											
Mean Height-Garn	.699[a]	.434[a]	1.000										
Weight Stuart-Meredith	.519[a]	.817[a]	.559[a]	1.000									
Height Stuart-Meredith	.786[a]	.526[a]	.797[a]	.674[a]	1.000								
Income	-.130	.148	-.038	-.030	-.142	1.000							
Homemaker Age	-.058	.193	.068	.206[b]	.211[b]	.256[a]	1.00						
Food Recall	.039	-.145	.157	.062	.105	-.051	-.027	1.000					
Thiamin Excretion	.106	.040	.092	.010	.055	-.052	.064	.015	1.000				
Riboflavin Excretion	-.139	-.124	.033	-.163	.032	.021	.153	.072	.405[a]	1.000			
Nutrition Attitude	-.034	-.170	.112	-.056	.103	-.050	-.118	.130	.117	.199	1.000		
Homemaker Education	.173	.171	.164	.120	.151	.020	-.034	.105	-.012	.032	.280[a]	1.000	
Nutrition Knowledge	.230[b]	-.070	.186	.044	.207[b]	.216[b]	-.022	.333[a]	.018	.030	.445[a]	.209[b]	1.000

[a]indicates significance at .01

[b]indicates significance at .05

CHAPTER V

DISCUSSION

Growth status of 149 preschool children was determined. Standards established by Stuart and Meredith and recorded by Lowrey (1973) were used. Heights and weights of this group of children were analyzed according to standards resulting from recent research also. (Robson, in press). Garn (1973) has developed standards for stature according to race from National Nutrition Survey (NNS) data. These standards were used to compare stature of Black and non-Black preschool children.

Children in this study were members of families belonging to the ENFP in Lenawee, Jackson, Kent, Saginaw, St. Joseph or Wayne counties or to demographically similar families in Ingham county. The similarity between the socioeconomic background of these families and those in the NNS allows comparison. In that this survey was conducted in Michigan, data from the Michigan portion of the NNS (MNS) will be used for comparison when possible.

Demographic data from the MNS reveal an ethnic

distribution of approximately 50 percent White, 49 percent Black and less than one percent Spanish-American. The ethnic background of families in this project were divided as follows: 55 percent White, 32 percent Black and 12 percent Spanish-American. While Blacks made up only 11 percent of the National population according to 1967 census figures, one third of poor people are Black. This is closely in line with the demographic data obtained in this study.

The mean family size for our sample was 4.73 persons while MNS families averaged 5.82 persons. Non-Blacks usually have smaller families than Blacks (MNS, 1971); the percentage of Black families in our study was smaller than that in the MNS. Family size has been suggested as a negative correlate of growth in that more competition exists for such basic life-necessities as food (Lowe, 1967).

Mean monthly per person income in the MNS was $84.77 in 1969. This same figure in this evaluation project was $78.22 in 1972. Taking annual inflation into account a poor person had considerably less in 1972 to spend on food than in 1969. Cost ranks first in influence upon homemaker's food purchase decisions (Duff, 1974). Decreased income further increases the difficulty of selecting nutritious foods in the case of the poor.

The preschool child is nutritionally at risk (Owen

et al., 1969). The child at this age is more dependent upon those in his near environment (Sims, 1971). The near environment experienced by the preschool child is most directly influenced by the homemaker. The average homemaker in this study was a 27 year old urban dweller with a tenth grade education. While the younger homemaker has been shown to perform better in family feeding than the older homemaker (Young et al., 1956) educational level also affects family feeding. More educated homemakers tend to feed their families more nutritious meals than less educated homemakers (Bass, 1969; Eppright et al., 1969; Furtel et al., 1971). The educational level of homemakers in this project suggests that room for improvement in family feeding performance exists.

Homemakers' food recall scores showed the meat group to be the one most frequently met followed by breads and cereals, then, fruits and vegetables. The milk group was met least frequently.

Young children have been shown to adopt eating behaviors of family members (Kerry et al., 1968 and Emerson, 1967). Although food recalls were not taken on the preschool child it is presumed that his diet is similar to that of the homemaker. This suggests that the child is eating a diet consisting predominantly of meat and bread

items with few fruits and vegetables and little milk. Food recalls have been called a test of memory in individual cases but are considered reliable when taken on a group (Beal, 1967). Food recalls for preschool children would have to be supplied by the homemaker, but these were not taken as a greater chance of error exists in the reporting of food consumption of the child by the homemaker than in the reporting of food consumption of the homemaker, herself.

Riboflavin and thiamin excretion data were compared to ICNND (1963) standards. A mean score of 3.82 for thiamin excretion was obtained. Thiamin nutriture would appear adequate in this population. Riboflavin excretion, however, was not as adequate as thiamin excretion. This might be expected from the low milk consumption. The mean riboflavin excretion score was 2.87. This finding concurs with NNS data which showed riboflavin nutriture to be inadequate among Blacks and the poor.

Eppright and her co-workers (1970) showed a high positive correlation between food and nutrition attitude and nutrition knowledge. Mean nutrition attitude in this study, 3.2 on a scale of four, indicated a homemaker who favored planning for nutrient intake as opposed to laissez-faire which would have been indicated by a lower score.

These two factors combine to indicate a homemaker who considered nutrition important enough to plan for but whose nutrition knowledge may not be up to the task.

Height and weight data were collected according to the demands of the field situation. In order to obtain the co-operation of the homemaker interview appointments were made at her convenience. This resulted in weighing and measuring children at various times during the day. In that this was not a clinic situation researchers used portable bathroom scales and wooden measuring tapes and measured children in light indoor clothing. Consistent technique should minimize differences resulting from this method.

Comparison of height and weight data to Stuart and Meredith standards (Lowrey, 1973) showed 25 percent of children to be below the third percentile for height and 13 percent below this same figure for weight. Substantial growth retardation, particularly in height, among low income children is concluded. This finding was demonstrated in the MNS (1971) in which 46.5 percent of children measured fell one or more standard deviations below the Stuart and Meredith (Lowrey, 1973) mean for height while 28.8 percent of children measured fell one or more standard deviations below the mean for weight. Other research

supports the possibility of growth retardation under depressed socioeconomic conditions (Chase, 1971, 1973; McGanity, 1969; Sandstead, 1971; Goldsmith, 1965). Greater retardation was seen for height than for weight. Fryer (1972) hypothesized that foods eaten by the poor contribute more to weight than to height.

Robson (in press) developed growth standards specifically for the child's background after working with Black and White, low income children. Data from this research are in agreement with Robson's results. This suggests that perhaps Stuart and Meredith standards should be applied only to children of ethnic backgrounds similar to the backgrounds of the children from whom the standards were derived. This possibility has been suggested by other researchers (Falkner, 1962a and 1962b; and Tanner, 1966).

A genetic disposition may exist among Black children for greater stature. In the MNS (1971) while all groups of children showed growth retardation, more non-Blacks than Blacks were concentrated at the lower percentiles for height: 53 percent of the non-Black children were one or more standard deviations below the Iowa mean for height while only 38 percent of the Black children were one or more standard deviations below the mean. This same trend appeared in weight data: 31 percent of non-Black

children as opposed to 25 percent of Black children were below one standard deviation from the mean. Similar results have been reported by other researchers. (Moore, 1970; Verghese et al., 1969; Wingred, 1971; and Barr, 1972). Analysis of data from this project showed that fewer ($p \leq 0.025$) Black children than non-Black children fell into the lower percentiles for height and weight when Stuart and Meredith standards (Lowrey, 1973) were utilized.

Non-Black children were different ($p \leq 0.05$) from Black children when analyzed according to Robson's standards (in press). Results from analysis according to Garn's (1973) standards also showed Black preschoolers to be significantly ($p \leq 0.003$) taller than non-Black children. The fact that similar results were obtained regardless of the standards used for analysis gives strong support to a racially based difference in stature.

Conclusions

1. The children in this study, representing a northern, urban, low income population, are retarded in height and weight.
2. A racial difference was observed in statural growth.
3. Growth standards appropriate to the ethnic

background of the child should be used when evaluating the growth status of a child.

4. The diet of the preschool children in this study, if it follows the pattern of the northern, urban, low-income homemaker is low in fruits and vegetables and milk, and has a higher proportion of cereals and meats.

Suggestions for Future Research

1. Future research might include weighing and measuring these children again after a two year period to see if they retain their retarded growth status or if some "catch-up phenonom" has occurred.
2. Gathering of other biochemical (i.e. blood) specimens and anthropometric (i.e. head circumference, triceps measurement) might shed further light on the nutritional status of the population and causes thereof.
3. As a slight correlation was observed between the height and weight of the child and the nutrition knowledge of the homemaker further investigation of improvement in the growth status of the child with improvement in the nutrition knowledge of the homemaker might be warranted.

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APPENDIX A

Biological-Consumer Questionnaire

BIOLOGICAL DATA

County _____

Family ID Number _____

Part I. General Family Information Group sessions_____

Total number of aide visits with homemaker or family member_____

Check for residence location: _____ NI

_____ urban

_____ rural non-farm

_____ farm

Check for aid received by family: _____ NI

Yes	No	
____	____	USDA Food Stamps
____	____	USDA/FHA Assistance
____	____	Welfare
____	____	Social Security
____	____	Other (specify) _____

Homemaker's 6-month 24-hour Food Recall (record actual number of servings)

_____ NI

_____ Meat group

_____ Milk group

_____ Fruit-vegetable group

_____ Bread-cereal group

Net family income for last month (dollars) _____

Amount spent for food/food stamps last month _____

If receiving food stamps, value of bonus stamps received_____

BIOLOGICAL DATA

County _____

Family ID Number _____

Information for Phase I

If homemaker was pregnant at entry into the program, what trimester of pregnancy was she in at that time?

____ NA ____ NI Circle trimester: 1 2 3

Amount spent for food/food stamps at program entry _____

If receiving food stamps, value of bonus stamps received at program entry _____

BIOLOGICAL DATA County Code _____ Family ID Number _____ Part II Individual Information

Name	Individual ID	Use of vitamin pills	Relation to Homemaker	Sex	Birth Date	Participation in School Lunch	Avail. of School Lunch	Ht.	Wt.	Urine Specimen					
										No.	Hb.	Ket.	Glu.	Alb.	pH

BIOLOGICAL DATA

County _____

Family ID Number _____

Part III. Family Interview

Date _____

What grade did you complete in school? _____

If high school incomplete did you take G.E.D. test?

_____ NI _____ NA _____ Yes _____ No

Did you have a course in nutrition in high school or elsewhere, other than in the Expanded Nutrition Program?

_____ NI _____ Yes _____ No

Check for homemaker:

_____ NI

_____ non-pregnant

_____ pregnant (circle trimester: 1 2 3)

_____ lactating

Do you have a garden or did you have one this past summer?

_____ NI _____ Yes _____ No

Check for equipment available: _____ NI

Yes	No	
____	____	Stove/range
____	____	Oven
____	____	Hot plate
____	____	Electric frying pan
____	____	Refrigerator (one-door)
____	____	Refrigerator/freezer combination (two-door)
____	____	Separate freezer

BIOLOGICAL DATA

County Code _____

Family ID Number _____

Part III. (continued)

____ ____ Ice box

____ ____ Electricity

____ ____ Running water

____ ____ Indoor bathroom

Who does the grocery shopping for your family most of the time?

_____ NI

_____ mother

_____ father

_____ mother & father

_____ children

_____ mother & children

_____ other relative

_____ non-relative

_____ other combination

Where do you (or other person) usually shop for groceries?

_____ NI

_____ supermarket

_____ small neighborhood store

_____ specialty food store

_____ Other (specify) _____

How far away from your home is this store?

_____ NI

_____ less than 1 mile

_____ 1-5 miles

_____ 6 miles or more

BIOLOGICAL DATA

County Code _____

Family ID Number _____

Part III. (continued)

How do you usually get to the store?

_____ NI

_____ family car

_____ neighbor, friend, relative drives their car

_____ walk

_____ bus

_____ taxi

_____ bicycle

_____ other (specify) _____

Is there any other store where you occasionally buy groceries?

_____ NI

_____ no

_____ supermarket

_____ small neighborhood store

_____ specialty food store

_____ other (specify) _____

When you go grocery shopping, there are many, many different kinds of food you could buy. What kinds of things help you decide what to buy? Record 2 responses.

_____ NI

_____ cost--whether I can afford it

_____ I or someone in my family likes it

_____ it is on my grocery list

BIOLOGICAL DATA

County Code _____

Family ID Number _____

Part III. (continued)

_____ I am out of it/need it

_____ I need it for something special

_____ it is on sale

_____ It is easy to prepare/quick/convenient

_____ I compare costs per unit/comparison price shop

_____ it is a new product someone wanted to try

_____ it is good for us--nutrition

_____ it is in season

_____ it is a specific brand

_____ the way it looks--appearance of packaging

_____ the way it looks--quality of product

_____ I plan my meals and shop accordingly

_____ what will stretch for a long time

_____ other (specify) _____

APPENDIX B

1. Food and Nutrition Attitude Questionnaire
2. Nutrition Knowledge Questionnaire

(1) SA MA MD SD Children will eat the right things if they pick what they want to eat.

(2) SA MA MD SD If a child drinks enough milk, his mother doesn't need to worry about nutrition.

(3) SA MA MD SD The foods that children eat will have a big effect on their health in the future.

(4) SA MA MD SD As long as children eat a lot, they will get all the vitamins and other nutrients they need.

(5) SA MA MD SD It's all right for people to snack between meals.

(6) SA MA MD SD A good mother should make her child eat what she thinks is best for him.

(7) SA MA MD SD If children are not sick, it means they are eating the right foods.

(8) SA MA MD SD Parents should let their children eat whatever they want.

(9) SA MA MD SD Dessert always just adds extra calories but no other nutrients to a family's diet.

(10) SA MA MD SD Children's foods have so many vitamins added to them that parents don't need to worry about their children's nutrition.

(11) SA MA MD SD It is all right for children to choose their own food as long as they do not always pick the same thing.

(12) SA MA MD SD Young children don't grow correctly if they eat the wrong foods.

(13) SA MA MD SD Children should be able to choose what they want to eat for meals even if it means a little more work for the mother.

(14) SA MA MD SD If children have plenty of liquids, their mothers don't need to worry about what they eat.

(15) SA MA MD SD If a child doesn't like to eat breakfast, it is better to let him go without it than to start the day off with an argument.

(16) SA MA MD SD Nutrition is one of the most important concerns a mother has for her family.

(17) SA MA MD SD If a child wants a particular food to eat, it is important to let him have it.

(18) SA MA MD SD As long as the doctor doesn't say anything to a mother about nutrition, she doesn't have to worry about it.

(19) SA MA MD SD A child should always be made to eat everything on his plate.

(20) SA MA MD SD Eating fruits and vegetables is important for children but doesn't make much difference for adults.

(1) SA MA MD SD Meat, milk, and eggs all have lots of nutrients which are needed for the growth of small children.

(2) SA MA MD SD When children have enough food to satisfy their appetites, they are getting enough nutrients.

(3) SA MA MD SD Gelatin desserts are a good source of protein.

(4) SA MA MD SD It is better not to have orange juice and milk in the same meal because the orange juice causes the milk to curdle in the stomach.

(5) SA MA MD SD Eating bacon for breakfast is a very good way to get the protein that is needed for the day.

(6) SA MA MD SD School-age children need to have vitamin pills every day for good health.

(7) SA MA MD SD A good easy way to lose weight is to skip breakfast.

(8) SA MA MD SD Applies have a lot of Vitamin C.

(9) SA MA MD SD Healthy, active young children need some sweets, such as candy or cake, each day for energy.

(10) SA MA MD SD It is best to avoid eating milk and fish together.

(11) SA MA MD SD Adding soda while cooking vegetables and dried beans makes them easier to digest.

(12) SA MA MD SD Dried beans contain many of the same nutrients as meat.

(13) SA MA MD SD Year-old babies should eat different kinds of foods, since drinking only milk may not be enough for growth.

(14) SA MA MD SD White bread and cereals that are enriched are better for both children and adults than those that are not.

(15) SA MA MD SD Eating cheese causes constipation.

(16) SA MA MD SD It is important to eat many kinds of foods from day to day.

(17) SA MA MD SD Adults should avoid fat in their diets in order to prevent heart diseases and strokes

(18) SA MA MD SD Milk is needed mainly by infants and growing children.

(19) SA MA MD SD Lemonade and orange juice have about the same amounts of Vitamin C.

(20) SA MA MD SD Peanut butter is a nutritious food for both children and adults.

(21) SA MA MD SD Most fat children and adults have a problem with their glands.

(22) SA MA MD SD A reducing diet should not contain bread or potatoes.

(23) SA MA MD SD Skim milk has about the same amount of minerals and protein as whole milk.

(24) SA MA MD SD Eating carrots helps a person see better.

(25) SA MA MD SD If a person drinks enough orange juice, he won't get a cold.

APPENDIX C

1. Interviewing procedure for biological data

2. Interviewing procedure for attitudinal data

APPENDIX C-1

Interviewing Procedure for Biological Data

"Hello! I am _____, a graduate student from Michigan State University.

"We are adding something new to the Expanded Nutrition Program. It is something only for new families now being enrolled. It is something you can participate in if you want to, but you don't have to. We would like to provide a free mini-health check-up for the new families. We do this with a urine sample.

"Now, if you've ever gone to the doctor, he's probably asked you for a urine sample. He probably gave you a cup like this, (show collection cup) for you to collect the urine in. Some doctors test urine with dip-sticks like these (show Labstix). He dips it into the urine, then checks the colors against those on the bottle here (show chart on bottle).

"This tells him a few things about your general health; it doesn't tell him everything. One thing it does check for is sugar, though. It also tests for blood in the urine.

"This urine test is very quick and easy to do. We can do it right here in your home and tell you the results right away. We feel it is a very good thing to have done. Would you be interested in participating in this mini-health check? (Pause) Do you have any questions? (Pause)

"After we test the urine here, we would like to take the sample back to Michigan State University and there we'll check it for certain vitamins. Your sample will be given a number so no one will

know it's yours. We want to get an idea of how well families in the Expanded Nutrition Program are getting these vitamins. We hope this will help us make the program better for you and other families. Do you have any questions?

"I would also like to weigh and measure your preschool children, and I have just a few questions for you.

"Next week when the aide comes, she'd like to bring another girl with her. This girl will bring a series of statements about things like nutrition, children, and education. These are statements that people have many different opinions about. There are no right and wrong answers; she'll just be interested in learning how you feel about these things. Do you have any questions?

"The information which you give us will be combined with that from other families, but it will never be identified as coming from a particular person by name. We are interested in <u>group</u> information. After you have worked with the aide for about 9 months or so, I would like to come back and visit with you again. Would you like to participate in our project? (If 'yes', proceed.)

"I have to show my supervisor that I was here and have your permission to do this. I'll read this statement (read permission slip.) Since you want to participate, would you please sign here? I'll have the aide sign also."

APPENDIX C-2

Interview Procedure for Attitudinal Data

"We are interested in knowing what you think or feel about some things. These are things that a lot of people have different ideas about, but that doesn't mean that any of them are right or wrong. For example, you and your neighbor or best friend may not agree about many of them; what we really want to know, then, is what you think about each one.

"For each item, I'd like for you to say whether you strongly agree, mildly agree, mildly disagree, or strongly disagree. I have some cards that have those different responses on them, so you can look at them while you think about each item and then show me which one is the closest to your opinion for that item. Here are the cards. (Present cards in the order SA-MA-MD-SD, labeling each as it is presented, so that the SA is on the respondent's left and the SD on her right.)

"I'll also give you a copy of the statements so that you can follow while I read them if you'd like.

"Let's try a sample item first. For example, if I gave you this statement --

> People generally base their decisions on past experiences.

-- how would you respond to it? (Be sure that respondent indicates her response by pointing to a card and verbalizing the response, if possible, so that you are sure she understands the procedure. Clarify if necessary.)

"Good. Are there any questions?

APPENDIX D

Permission--Proof of Home Call

APPENDIX D

Permission--Proof of Home Call

The Expanded Nutrition Evaluation Project has been explained to me.

I am willing to participate and have members of my family participate in the project.

I understand that I will be interviewed at agreed upon times, that my young children (if I have any) may be weighed and measured, and we will be asked to supply urine samples.

_____
Homemaker

_____
Aide

_____

APPENDIX E

Physician Referral Slip

APPENDIX E

Date: _____

Time: _____

To Whom It May Concern:

In doing a routine uninalysis for research project of the Expanded Nutrition Program, subject _____ showed a positive test for _____. The test was made using Labstix produced by the Ames Company, a division of the Miles Laboratories.

Signed: _____
Research Assistant