PRESCHOOL CHILDREN'S MEALTIME BEHAVIOR RELATED TO GROWTH

by

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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

INTRODUCTION

The preschool-age child is in a period of life when there is rapid change in growth and development. It is a critical period for the child's future health and well being. These growth and development changes make the child more susceptible to disease, social stress and nutritional inadequacies (1). It is widely believed that environmental factors play an important role in the child's development, both physical and mental (2-5).

Nutritional status is a term used to measure the response of the body to the nutrients it has ingested (6). Environmental factors such as nutrient intake, food preference and family have been studied in relation to nutritional status (2, 7, 8), but little is known about the effect of mealtime behavior on nutritional status. Anderson (9) did find that mothers report of child feeding behavior was positively correlated to child's growth. Many of the researchers that have dealt with mealtime behavior have studied institutionalized individuals (10, 11). They have attempted to find the factors effecting mealtime behavior so that changes could be made to improve behavior.

Determining if a relationship exists between nutritional status and mealtime behavior would be helpful in improving the nutritional status of children. The objective of this study was to observe mealtime behavior of children in a university daycare center and relate it to nutritional status.

REVIEW OF LITERATURE

Mealtime Behavior

Food habits that are developed during the preschool years are believed to have a strong influence on the food habits that persist into adulthood (4, 12-15). This is a basic premise for much of the research done on preschool children and their food behavior. Wagner (12) believed that food habits result from the repetition of different experiences with specific foods. Niehoff (16) stated that food habits were traditional and that they even influence the way food is prepared and is ingested.

Food habits are influenced by a number of factors during the preschool years. Eppright et al (17) believed that the knowledge of · those different influences was necessary for an effective nutrition education program. Children's food preferences are affected by a wide range of environmental factors, such as home, school and peers (18). Food habits are difficult to change because they are so deeply rooted in tradition and culture (16). Dwyer and Mayer (19) reported that overnutrition in early life leads to a higher incidence of obesity in adult life. Preschool years are, therefore, a crucial time for establishing appropriate food behavior and may affect lifelong food habits (12).

There have been few studies of the relationship of food habits and nutritional status (13, 20). Ireton and Guthrie (21) alluded to this relationship in tracing the progression of food

patterns to food choice which in turn determines the nutrients that are eaten. Nutritional status is the condition of an individual which is determined by the food (nutrients) that are regularly ingested (22). Food habits established during the preschool years affect food choice and thus a person's nutritional status throughout life (3, 13, 14, 23).

There have been several studies on the nutritional status of preschool children in the United States. The results of the North Central Region study of preschool children's food habits indicated that 22% of the children had diets providing less than two-thirds of the National Research Council's Recommended Dietary Allowances (NRC-RDA) for one or more nutrients. The research of Kerrey et al (23) was based on the premise that food practices established in the early years affected the food choice and consequently the nutritional status of individuals the rest of their lives. In that study all mean intakes except for iron and calcium met the NRC-RDA in both the low and high income groups. The Owen Preschool Child study was a comprehensive and cross-sectional study. The researchers looked at dietary, biochemical and socioeconimic status. Owen et al (24) found that children's reactions to new foods did not seem to be related to socioeconomic status. Eppright et al (14) and Dierks (25) found that preschool children have a high incidence of iron deficiency.

Studies such as these have lead researchers to believe that poor nutrition is a part of many American's lives and that it is not

limited to any specific socioeconomic group (26). This is a serious problem because poor nutrition is a factor in many diseases (27). Poor nutrition practices may lead to specific nutrient deficiencies or to overnutrition and consequent obesity (5). Obesity is increasing in the United States and is a serious health problem in itself (19). Obesity is also a risk factor in such problems as heart disease and hypertension. It is possible to use nutrition education to change food habits and behavior and in this way improve the health and nutritional status in the community (24).

The ideal time to favorably influence food habits is during the preschool years when food behavior is forming. There have been many studies on the different factors that affect food habits and, in so doing, nutritional status. Dietary intake is one factor that has been found to affect the physical and mental development of a child (4). The child's food preferences, likes and dislikes, are also important factors (8). Yperman and Vermeersch (18) found that many environmental factors such as home environment, nutrition knowledge, school and the social environment of the child affect food behavior.

There have been few studies conducted to find out what type of food behavior has positive or negative effects on food intake and therefore nutritional status. Several authors have related appetite to mealtime behavior (13, 28). Pipes (13) stated that the appetite of a preschooler is erratic and therefore the child will behave differently towards feeding situations depending on the appetite.

Baldwin (28) told of the relationship between the family and a child's eating behavior. Affection and attention encourage a wider range of food preferences while a strict atmosphere produces good table manners but not necessarily a good appetite. A parent who is strict but approving produces children with good appetites and behavior. If such children are allowed free food choices they will be healthy and socially well-adjusted. Wagner (12) found from research with preschoolers in a nursery school atmosphere that a relaxed, non-pressured eating atmosphere led to a healthier atti- tude about eating and mealtime.

Inappropriate and appropriate mealtime behavior has been studied by various workers. Dreyer and Dreyer (29) observed 40 middle-class preschool children during their family dinner time. Mealtime was found to be a highly socialized situation where parents stressed discipline. As a result of the observations during this study, preschool children's mealtime behavior was characterized in relation to the family. O'Brien (11) defined inappropriate and appropriate feeding behaviors in terms of self-feeding and the child's response to the eating environment. Many of the defined behaviors dealt with the interaction between the child and the eating utensil or the food itself. Barton (10) defined mealtime behaviors of institutionalized children in preliminary observations. The children's mealtime behavior was observed and recorded according to the behavior that had been previously defined. The mealtime behavior dealt mainly with the use of utensils and manipulation.

McMahon and Forehand (30) studied inappropriate and appropriate behavior, as established by Barton (10) and Dreyer and Dreyer (29), in normal preschool children in their home environment. Behavior was recorded and then a training program was initiated with the family to change the observed inappropriate behavior. The behavior change was made by using written instructions to the parents and children's inappropriate behavior was decreased by 50 to 80%.

Mealtime is a very important time in the development of social interactions and physical abilities. In characterizing the factors affecting food intake, the Committee on Nutrition for the American Academy of Pediatrics suggested that mealtime can be very emotional for a child. The feelings a child has towards his family, home and friends can affect his mealtime behavior. A child may be afraid of a parent's reaction during mealtime. The environment itself, for instance the temperature of the feeding room, can affect the behavior at mealtime. Yperman and Vermeersch (18) found that the child's food ingestion was somewhat determined by what the child thought his peers would select.

Nutritional Status Measurements

Dugdale (31) studied the relationship between anthropometric measures and nutrition. He believed that nutrition and heredity were the two main factors in the size of the child. Eppright et al (14) found that the rate of growth in height was a better measurement for nutritional status than body weight changes

were. It was found that weight for height was better than either height or weight alone. Falkner and Roche (6) stated that there was a need for an age-independent measure of nutritional status. A reliable nutritional index is necessary because often ages are not known for preschool children, especially in research done in developing countries. The Dugdale Index was developed to fulfill that need. It is an age-independent anthropometric index of nutritional status for children ages 1 to 5. It uses the ratio of weight to height (32). The reliability of the Index was established by Brookens (33).

MATERIALS AND METHODS

Design

The model developed as the framework for this study was
based on the premise that mealtime was a time to ingest nutrients
(figure 1). Appropriate behavior was determined by whether the
behavior lead to adequate ingestion of nutrients. A child's growth
should be optimal if he obtains adequate amounts of the essential
nutrients. In this study, growth was represented by the Dugdale
Index of the child.

Appropriate Behavior	------>	Adequate Food Ingestion	------>	Growth
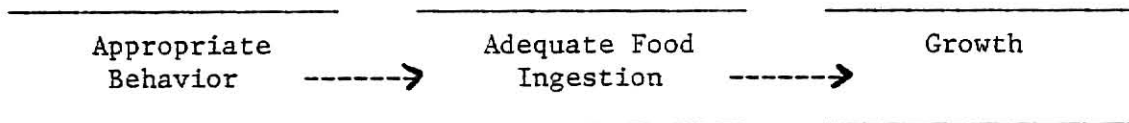
Figure 1 Research model

The research model was an adaptation of the Sim's model found in
appendix 1 and Anderson's model in appendix 2. The observed appro-
priate mealtime behavior and the attained growth for each child were
measured in this study. By applying the model, correlations were
determined between specific mealtime behaviors and attained growth.

The variables used to measure a child's attained growth were
the dependent variables of this study. They consisted of the Dugdale
Index and the hemoglobin values. The independent variables were the
preschooler's behavior towards food, environment, peers and adults.
These variables were defined in the preliminary work.

Population and setting

The setting for this study was the Stonehouse Child Care
Center, Kansas State University in Manhattan, Kansas - a day care
facility for children ages 2 to 5 years old. A consent form and
letter of explanation (appendix 3) were sent out to each household
with children enrolled in the center. The population consisted of
30 preschool children ranging in age from 2 to 5 years. Children
at the Stonehouse were divided into two groups. There were 12
toddlers (2 to 3 years) and 18 3 to 5 year olds. The two groups
were physically separate; one group being downstairs and one group
upstairs. They were served the same meal and their mealtimes over-
lapped so that the group being observed was alternated daily
throughout the week.

Development of Instruments

Preliminary information was collected for 8 weeks prior to
the beginning of data collection. This let the children become
accustomed to seeing the observers in the booth so that normal
behavior was not disrupted when data collection was started. It
was necessary also for the observers to become familiar with the
setting and the children so that data could be collected as
efficiently as possible.

Children were randomly selected to be observed in this pre-
liminary work. One child was watched for several meal periods and
behavior was recorded. These observations helped to establish the
4 independent variables for the study. Food, environment, peers and

adults were determined to be the main factors that affected behavior of the children during mealtime. Guidelines were then set up to determine appropriate and inappropriate behavior for each independent variable.

The guidelines were formed from the baseline information taken in the preliminary work for the food and environment variables. The behavior was categorized appropriate or inappropriate depending upon the effect it had on the child's food intake. The guidelines for the behavior with the peers and adults were based on observations from baseline data and guidelines reported in previous preschool studies by Parten (34). Appropriate behavior was behavior that was categorized prosocial and inappropriate behavior was antisocial behavior.

The time sampling method of observation, as described by Wright (35), was used. Time sampling allowed specific behaviors to be recorded within a precise time frame with the observations being spaced in designated time intervals. Two important advantages to the time sampling method are that no interaction occurs between the observer and the subject and very little time elapses between the observation and the rating of that observation (35).

Observations were timed with a stopwatch to determine the mealtime behaviors occurring within various time periods. From these trials it was found that 30 seconds was the best time frame to use. When longer time periods were used there was too much behavior occurring to record in one observation and this caused less inter-observer reliability.

At first, time trials were taken with a stopwatch but later a cassette tape with time signals was developed to prevent the distraction of observing the stopwatch. A bell sounded indicating the beginning of an observation period. After 30 seconds had passed the bell sounded again and the observer had 15 seconds to record the behavior observed. The process was then repeated until the end of the meal.
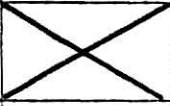
Data was recorded on a four by four grid. In testing it was found that there would always be some type of behavior recorded for environment so the 'no behavior' (0) block was crossed out for that variable (figure 2). This preliminary testing of the instrument helped to define problems in the behavioral guidelines and changes and additions were made when necessary.

Observation

The sequence of children in each group was randomized for each observation period according to a random numbers table (36). A total of at least 30 to 34 observations were collected for each subject.

All observations were made from behind an elevated double screened observation booth. The children were observed by 2 different observers simultaneously during their noon meal. Each observer had a randomized list so that she went from child to child according to scheduled intervals of time. Each child was observed for 30 seconds and then their behavior was scored based on previously developed parameters. Children were observed only while food was actually on

Date _____

\# _____

	-2	-1	0	+1
Food				
Environment			✕	
Peers				
Adults				

+1----------appropriate behavior towards variable

 0----------no behavior exhibited towards variable

-1----------inappropriate behavior towards variable

-2----------extreme inappropriate behavior that
                    disrupts entire meal setting

Figure 2 Four by four grid used in coding behavior

their plate. If a child did not have food when he/she came up in the order, the observer would go to the next child in the order and the previous child would be observed as soon as he had food in front of him.

Coding

The children's mealtime behavior was observed based on 4 independent variables:

FOOD--all food and beverage at a meal

PHYSICAL ENVIRONMENT--fork, spoon, mapkin, table, chair,

glass

PEER--all preschool children present at mealtime

ADULT--teachers and teacher aides, student dietician

The children were scored on whether their behavior was appropriate or inappropriate. The guidelines that were established during the preliminary trials appear in (table 1). The guidelines for the food and environment variables were based on the researcher's observations during the preliminary work and were categorized appropriate or inappropriate depending on the effect of the behavior on the child's food intake. The guidelines set for the variables of peers and adults were based on previous studies done with preschool children (34). Behavior categorized as appropriate was that behavior which was prosocial; inappropriate behavior was antisocial behavior. The guidelines were detailed enough to allow each observer to read them and code behavior the same way. Each

Table 1 Guidelines For Reporting Appropriate or Inappropriate
Behavior

_____

Variable

Food

_____

Appropriate Behavior

1. successful in getting food
   to mouth
2. sized bites that are easily
   managed
3. interest in food served

Inappropriate Behavior

1. playing with food
   (mashing, stirring)
2. removes food from mouth
3. uses food for attention
4. exaggerated eating
5. purposeful spilling
6. eating non-finger foods
   with fingers
7. eating too rapidly (stuf-
   fing)
8. total lack of interest in
   food
9. blows in milk

Variable

Physical Environment

Appropriate Behavior

1. eating with appropriate
   utensil for food being
   eaten
2. sitting straight in chair
3. remaining in chair
4. using utensil as it was
   designed to be used

Inappropriate Behavior

1. inadequate manipulation
   (food not getting to
   mouth)
2. playing with utensils
3. sitting on the side of
   chair, or on legs
4. standing while eating
5. standing on chair
6. out of chair without
   reason
7. pointing with utensil
8. tips chair
9. plays with bib
10. licking plate or bowl

Table 1 cont. Guidelines For Reporting Appropriate or Inappropriate
Behavior

<u>Variable</u> .

<u>Peer</u>

<u>Appropriate Behavior</u>

1. Pro-social behavior
    helping in distress
    sharing
    cooperating
    positive verbal interaction

<u>Inappropriate Behavior</u>

1. distracting others
    (pointing, talking,
    laughing, kicking)
2. talking for noise
3. interferring with others
4. making loud noises
5. resisting help or sharing
6. being distracted by what
    is going on around
7. negative verbal interaction

<u>Variable</u>

<u>Adult</u>

<u>Appropriate Behavior</u>

1. attentive
2. responds correctly to
    teachers directions
3. positive verbal interaction
4. non-interferring
    conversation

<u>Inappropriate Behavior</u>

1. demands teachers attention
2. talking for noise or
    attention
3. negative verbal inter-
    action
4. resisting assistance

<u>General Guidelines</u>

1. If a child is not distracted by immediate environment then it
    is coded negative for food if the child appears distracted.
2. There is never a time when (0) is an appropriate code for
    the physical environment.
3. If an inappropriate action occurs during the time interval
    then it is coded negative.

observer had a copy of the guidelines present at all times during data collection.

Behavior was coded either appropriate (+1), no behavior (0), inappropriate (-1) or extremely inappropriate (-2). This scoring range was used because it was believed that a wider range would lead to less interobserver reliability. The four by four grid was used for scoring. One grid was used for each observation. This instrument was prepared and tested prior to data collection.

Reliability

There were 2 observers throughout the entire study. Inter-observer reliability had to be obtained before data collection started. When all of the instruments had been tested, trial data collection periods were started. Observers coded the same child's behavior during the same time intervals and then the number of agreements were compared against the total number of agreements possible; $\frac{number\ of\ agreements}{number\ of\ observations} = 5$ reliability. This method of measuring reliability is called observer agreement and is the most commonly used for observational studies (37). Reliability is important to the usefulness of the data. The ability of the observers to collect accurate data is important for observational type research (38). Other studies using observational methods have recorded reliability ranging from .76 to .90 (10, 34, 35, 39). The more variables a study has the harder it is to have a high observer agreement (37). Interobserver reliability had to reach 80% before data collection was started in this study. Fifty observations

were made with 82% reliability recorded before data collection started. Two spot checks on reliability were made during data collection and reliability was recorded at 82%. A total of 40 observations were made with 36 agreements.

Questionnaire

The questionnaire used in this study was an adapted version of Anderson's (9). A copy can be found in appendix 4. It was sent to each household in the study with 26 of the 30 (86%) being returned. The questionnaire consisted of questions on the child's behavior at home during mealtime, the parent's feeling about feeding and socioeconomic information on the family. The questionnaire was carefully worded so that parents would answer honestly and not what they thought was the correct answer. All questionnaires returned were complete so that they could all be used.

Height and Weight

Height and weight were recorded for each child. Standing height was measured using a modified measuring board, consisting of a steel tape, mounted on a wall without a baseboard, and a leveling board. Height was recorded in centimeters (cm). The child was measured by standing straight with shoes off, feet flat, heels against the back of the board, knees straight and head level. A leveling board was then brought down against the head and the measurement read against the measuring tape.

Weights were recorded in pounds on a Detecto clinical, beam balance, portable scale and then converted to kilograms (1 kg = 2.2 lbs).

The scale was calibrated after it was in place and before the children were weighed. The weights were recorded with the children wearing light clothing and no shoes.

Height and weight measurements were used to calculate the dependent variable, the Dugdale Index. This index is validated as being independent of age in 1 to 5 year olds and is sensitive to changes in nutritional status (32, 33). It was developed by Dugdale as a power index of height and weight; $[\text{weight (kg)/height (cm}^{1.6})]$ $\times 10^4$. This index provides a continuous standard for attained growth in 1 to 5 year old children against which to examine the independent variables. An Index value of 88.9 or below corresponds with poor nutritional status (corresponding with the 3rd percentile of the Stuart-Stevenson growth series) and a value of 110 is the upper limit (97th percentile) (32).

Blood Collection

Special consent forms were sent to gain permission to take a blood sample for each child (appendix 5). Eighteen children (60%) participated in the blood collection portion of the study. A trained technician drew the blood samples. The child's finger was pricked and enough blood to fill a small capillary tube was withdrawn. The blood was then transferred into small tubes containing the Uno-Heme diluent. Each tube was numbered and recorded with the subject's name. Hemoglobin values were determined the same day the samples were taken. Standards were made up according to directions given in the Unopette pamphlet (40). The method used was based on

the procedures for determining hemoglobin using the Drabkin's Reagent (41). A calibration curve was constructed to establish the hemoglobin values. Four tubes were made up according to directions to correspond to specific hemoglobin values. The diluent was used as a blank to zero the spectrophotometer. The absorbance of all tubes was read on a Bausch-Lomb spectrophotometer with the wavelength set at 540 nm. Each subject's tube absorbance was read and plotted on the calibrated curve and hemoglobin's were then read from the graph. The values were used to indicate nutritional status (42). The acceptable standard level for hemoglobin for children 2 to 5 years of age is 11.0 gm/100ml.

Analysis

Using the scores established for each child, the total observation score for each independent behavior variable was computed. An average score was obtained by dividing the total score by the number of observations. This was done for each of the 4 independent variables and then the averages were added together to get the overall behavioral score for each child.

The teachers at the preschool were asked to evaluate each child's behavior using the same form as the observers used. This evaluation was then compared to the observed recorded behavior.

The data was compiled and keypunched onto IBM computer cards. The Statistical Package for the Social Sciences (SPSS) (43) computer program was used to obtain the measurements of association in correlation coefficients and stepwise multiple regression. The

tests of significance used were based on the F-distribution.

Multiple regression is a type of multivariable analysis that makes it possible to look at the relationships between a dependent and several independent variables. The process also automatically considers the inter-associations among the independent variables. Stepwise multiple regression was used so that each independent variable could be added to the equation based on the amount of variation it explained in the dependent variable. The dependent variable used in the equation was the Dugdale Index.

RESULTS AND DISCUSSION

Population Characteristics

Permission was obtained for 30 children, all of those en-
rolled in the center, to be observed during their noon meal. Of
the 30 children there were 18 boys and 12 girls. There were 27
Caucasian, 2 Oriental and 1 Mexican children (table 2). Ages ranged
from 24 to 66 months with a median of 44 months (table 3). There
were 19 first-born, 9 second-born children and 2 that were third in
birth order. The mean birth order was 1.4 and had a standard
deviation of 0.63 (table 4).

Table 2   Race and sex of study population

	Male	Female	Total
Caucasian	16	11	27
Oriental	1	1	2
Mexican	1	0	1
Total	18 (60%)	12 (40%)	n=30

Table 3   Ages in months of subjects in study

Months	Number
24–35	5
36–47	14
48–59	6
60–71	5
median – 44 months	n = 30

Table 4   Birth order of children in study

Order	Number
1st	19
2nd	9
3rd	2
n = 30 $\bar{x}$ = 1.4 s.d. = 0.63	

Socioeconomic

The economic status of the families was given in terms of employment and income. This information came from the questionnaire that was sent out to each family. Twenty-six of the thirty question-naires were returned so that the socioeconomic data is for 86.6% of the children. From the information obtained, in 64% of the cases, both parents worked; in 24% only the mother worked; in 8% only the father worked; and in 4% neither parent worked. In those families

where only one parent or neither parent worked the parents were
students at the university. However, 3 children were from one
parent families, all with mothers, and all of these mothers were
employed (table 5).

The monthly per capita income was also obtained from the
questionnaire. All 26 of the families returning questionnaires
did have income, although the source of student income was not
obtained. There were not any families tat reported a monthly in-
come below $300. For these families, incomes ranged from $300 to
more than $2400 (table 6).

Table 5   Employment status of study children's parents

Parent	•	Number	%
Mother only (3 single parents)		6	24
Father only		2	8
Both parents		16	64
Neither parent		1	4

n = 26

Table 6   Monthly per capita income of families in study

Income Range	Number	%
$1-300	0	00
$301-600	2	8
$601-900	9	35
$901-1200	1	4
$1201-1500	4	15
$1501-1800	6	23
$1801-2100	0	00
$2101-2400	2	7
more than $2400	2	8

n = 26

Growth Variables

Height, weight, Dugdale Index and hemoglobin were the growth
variables which were used in this study.   Individual data on the
growth variables and age can be found in table 7.   The heights
ranged from 85.0 to 118.8 cm with a mean of 102.4 and a standard
deviation of 8.4 cm.   The weights ranged from 10.5 to 24.8 kg with
a mean of 16.8 and a standard deviation of 3.3 kg.

Table 7   Individual data on the growth variables and age

Subject	Age (months)	Hgb (gm/100ml)	Ht. (cm.)	Wt. (kg.)	Dugdale Index
1	40	----	94.0	12.5	87.1
2	38	12.9	96.4	13.2	88.2
3	38	11.6	99.5	16.2	103.4
4	29	12.9	91.0	13.2	96.7
5	42	13.0	101.2	16.8	104.1
6	24	11.5	85.0	12.5	102.3
7	32	12.0	95.9	15.1	101.9
8	40	12.9	100.7	17.8	111.3
9	65	12.6	113.7	18.9	97.5
10	37	----	95.1	15.5	105.6
11	38	----	101.4	17.1	105.3
12	31	----	92.7	11.4	80.9
13	29	----	90.2	10.5	77.8
14	64	12.6	118.5	24.8	119.1
15	57	----	118.8	23.8	113.8
16	47	11.6	98.4	13.2	85.3
17	58	12.3	102.0	18.5	113.2
18	59	12.3	109.0	17.8	98.1
19	55	12.3	108.9	17.3	95.1
20	53	13.2	106.3	20.6	117.7
21	46	12.0	103.9	17.6	104.5
22	45	12.9	98.4	14.6	94.2
23	66	----	112.4	20.9	109.4
24	65	----	115.8	19.7	98.1
25	65	----	110.0	17.4	94.2
26	49	----	101.0	16.5	102.3
27	47	----	102.4	18.3	111.2
28	44	----	105.0	18.4	107.3
29	43	----	101.7	17.3	106.1
30	43	----	101.5	16.8	103.6

The Dugdale Index, a weight-for-height index which is independent of age for children from 1 to 5 (32, 33), had a mean of 101.2 and a standard deviation of 10.3. Dugdale designated 88.9 as the cutoff value for children that were undernourished and 110 for children that were obese. This corresponds with the 3rd and 97th

percentiles respectively of the Stuart-Stevenson growth series (32).
Five (16.7%) of the children in this study were in the undernourished
range, 5 (16.7%) were in the obese range and 17 (63%) were within
the normal range (table 8). If this population were normal by Stuart-
Stevenson standards, only 3% of the population would fall below 88.9
and 3% above 110. The Dugdale Index does not account for children
that have stunted growth due to previous chronic undernutrition nor
does it account for body build.

Table 8   Children's Dugdale Index scores grouped into ranges

Dugdale Index	77-88.9	89-99.9	100-109.9	110-119
	5 (16.7%)	7 (23%)	12 (40%)	5 (16.7%)

$\bar{x}$ = 101.2   s.d. = 10.3   n = 30

Hemoglobin values were obtained for 16 (53%) children. The
range of values in this study was from 11.5 to 13.2 gm/100ml with a
mean of 12.4 and a standard deviation of 0.15 gm/100ml (table 9).
Current criteria for assessing hemoglobin values are found in
Christakis (42) (table 10). All hemoglobin values obtained in this
population fell within the acceptable range. Hemoglobin was not used
in any further computations because there was insufficient variation
in the values to obtain any meaningful conclusions.

Table 9 Means and standard deviations of growth variables

Variable	Mean	Standard deviation
Height (cm)*	102.4	8.4
Weight (kg)*	16.8	3.3
Dugdale Index*	101.2	10.3
Hemoglobin ≠ (gm/100ml)	12.4	0.15

  *n = 30   ≠n = 16

Table 10 Guidelines for criteria of nutritional status for hemoglobin*

	Age of subject	Deficient	Marginal	Acceptable
Hemoglobin (gm/100ml)	2-5	up to 10.0	10.0-10.9	11.0+

*Source: Christakis, 1973, p. 34.

Pearson Linear Correlations

The Pearson product-moment correlation coefficient was computed
for each pair of variables. It was used to measure the strength of
the relationship between that pair. The correlation coefficient can
be squared to give a measure of how much one variable explains the
variance in the other variable. The variables for which Pearson
linear correlations were computed are listed in table 11. The total
behavioral score which is made up of the four individual behavioral
scores was included with the independent variables (table 11). All
observations of behavior for each subject are listed in Table 14.

Table 11   List of variables included in the Pearson correlations

Growth variables	Independent variables

Dugdale Index
Height
Weight
	Mealtime Behavioral Scores
	    Food
	    Environment
	    Peers
	    Adults
	    Total score
	
	Other
	    Child's age
	    Birth order of child

The Dugdale Index was found to be significantly and positively correlated with all independent variables except birth order and environment behavioral score. Food and adult mealtime behavior variables were correlated at the $P \leq 0.10$ level, child's age at $P \leq 0.05$ and peers at the $P \leq 0.001$. The total mealtime behavioral score was made up of the four individual mealtime variables (food, environment, peers, adults) so that the total behavioral score would be correlated according to how the individual variables correlated. The Dugdale Index correlated with the total behavioral score at the $P \leq 0.001$ level (table 12).

The child's age was significantly correlated with all four of the mealtime behavioral scores and the total behavioral score. Age correlated with food and environment variables at the $P \leq 0.025$ level. Age and behavior with adults was not as highly correlated ($P < 0.10$) as behavior with the food and enviornment. Age

Table 12 Pearson Correlation Matrix

	Child's Age	Birth Order	Food	Environ.	Peers	Adults	Total Beh.
Dugdale Index	0.35[2]	0.06	0.26[1]	0.13	0.61[5]	0.25[1]	0.56[4]
Child's Age	-----	-0.07	0.38[3]	-0.38[3]	0.68[5]	0.24	0.48[4]
Birth Order	-----	-----	0.07	-0.02	-0.09	0.03	-0.04
Height	0.91[5]	-0.02	0.46[4]	-0.29[1]	0.71[5]	0.28[1]	0.56[4]
Weight	0.77[5]	-----	0.42[3]	-0.14	0.75[5]	0.29[1]	0.62[5]
Food	-----	-----	-----	-0.01	0.59[5]	0.18	0.68[5]
Environment	-----	-----	-----	-----	0.07	0.18	0.40[3]
Peers	-----	-----	-----	-----	-----	0.21	0.86[5]
Adults	-----	-----	-----	-----	-----	-----	0.53[4]
Total Behavior Score	-----	-----	-----	-----	-----	-----	-----

[1] $0.1 > P > 0.05$
[2] $0.05 > P > 0.025$
[3] $0.025 > P > 0.01$
[4] $0.01 > P > 0.001$
[5] $P \leq 0.001$

correlated with behavior with peers and total behavior at the $P \leq 0.01$ level.

Height and weight were significantly correlated with all five behavior scores except in one instance. Weight was not significantly correlated with environment; however height was correlated at $P \leq 0.05$ level. Height and weight were correlated with the food behavior score at the $P \leq 0.01$ level. Both growth variables were highly correlated with the peer behavior score ($P \leq 0.001$). The adult behavioral score was correlated at the $P \leq 0.10$ level. The total behavioral score, again a reflection of the four individual scores, was correlated at the $P \leq 0.01$ level.

The correlations between the four behavioral scores indicated only two of the variables significantly correlated to each other. The behavior with food and behavior with peers variables were found to be correlated at $P \leq 0.001$. When looking at the correlations among the 4 behavioral scores only these 2 variables significantly correlated with each other.

Birth order was not significantly correlated with any variable. This could be explained by the very small variance (s.d. = 0.63) and the fact that the majority of the children were first born. Since birth order did not appear to be an important factor among these subjects it was not included in the stepwise regression equation.

The Dugdale Index was found to be correlated to age at the $P \leq 0.05$ level. This presents a problem because the Dugdale Index has been validated as independent of age (32, 33). Also, in Anderson's

research (9), on which this study is based, the Dugdale Index was independent of age. In a sample of just 30 subjects, however, a deviation of this sort is not totally unexpected. Additionally, 5 children in this study were older than 5 years of age (table 3). Dugdale Index only claims to be independent of age from ages 1 to 5.

The Pearson correlation coefficients show a child's age significantly correlated to all of the behavioral variables. This seems plausible since as age increases the physical capabilities of the child and his social maturity would improve. Thus the high correlation of age with the child's food and environment related behavior was expected. The peer and adult behavior would also seem likely to improve as the child matures and becomes more disciplined in controlling his own behavior related to peers and adults.

Food and peer related behavior were the only mealtime behavioral variables that were found to correlate with each other. This seems to imply that positive behavior towards food occurs concurrently with a child's positive behavior toward his peers. Yperman and Vermeersch (18) found that peers influenced a child's food choice so that it seems possible that peers could be a positive influence on the child's behavior with food.

The guidelines for observing food behavior were drawn up on the basis that a child's appropriate behavior towards food led to appropriate food ingestion. The nature of the relationship between a child's behavior with food and his behavior with peers which is implied by the high correlation between these 2 variables need further

investigation. This might then give a clearer understanding as to whether a child's social interactions directly influence his food ingestion.

Stepwise Multiple Regression Analysis

Stepwise multiple regression made it possible to look at the variation in the dependent variable, Dugdale Index, as it relates to the mealtime behavior scores which were the independent variables. The best analysis of the Dugdale Index was obtained at the first step of the stepwise multiple regression equation (table 13). At this step, the child's mealtime peer behavior has a value of $P \leq 0.001$ with an R^2 value of 0.369. Additional variables added beyond the first step did not appreciably increase the amount of variance in the Index explained by behavior. In subsequent steps, food and adult mealtime behavior scores, child's age and environmental behavior score entered the regression equation but not at significant levels.

The mealtime peer behavior variable had a positive association with the Dugdale Index. This indicates the higher the score for the mealtime behavior with peers the higher the Dugdale Index was for the child. This variable explained 37% of the variance in the Dugdale Index (table 13). In this way, stepwise multiple regression adds to information about correlations with Dugdale by accounting for the effect of other variables.

Subjective observations made during data collection helped to characterize the influence that peers have on each others food behavior. All of the children at a table would be eating and one individual would

Table 13 Independent variables entering the stepwise multiple
regression equation against Dugdale Index

Step	Variable	Direction of Association	F Value	Cumulative R^2
1	Mealtime Peer Behavior	+	16.4	0.369
2	Mealtime Food Behavior	−	0.72	0.386
3	Mealtime Adult Behavior	+	0.81	0.404
4	Child's Age	−	0.47	0.415
5	Mealtime Environmental Score	−	0.01	0.415

indicate a distaste for a specific food. The rest of the children at
the table would then quit eating that food. The opposite influence
also occurred. A child indicated how much he liked a specific food
and his friends sitting next to him would indicate how much they
liked the food.

The evident importance of the interaction with the peers
during the mealtime has important implications for the preschool child
caretaker. Yperman and Vermeersch (18) stated that possibly nutrition
education should be centered more around classroom experiences that
deal with the children's food attitudes. This study gives some support
to this idea. If a positive attitude towards food can be developed in
the learning environment then it could possibly lead to more appropriate
behavior at the table and better nutritional status.

SUMMARY

The effect of mealtime behavior on a child's nutritional status has received very little research attention to date. Because the chosen mode of nourishing a child involves a social setting, either in the home or in group care, it is important to better understand the relationship among a child's mealtime behaviors as they might influence his food intake and subsequent nutritional status. This in turn will provide useful information to help improve the nutritional status of poorly grown children.

The purpose of this study was to observe mealtime behavior of children in a university daycare center and relate this to the nutritional status of the children. The Dugdale Index, $[\text{weight (kg)}/\text{height (cm)}^{1.6}] \times 10^4$ an age-independent antrhopometric index of nutritional status for children ages 1 to 5, and hemoglobin were used as the indicators of nutritional status.

Thirty children, ranging from 2 to 5 years, were observed during their noon meal at the Stonehouse daycare center. Preliminary work established the behavior variables, observation guidelines and the different instruments that were used during data collection. A child's interaction with food, environment, peers and adults were the four mealtime behavior variables established. Guidelines for observing the food and environment variables were based on whether the behavior interfered with food ingestion. The peers and adult behavior guidelines were based on whether the act was prosocial or

antisocial behavior.

Behavior was scored either as appropriate (-1), no behavior (0), inappropriate (-1) or very inappropriate (-2). The actual scoring was recorded on four by four grid using a time sampling method of observation. The children were observed in a randomized order for a 30 second period of time. Interobserver reliability between the 2 data collectors was established at the 82% level before data collection started. Two spot checks were made during data collection with 82% reliability being maintained.

Measurements of height and weight were taken for each child and the Dugdale Index computed. Hemoglobin values were obtained on 16 of the children. A questionnaire was sent out to all households to obtain socioeconomic information.

Twelve girls and eighteen boys participated in the study, 27 Caucasians, 2 Oriental and 1 Mexican, ranging in age from 24 to 66 months. Nineteen children were first born, with 9 being 2nd and 2 being third in birth order. In 16 of the cases both parents worked, 6 only the mother worked, 2 only the father worked and 1 neither worked. Monthly per capita incomes ranged from $301 to more than $2400.

The study indicated 5 children were at risk of being under-nourished and 5 at risk of being overweight according to the Dugdale Index. All children for whom blood was obtained (16) had normal hemoglobin levels.

Pearson product-moment correlations were made. All independent variables were significantly correlated to the Dugdale Index

except birth order and the child's mealtime environment behavior score. The Dugdale Index correlated with the overall behavior score ($P \leq 0.001$). The correlation matrix indicated that food and peer behavior scores were significantly correlated at the $P \leq 0.001$ level. The stepwise multiple regression equation indicated that only the peer mealtime behavior score was highly significant ($P \leq 0.001$), and explained 37% of the variation in the Dugdale Index.

The correlation between a child's mealtime peer-related behavior and growth warrants more study on a larger population to better understand the nature of the affect peer behavior has on food ingestion and subsequent nutritional status. It would certainly seem that the high correlation between peer behavior and growth have implications for preschool daycare mealtime settings. Also nutrition education activities in preschool daycare settings could promote positive interactions toward food among both children and teachers.

ACKNOWLEDGMENTS

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APPENDIX

APPENDIX 1

SIM'S MODEL

THE ENVIRONMENT

TECHNOLOGICAL   BIOPHYSICAL   SOCIOCULTURAL

THE FAMILY

INFORMATION   MATTER – ENERGY

NUTRIENT INTAKE OF CHILD

CHILD AS ECOSYSTEM

PHYSICAL GROWTH NUTRITIONAL STATUS
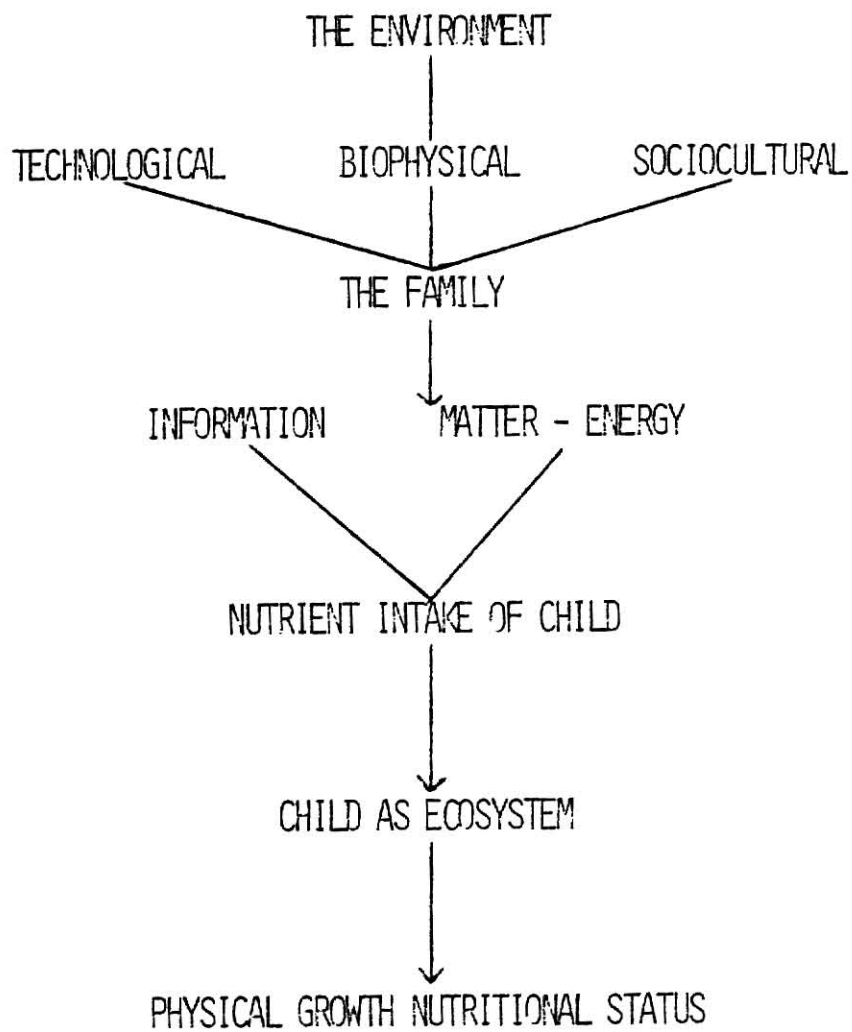
APPENDIX 2

ANDERSON'S MODEL

MOTHER

↓

FEEDS CHILD

↓

WHO EATS FOOD

↓

TO OBTAIN NUTRIENTS AND STIMULATION

↓

WHICH DETERMINE DEVELOPMENT
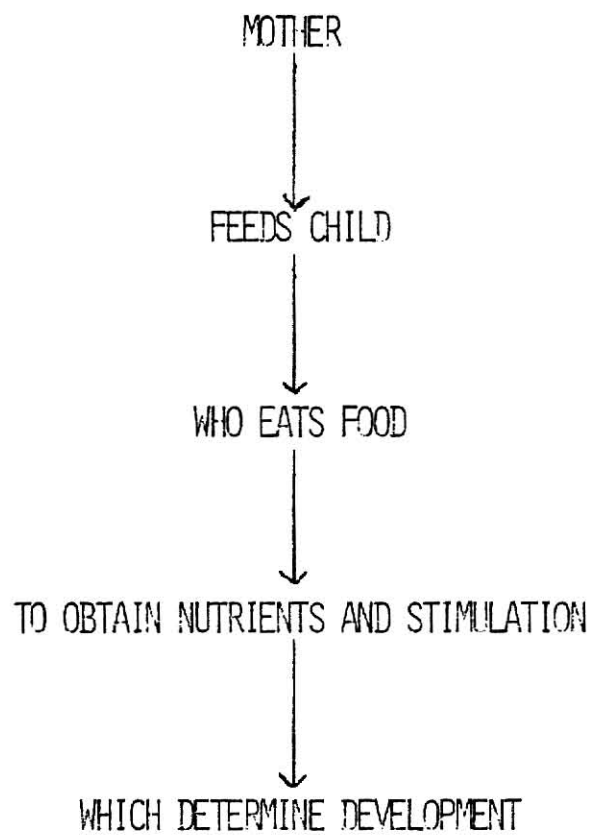
APPENDIX 3

April 1, 1979

Dear Parent:

The Department of Food and Nutrition at Kansas State University, in cooperation with Stone House Day Care Center is conducting a study to observe the usual mealtime behavior of preschool children in a day care setting.

We would like your permission to include your preschool child in this study. The study consists of observing each child for whom we obtain permission for short periods of time during lunch in April, May and possibly June. We will measure the weight and height of each child participating, and the parent will be asked to fill out a brief questionnaire sometime before June.

We would like permission to determine your child's hemoglobin value also. This is a test to determine the level of iron in a person's blood and it involves obtaining a tiny amount of blood from a finger stick. A qualified technician would take the blood to determine the hemoglobin value.

We hope you will be willing to allow your child to be observed and also to have his hemoglobin value determined. A consent form is attached for each part of the study.

Thank you very much for your help in our endeavor to know more about how children behave at mealtime.

Sincerely,

Mary Kay Sherlock
Graduate Student

Murray Krantz, Ph.D.
Director, Child Development Centers

Approved by:

_____ Judy V. Anderson, Dr.P.H., Project
                                    Director
_____ Jane Bowers, Ph.D., Head, Department
                                    of Food and Nutrition

MEALTIME BEHAVIOR SURVEY

1. To be better able to plan services for mothers with young children to help answer concerns about children's eating behavior, we wish to survey mealtime behavior and growth status of children in selected preschools.

2. The study will involve participation by the parent or guardian and participation of the child.

    A. The child will be observed during the noon meal at the child care facility.

    B. The height and the weight of the child will be measured.

    C. Your participation will be asked in a one time interview or questionnaire, where a series of questions will be asked of you about your child's behavior at mealtime, and a few questions about the family situation - size, food expenditures, whether live in town or rural area, etc. The questions you will be asked will take from 30 to 60 minutes of your time.

3. The project director will be glad to answer any questions or concerns you might have about this survey.

4. This permission is effective until the survey is complete. You may withdraw your consent, by writing, at any time, if you have second thoughts about participating.

5. I (the caretaker) have given permission for _____ to be a participant in the mealtime behavior survey, and to have his/her height and weight measured. I will also answer questions about usual mealtime behavior of the above mentioned child. This will be carried out in the preschool which the child attends in cooperation with the Department of Food and Nutrition, Kansas State University through its agents and/or employees, and consultants.

6. It is understood by study personnel that your individual information will be kept confidential. This survey is being conducted to determine the usual eating and mealtime behavior of preschool children from selected preschools in Manhattan, and it is limited to the purpose stated.

Date: _____

Parent, Guardian, or Caretaker: _____

Witness: _____ Title: _____

APPENDIX 4

MEALTIME OF ONE-TO
FOUR-YEAR OLDS

Child's Name _____ Date _____ I.D. _____

Birthdate: _____ Birth Order: _____

Parent: We would appreciate your time to answer a few questions
related to mealtime with your child. We hope you will
answer as honestly as possible. If there are questions
which you do not want to answer, please leave them blank.

Note: Any reference to "family meals" means when the child is eating
with an adult, rather than just with other children or by
himself.

1. Mark the boxes which best describe your child's usual behavior
during a family meal at home:

Yes	No		Yes	No	
☐	☐	Cries	☐	☐	Needs to be prodded
☐	☐	Disruptive	☐	☐	Is quiet
☐	☐	Dawdles	☐	☐	Sits
☐	☐	Eats everything	☐	☐	Talks
☐	☐	Fast eater	☐	☐	Throws food
☐	☐	Happy at mealtime	☐	☐	Up and down
☐	☐	Likes games at meals	☐	☐	Uses food for attention
☐	☐	Messy	☐	☐	Is a picky eater
☐	☐	Plays	☐	☐	Easily distracted

2. How long does he stay at the table for an average meal? ____minutes

3. What meals does your child eat alone and what meals does he/she eat with family?

Meals with others: _____

Meals eaten alone: _____

4. At what age did your child begin eating table foods? (those foods prepared for the rest of the family, not ____ wks/mos? home prepared baby food.)   (circle which)

5. When your child says he is hungry, what do you do?

☐ Feed him   ☐ He has to wait for meal   ☐ Give him cookie or cracker until meal

☐ Other, splease specify: _____

6. When do you give him/her food?   ☐ Only at mealtime

☐ Set meals and snacks   ☐ Whenever hungry   ☐ When he is good

☐ For special treats too   Other, specify: _____

7. What happens if your child does not eat?   ☐ Sent to room

☐ O.k. can eat later   ☐ Sits until done   ☐ O.k. but must wait for next meal

☐ Punished   ☐ O.k. but sits at table as long as rest of family

☐ Must eat what served   ☐ Must eat what says he wants

☐ Other, specify: _____

8. How much do you expect your child to eat at a meal?

☐ Taste everything   ☐ Clean his plate   ☐ Eat whatever he takes

☐ As much as he wants   Other, specify: _____

9. How much do you serve on your child's plate?   ☐ He serves self

☐ Serve his plate like everyone else   ☐ Serve him small spoonfulls, he asks for more

He eats fixed amount, specify _____

Other, specify _____

10. Are there times when your child asks for food and you don't give it to him?

☐ Yes   ☐ No   ☐ When he has had too much   ☐ When he has been bad

☐ When it is too close to a meal

Other, specify _____

11. What is your child's usual snacking pattern? _____ No. snacks a day

When? _____

12. What kinds of snacks does you child prefer? _____

_____

13. From whom or where did you obtain information about what and how to feed your child? _____

_____

14.	What foods does you child like?	What foods does he dislike?

15. How would you assess your child's ability to use eating utensils?

   ☐ eats more with hands than utensil

   ☐ eats with utensil but can't cut yet

   ☐ has trouble keeping food on utensil

   ☐ always successful in getting food to mouth by using utensil

16. What utensil does your child usually use at home? ☐ Spoon

   ☐ Fork   ☐ Knife

17. Did your child receive human milk or formula as an infant?

   ☐ Human milk   ☐ Formula   For how long? _____

18. When your child eats lunch at home, what does he usually have (food and liquids)?

Food	Amount

19. In your opinion does the amount of food your child eats usually seem:

   ☐ Too much   ☐ Adequate   ☐ Too little

20. What sort of activity does you child ususally engage in?

☐ Light exercise (T.V., quiet playing, routine activity)

☐ Moderate exercise (outside play)

☐ Strenuous exercise (always in motion)

FAMILY INFORMATION:

21. Occupation of household: Male _____

Female _____

22. Height of child's natural parents: _____ Mother _____ Father

_____ Unknown _____ Unknown

23. What are the ages of child's caretakers? ☐ 20-24 ☐ 25-29
☐ 30-34 ☐ 35-39 ☐ 40-44 ☐ 45-49 ☐ 50-54 ☐ 55-59

24. What is the last grade of school or college which you attended?

☐ less than 12th   ☐ finished undergraduate

☐ finished high school   ☐ graduate school

☐ attended college

25. How long have you been in the Manhattan area? _____ years/months
(circle one)

Where do you live?   ☐ town   ☐ rural   ☐ farm

26. Indicate the range which most accurately identifies family take-home pay for a month:

☐ No income   ☐ $1 - 300   ☐ $301 - 600   ☐ $601 - 900

☐ $901 - 1200   ☐ $1201 - 1500   ☐ $1501 - 1800

☐ $1801 - 2100   ☐ $2101 - 2400   ☐ more than $2400/mo.

27. How many people are supported on this income? _____people

28. How much money do you spend on food each month? $_____

29. Does your household receive food stamps? ☐ yes   ☐ no

30. If a substantial amount of your food comes from a home garden, please estimate the percentage: _____%

31. Ethnic origin: _____

32. Person answering this questionnaire: ☐ male   ☐ female

Thank you very much for your time and help.

APPENDIX 5

MEALTIME BEHAVIOR SURVEY

Hemoglobin Determination

1. As a supplement to the information being collected in the meal-time behavior survey, we would like your permission to obtain a drop of blood from a finger prick to determine your child's hemoglobin value.

   A. The child's hemoglobin would be determined one time during the study by obtaining a drop of the child's blood from a prick on his finger.

   A_1. The child's finger may be sore for a day or so after the blood is taken - like a small cut might hurt.

   A_2. The child also may be afraid of the small needle used to obtain the blood.

2. Your child's participation in this part of the survey is not necessary for him/her to participate in the observation portion of the survey.

3. The project director will be glad to answer any questions or concerns you might have about this hemoglobin determination.

4. This permission is effective until the blood for hemoglogin determination is collected. You may withdraw your consent, by writing at any time before the drop of blood is taken, if you have second thoughts about participating.

5. I (the caretaker) give permission for _____ to have his/her hemoglobin determined from blood obtained by a finger stick. This will be carried out in the preschool which the child attends in cooperation with the Department of Food and Nutrition, Kansas State University through its agents and/or employees, and consultants.

6. It is understood by study personnel that your individual informa-tion will be kept confidential. This supplemental permission is for the purpose of determining the hemoglobin value of children participating in the mealtime behavior survey of preschool chil-dren from selected preschools in Manhattan, and it is limited to that stated purpose.

Date: _____

Parent, Guardian, or Caretaker: _____

Witness: _____   Title: _____

Table 14 Observations of behavior for each subject

Subj. 1					Subj. 2					Subj. 3				
Observ.	Food	Env.	Peer	Adult	Observ.	Food	Env.	Peer	Adult	Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	0	1.	-1	-1	0	0	1.	+1	+1	0	0
2.	+1	+1	-1	0	2.	+1	+1	0	0	2.	+1	+1	0	0
3.	+1	+1	0	0	3.	+1	+1	0	+1	3.	+1	+1	+1	+1
4.	+1	+1	+1	0	4.	+1	-1	0	+1	4.	+1	+1	0	0
5.	+1	+1	0	+1	5.	0	+1	-1	0	5.	+1	+1	0	0
6.	-1	+1	-1	0	6.	+1	+1	+1	+1	6.	+1	0	0	0
7.	+1	+1	0	+1	7.	0	+1	0	-1	7.	0	+1	+1	+1
8.	+1	-1	0	+1	8.	0	-1	-1	+1	8.	+1	+1	0	0
9.	+1	+1	0	+1	9.	+1	+1	-1	+1	9.	+1	+1	0	0
10.	+1	-1	-1	0	10.	-1	-1	-1	0	10.	+1	+1	0	+1
11.	+1	+1	0	+1	11.	-1	-1	0	0	11.	+1	+1	0	+1
12.	+1	+1	0	0	12.	-1	+1	-1	0	12.	+1	-1	0	0
13.	+1	+1	0	+1	13.	+1	+1	0	0	13.	+1	+1	0	+1
14.	+1	-1	0	+1	14.	+1	+1	0	0	14.	+1	+1	-1	0
15.	+1	+1	0	0	15.	0	-1	-1	0	15.	+1	+1	0	+1
16.	-1	-1	-1	0	16.	+1	+1	-1	0	16.	+1	+1	0	+1
17.	+1	-1	-1	+1	17.	+1	+1	0	+1	17.	+1	+1	0	+1
18.	-1	-1	0	0	18.	-1	-1	+1	0	18.	+1	+1	0	+1
19.	+1	+1	0	0	19.	+1	-1	0	0	19.	+1	+1	0	+1
20.	+1	-1	-1	0	20.	+1	+1	0	0	20.	0	+1	+1	0
21.	+1	+1	0	0	21.	+1	+1	-1	0	21.	+1	+1	+1	0
22.	+1	+1	0	+1	22.	-1	+1	-1	0	22.	0	+1	0	+1
23.	0	+1	-1	0	23.	+1	+1	0	-1	23.	+1	+1	0	+1
24.	-1	-1	0	0	24.	+1	+1	0	+1	24.	+1	+1	0	0
25.	+1	+1	0	+1	25.	+1	+1	0	+1	25.	+1	+1	0	0
26.	+1	+1	0	0	26.	+1	+1	0	0	26.	+1	+1	0	0
27.	0	-1	0	-1	27.	+1	+1	-1	0	27.	+1	+1	+1	+1
28.	0	-1	0	+1	28.	+1	+1	+1	0	28.	+1	+1	0	0
29.	+1	+1	0	+1	29.	+1	-1	0	0	29.	+1	+1	0	0
30.	+1	+1	0	0	30.	+1	-1	+1	+1	30.	+1	+1	+1	+1
31.	-1	+1	0	-1	31.	+1	+1	0	0					
32.	0	+1	+1	+1	32.	+1	+1	0	0					
					33.	+1	-1	-1	-1					
Average	.56	.44	-.19	.34	Average	.52	.33	-.21	.18	Average	.90	.93	.17	.43
Average Total Behavior --				.30	Average Total Behavior --				.20	Average Total Behavior --				.61

Subj. 4

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	0
2.	+1	+1	0	0
3.	+1	+1	0	+1
4.	+1	+1	0	0
5.	+1	-1	-1	0
6.	+1	+1	0	+1
7.	+1	+1	0	0
8.	+1	-1	0	0
9.	+1	+1	0	0
10.	+1	+1	0	+1
11.	+1	-1	+1	0
12.	-1	+1	0	0
13.	-1	+1	0	+1
14.	+1	-1	0	0
15.	+1	+1	0	0
16.	+1	+1	0	0
17.	-1	-1	0	+1
18.	-1	+1	-1	-1
19.	+1	+1	0	+1
20.	+1	+1	0	0
21.	+1	-1	0	0
22.	+1	+1	-1	0
23.	0	+1	0	+1
24.	-1	-1	-1	0
25.	+1	+1	0	+1
26.	-1	-1	0	0
27.	-1	-1	0	0
28.	-1	-1	-1	0
29.	-1	+1	-1	0
30.	-1	-1	-1	0
31.	+1	-1	-1	0
32.	+1	-1	-1	+1
Average	.34	.19	-.25	.25
Average Total Behavior --				.13

Subj. 5

Observ.	Food	Env.	Peer	Adult
1.	0	+1	+1	0
2.	+1	+1	0	0
3.	+1	+1	-1	+1
4.	0	-1	-1	0
5.	+1	+1	0	0
6.	+1	-1	0	0
7.	+1	+1	0	0
8.	+1	+1	+1	0
9.	-1	+1	-1	0
10.	+1	+1	0	+1
11.	-1	+1	0	0
12.	0	+1	0	0
13.	+1	+1	0	0
14.	+1	-1	0	0
15.	+1	+1	0	0
16.	+1	-1	0	0
17.	-1	+1	0	+1
18.	+1	-1	0	0
19.	+1	+1	0	0
20.	+1	+1	0	0
21.	0	+1	-1	0
22.	+1	+1	+1	0
23.	-1	-1	0	-1
24.	+1	-1	0	+1
25.	+1	+1	0	0
26.	+1	-1	0	0
27.	-1	+1	0	0
28.	+1	+1	0	0
29.	+1	+1	+1	0
30.	+1	+1	0	0
31.	+1	-1	-1	0
32.	+1	-1	-1	0
Average	.56	.44	-.06	.09
Average Total Behavior --				.26

Subj. 6

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	+1
2.	+1	+1	-1	0
3.	+1	+1	0	+1
4.	0	+1	0	+1
5.	+1	-1	0	+1
6.	+1	-1	-1	0
7.	+1	+1	0	+1
8.	+1	-1	0	+1
9.	+1	+1	-1	+1
10.	-1	+1	0	0
11.	+1	+1	0	+1
12.	+1	+1	0	0
13.	+1	+1	0	+1
14.	-1	+1	+1	0
15.	+1	-1	0	0
16.	-1	-1	0	-1
17.	+1	+1	0	+1
18.	0	+1	0	+1
19.	+1	-1	0	0
20.	0	+1	-1	0
21.	-1	+1	0	0
22.	+1	+1	0	0
23.	-1	+1	0	0
24.	0	+1	-1	0
25.	+1	+1	0	-1
26.	+1	+1	0	+1
27.	+1	+1	-1	0
28.	+1	+1	0	0
29.	-1	+1	0	0
30.	+1	+1	-1	0
31.	+1	+1	0	0
Average	.48	.55	-.19	.35
Average Total Behavior --				.29

Subj. 7

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	0
2.	0	+1	0	+1
3.	+1	-1	0	0
4.	+1	+1	+1	0
5.	+1	+1	+1	+1
6.	+1	+1	0	0
7.	-1	+1	0	+1
8.	-1	+1	0	0
9.	+1	+1	0	+1
10.	+1	+1	+1	0
11.	+1	+1	0	+1
12.	+1	+1	0	+1
13.	-1	+1	0	+1
14.	+1	+1	0	+1
15.	0	+1	-1	0
16.	+1	+1	0	0
17.	+1	-1	0	0
18.	0	-1	-1	0
19.	0	+1	-1	+1
20.	+1	+1	0	0
21.	+1	-1	0	0
22.	0	-1	0	+1
23.	-1	+1	0	0
24.	+1	+1	0	0
25.	0	+1	0	+1
26.	+1	+1	0	0
27.	+1	+1	0	0
28.	+1	+1	0	0
29.	+1	+1	0	0
30.	-1	+1	0	+1
31.	0	+1	0	+1
32.	+1	+1	+1	0
Average	.47	.69	.03	.41
Average Total Behavior		--		.39

Subj. 8

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	+1
2.	+1	+1	0	0
3.	+1	+1	0	0
4.	+1	+1	0	+1
5.	+1	+1	+1	+1
6.	+1	+1	0	0
7.	+1	+1	0	0
8.	0	+1	-1	0
9.	+1	-1	-1	+1
10.	-1	-1	0	0
11.	-1	-1	0	+1
12.	-1	+1	0	+1
13.	+1	+1	0	0
14.	+1	+1	0	+1
15.	-1	+1	0	0
16.	+1	+1	0	0
17.	+1	+1	0	0
18.	+1	+1	0	+1
19.	0	+1	+1	+1
20.	-1	+1	-1	0
21.	-1	-1	0	0
22.	-1	+1	0	+1
23.	+1	-1	0	+1
24.	0	+1	0	+1
25.	+1	+1	0	0
26.	-1	+1	-1	0
27.	+1	+1	0	0
28.	+1	+1	0	0
29.	+1	+1	0	+1
30.	+1	+1	0	0
31.	+1	+1	0	+1
Average	.39	.68	-.07	.45
Average Total Behavior		--		.36

Subj. 9

Observ.	Food	Env.	Peer	Adult
1.	+1	-1	+1	-1
2.	+1	-1	0	0
3.	+1	+1	0	0
4.	+1	-1	+1	0
5.	+1	+1	+1	0
6.	+1	+1	0	+1
7.	+1	+1	0	0
8.	+1	-1	+1	0
9.	+1	+1	0	+1
10.	+1	+1	0	0
11.	+1	+1	+1	+1
12.	+1	-1	-1	0
13.	+1	+1	-1	0
14.	+1	-1	-1	0
15.	+1	-1	+1	+1
16.	0	+1	0	+1
17.	+1	-1	0	0
18.	+1	-1	0	0
19.	+1	+1	0	0
20.	0	+1	+1	0
21.	+1	+1	+1	0
22.	+1	+1	+1	0
23.	+1	-1	0	0
24.	+1	-1	0	0
25.	+1	+1	+1	0
26.	+1	-1	0	0
27.	+1	+1	0	+1
28.	+1	+1	0	0
29.	+1	-1	-1	+1
30.	+1	-1	0	0
31.	+1	+1	0	+1
Average	.93	.03	.19	.23
Average Total Behavior		--		.35

Subj. 10

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	+1
2.	+1	+1	0	0
3.	+1	-1	0	0
4.	+1	+1	0	0
5.	+1	+1	0	+1
6.	+1	+1	+1	0
7.	+1	+1	0	0
8.	+1	+1	0	+1
9.	0	+1	0	+1
10.	+1	+1	-1	0
11.	+1	+1	0	+1
12.	-1	+1	0	-1
13.	-1	+1	0	-1
14.	-1	+1	+1	+1
15.	+1	+1	0	+1
16.	+1	-1	+1	+1
17.	-1	+1	0	0
18.	+1	-1	+1	0
19.	0	-1	0	+1
20.	+1	+1	0	0
21.	+1	-1	0	0
22.	+1	+1	0	0
23.	+1	+1	+1	0
24.	+1	+1	-1	0
25.	-1	+1	0	-1
26.	+1	-1	0	0
27.	0	-1	0	0
28.	-1	+1	0	0
29.	0	+1	+1	+1
30.	-1	+1	0	+1
31.	+1	+1	+1	0
Average	.42	.42	.16	.26
Average Total Behavior	--			.31

Subj. 11

Observ.	Food	Env.	Peer	Adult
1.	+1	-1	0	+1
2.	+1	+1	0	0
3.	+1	+1	+1	+1
4.	+1	+1	0	+1
5.	+1	+1	0	+1
6.	0	+1	0	+1
7.	+1	-1	+1	+1
8.	+1	+1	0	+1
9.	+1	-1	-1	0
10.	+1	-1	-1	0
11.	+1	-1	0	+1
12.	-1	+1	0	0
13.	-1	+1	-1	-1
14.	+1	+1	-1	0
15.	+1	-1	0	0
16.	-1	-1	-1	0
17.	+1	+1	0	+1
18.	+1	+1	+1	0
19.	+1	+1	0	+1
20.	+1	+1	0	+1
21.	+1	+1	-1	0
22.	+1	+1	0	0
23.	+1	-1	0	0
24.	0	+1	+1	0
25.	+1	+1	+1	+1
26.	+1	+1	0	-1
27.	+1	+1	0	0
28.	+1	+1	0	0
29.	+1	+1	0	+1
30.	0	+1	+1	0
31.	+1	-1	0	+1
32.	+1	+1	0	0
Average	.72	.50	.03	.37
Average Total Behavior	--			.41

Subj. 12

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	+1
2.	+1	-1	0	-1
3.	-1	+1	0	+1
4.	+1	+1	0	0
5.	+1	+1	0	+1
6.	+1	+1	0	0
7.	+1	-1	0	+1
8.	+1	+1	0	0
9.	+1	-1	-1	0
10.	0	-1	0	0
11.	+1	+1	0	+1
12.	+1	+1	0	+1
13.	-1	+1	0	0
14.	+1	+1	-1	0
15.	+1	-1	0	+1
16.	+1	-1	-1	0
17.	+1	+1	0	+1
18.	+1	+1	0	+1
19.	0	+1	0	0
20.	+1	+1	0	+1
21.	-1	-1	0	+1
22.	+1	-1	0	+1
23.	0	-1	-1	0
24.	+1	-1	0	+1
25.	+1	-1	0	+1
26.	-1	-1	-1	+1
27.	+1	+1	0	0
28.	+1	-1	-1	0
29.	-1	-1	0	-1
30.	-1	+1	0	0
31.	+1	+1	0	+1
32.	+1	+1	0	+1
Average	.53	.13	-.19	.47
Average Total Behavior	--			.23

Subj. 13

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	0
2.	+1	+1	0	0
3.	+1	+1	0	0
4.	+1	+1	0	-1
5.	-1	+1	0	0
6.	0	-1	-2	-1
7.	-1	+1	-1	-1
8.	+1	-1	0	0
9.	-1	+1	0	+1
10.	+1	+1	0	+1
11.	-1	-1	0	+1
12.	+1	+1	0	0
13.	-1	+1	-1	0
14.	+1	+1	0	0
15.	-1	+1	0	+1
16.	+1	+1	0	+1
17.	+1	+1	0	0
18.	+1	+1	+1	0
19.	0	-1	-1	0
20.	+1	-1	0	+1
21.	-1	+1	0	+1
22.	+1	+1	0	0
23.	+1	+1	0	0
24.	+1	-1	0	0
25.	+1	-1	0	0
26.	-1	+1	0	0
27.	-1	-1	0	0
28.	+1	+1	0	-1
29.	0	+1	-1	+1
30.	-1	+1	0	0
31.	-1	+1	0	0
Average	.19	.42	-.16	.13
Average Total Behavior	--			.15

Subj. 14

Observ.	Food	Env.	Peer	Adult
1.	+1	-1	-1	+1
2.	+1	+1	0	0
3.	+1	+1	0	+1
4.	+1	-1	+1	0
5.	+1	+1	0	0
6.	+1	+1	+1	0
7.	+1	-1	0	+1
8.	+1	+1	-1	0
9.	-1	+1	0	+1
10.	+1	-1	0	0
11.	-1	+1	+1	0
12.	+1	+1	+1	0
13.	+1	+1	+1	+1
14.	+1	+1	+1	0
15.	0	+1	+1	+1
16.	+1	+1	0	0
17.	+1	-1	+1	+1
18.	+1	+1	0	0
19.	+1	+1	0	+1
20.	+1	+1	0	+1
21.	+1	+1	0	+1
22.	+1	+1	0	+1
23.	+1	+1	+1	0
24.	+1	-1	+1	+1
25.	+1	+1	+1	0
26.	+1	+1	0	0
27.	+1	+1	+1	+1
28.	+1	+1	0	0
29.	+1	+1	-1	0
30.	+1	-1	-1	0
31.	+1	+1	0	+1
Average	.84	.48	.26	.52
Average Total Behavior	--			.52

Subj. 15

Observ.	Food	Env.	Peer	Adult
1.	+1	-1	0	+1
2.	+1	-1	0	0
3.	+1	+1	0	+1
4.	+1	+1	+1	+1
5.	+1	+1	0	+1
6.	+1	-1	0	0
7.	+1	-1	0	-1
8.	+1	+1	0	0
9.	+1	+1	0	0
10.	+1	+1	0	+1
11.	+1	-1	0	0
12.	0	-1	0	+1
13.	+1	-1	+1	0
14.	+1	+1	0	+1
15.	+1	+1	+1	+1
16.	+1	-1	0	0
17.	+1	-1	0	0
18.	+1	+1	0	+1
19.	+1	+1	+1	0
20.	+1	+1	0	+1
21.	+1	+1	0	0
22.	+1	-1	0	0
23.	+1	+1	0	0
24.	-1	+1	+1	+1
25.	+1	-1	-1	0
26.	+1	+1	+1	0
27.	-1	+1	+1	+1
28.	+1	+1	+1	0
29.	+1	+1	+1	0
30.	+1	-1	-1	0
31.	+1	+1	+1	0
Average	.84	.23	.26	.35
Average Total Behavior	--			.42

Subj. 16

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	0
2.	+1	+1	0	0
3.	+1	+1	-1	0
4.	-1	+1	0	0
5.	+1	+1	0	0
6.	+1	+1	0	0
7.	+1	+1	0	0
8.	+1	+1	+1	0
9.	+1	+1	0	0
10.	+1	-1	0	0
11.	+1	-1	-1	0
12.	-1	-1	0	0
13.	+1	+1	0	0
14.	+1	+1	0	0
15.	+1	-1	-1	0
16.	0	-1	0	0
17.	-1	-1	0	0
18.	0	-1	-1	0
19.	-1	+1	0	0
20.	+1	+1	0	0
21.	-1	-1	0	0
22.	+1	-1	0	0
23.	+1	+1	0	0
24.	+1	-1	0	0
25.	0	-1	+1	0
26.	+1	+1	0	+1
27.	+1	-1	0	0
28.	+1	-1	0	0
29.	+1	+1	0	0
30.	+1	+1	+1	+1
Average	.57	.13	-.03	.07
Average Total Behavior	--	.18		

Subj. 17

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	+1	0
2.	+1	-1	0	+1
3.	-1	+1	0	0
4.	+1	+1	-1	0
5.	+1	+1	0	+1
6.	-1	+1	0	0
7.	+1	+1	+1	0
8.	+1	+1	0	+1
9.	+1	+1	0	0
10.	0	-1	0	+1
11.	+1	+1	0	-1
12.	+1	+1	+1	0
13.	+1	+1	0	0
14.	-1	+1	0	0
15.	+1	+1	0	+1
16.	+1	+1	0	0
17.	-1	-1	-1	0
18.	-1	+1	0	0
19.	-1	+1	0	+1
20.	+1	+1	0	0
21.	+1	+1	+1	0
22.	+1	+1	0	0
23.	0	+1	+1	0
24.	+1	+1	0	0
25.	+1	+1	+1	0
26.	+1	+1	0	0
27.	+1	+1	0	+1
28.	-1	+1	0	+1
29.	+1	+1	0	0
30.	+1	+1	0	+1
Average	.48	.68	.19	.29
Average Total Behavior	--	.41		

Subj. 18

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	+1
2.	+1	+1	0	+1
3.	+1	+1	-1	0
4.	-1	+1	-1	0
5.	+1	+1	-1	0
6.	+1	+1	0	+1
7.	+1	-1	0	0
8.	+1	+1	+1	0
9.	+1	+1	0	0
10.	+1	-1	-1	0
11.	-1	+1	0	0
12.	+1	+1	+1	0
13.	+1	-1	-1	0
14.	+1	+1	0	0
15.	+1	-1	-1	0
16.	+1	+1	+1	0
17.	+1	-1	+1	+1
18.	-1	-1	-1	0
19.	+1	-1	0	+1
20.	+1	+1	0	0
21.	+1	-1	0	0
22.	+1	+1	+1	+1
23.	+1	+1	+1	0
24.	+1	+1	+1	0
25.	+1	+1	+1	0
26.	+1	+1	0	+1
27.	+1	+1	0	0
28.	+1	+1	+1	0
29.	+1	+1	0	0
30.	+1	+1	+1	0
Average	.81	.29	.13	.23
Average Total Behavior	--	.36		

Subj. 19

Observ.	Food	Env.	Peer	Adult
1.	-1	-1	0	0
2.	+1	-1	0	+1
3.	+1	+1	0	+1
4.	+1	+1	0	0
5.	+1	+1	0	+1
6.	+1	+1	0	0
7.	+1	+1	0	0
8.	+1	+1	0	0
9.	+1	+1	0	0
10.	-1	-1	0	0
11.	-1	+1	0	0
12.	+1	+1	0	0
13.	+1	+1	0	0
14.	+1	+1	0	0
15.	-1	-1	0	0
16.	+1	+1	+1	+1
17.	+1	+1	0	0
18.	+1	+1	0	0
19.	+1	+1	0	0
20.	+1	-1	+1	0
21.	0	-1	-1	+1
22.	0	+1	+1	0
23.	+1	+1	+1	0
24.	+1	+1	0	0
25.	+1	+1	0	0
26.	+1	-1	0	0
27.	+1	+1	+1	0
28.	+1	+1	0	+1
29.	+1	+1	0	+1
30.	+1	+1	+1	+1
31.	+1	+1	0	0
32.	+1	-1	-1	0
33.	+1	+1	0	0
Average	.64	.51	.12	.24
Average Total Behavior --				.38

Subj. 20

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	0
2.	-1	-1	-1	0
3.	+1	+1	0	0
4.	-1	-1	0	0
5.	+1	+1	+1	0
6.	+1	+1	0	0
7.	0	+1	0	+1
8.	+1	+1	-1	0
9.	+1	+1	0	0
10.	-1	-1	0	0
11.	+1	+1	0	0
12.	-1	-1	0	0
13.	+1	-1	0	0
14.	+1	+1	+1	0
15.	+1	-1	0	-1
16.	+1	+1	+1	+1
17.	0	-1	-1	0
18.	+1	+1	+1	0
19.	+1	+1	+1	0
20.	+1	+1	0	0
21.	+1	+1	+1	0
22.	0	+1	+1	0
23.	0	-1	+1	0
24.	+1	+1	+1	0
25.	0	+1	+1	+1
26.	+1	-1	+1	0
27.	+1	+1	+1	0
28.	+1	-1	0	0
29.	+1	-1	0	0
30.	+1	+1	+1	+1
31.	0	-1	+1	0
32.	0	+1	-1	0
33.	+1	+1	0	0
34.	+1	-1	0	0
Average	.50	.29	.27	.12
Average Total Behavior --				.29

Subj. 21

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	-1	0
2.	+1	-1	0	0
3.	+1	+1	0	0
4.	+1	+1	-1	0
5.	0	-1	-1	+1
6.	+1	-1	0	0
7.	+1	-1	+1	0
8.	+1	+1	0	0
9.	-1	+1	-1	0
10.	-1	+1	0	0
11.	+1	-1	-1	0
12.	0	-1	-1	0
13.	+1	+1	+1	0
14.	-1	-1	-1	0
15.	+1	+1	0	0
16.	-1	+1	0	+1
17.	0	+1	-1	0
18.	+1	+1	0	0
19.	+1	+1	-1	0
20.	-1	-1	0	0
21.	-1	+1	0	0
22.	+1	+1	+1	0
23.	-1	+1	0	0
24.	-1	+1	0	0
25.	0	+1	-1	0
26.	0	+1	+1	0
27.	+1	+1	+1	+1
28.	+1	+1	0	+1
29.	0	+1	+1	0
30.	+1	+1	+1	0
31.	0	-1	0	0
Average	.26	.35	-.10	.13
Average Total Behavior --				.16

Subj. 22

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	0
2.	+1	+1	0	0
3.	-1	+1	0	0
4.	+1	+1	-1	0
5.	+1	+1	-1	0
6.	+1	+1	-1	0
7.	+1	-1	+1	0
8.	+1	+1	0	0
9.	+1	-1	0	0
10.	+1	-1	+1	0
11.	+1	+1	+1	0
12.	-1	-1	0	0
13.	-1	+1	0	0
14.	+1	+1	0	0
15.	-1	+1	-1	+1
16.	+1	+1	-1	0
17.	+1	+1	0	0
18.	+1	+1	-1	+1
19.	+1	+1	0	0
20.	+1	-1	-1	0
21.	+1	+1	-1	+1
22.	+1	+1	0	+1
23.	+1	-1	0	0
24.	+1	+1	0	+1
25.	+1	-1	0	0
26.	+1	-1	0	+1
27.	+1	+1	0	0
28.	+1	+1	0	0
29.	+1	+1	0	0
30.	+1	+1	0	+1
31.	+1	+1	0	0
32.	-1	+1	0	+1
Average	.69	.56	-.13	.25
Average Total Behavior	--			.34

Subj. 23

Observ.	Food	Env.	Peer	Adult
1.	+1	-1	-1	0
2.	+1	-1	-1	0
3.	+1	+1	+1	+1
4.	+1	+1	-1	0
5.	0	-1	0	-1
6.	0	-1	0	+1
7.	+1	-1	0	0
8.	+1	+1	+1	0
9.	+1	+1	+1	0
10.	+1	+1	0	0
11.	+1	+1	+1	0
12.	+1	-1	0	0
13.	+1	+1	+1	+1
14.	-1	-1	0	0
15.	+1	-1	0	0
16.	+1	-1	0	0
17.	-1	-1	0	0
18.	0	-1	0	0
19.	+1	-1	0	0
20.	+1	-1	0	0
21.	+1	-1	-1	0
22.	+1	-1	0	0
23.	+1	-1	+1	+1
24.	+1	+1	+1	0
25.	+1	+1	0	0
26.	0	-1	0	0
27.	0	-1	+1	+1
28.	+1	+1	0	+1
29.	+1	-1	+1	0
30.	+1	+1	0	+1
Average	.70	-.27	.13	.20
Average Total Behavior	--			.19

Subj. 24

Observ.	Food	Env.	Peer	Adult
1.	+1	-1	0	+1
2.	0	-1	0	+1
3.	+1	+1	0	0
4.	+1	-1	0	0
5.	+1	+1	+1	+1
6.	+1	+1	+1	0
7.	+1	-1	-1	0
8.	+1	-1	0	0
9.	+1	-1	0	0
10.	+1	+1	0	+1
11.	+1	+1	0	0
12.	+1	+1	0	0
13.	-1	+1	-1	+1
14.	-1	+1	0	+1
15.	+1	+1	0	0
16.	+1	+1	+1	+1
17.	0	+1	-1	0
18.	+1	-1	0	+1
19.	-1	-1	0	0
20.	-1	-1	0	0
21.	-1	+1	0	0
22.	0	-1	0	0
23.	+1	-1	0	0
24.	+1	+1	+1	+1
25.	+1	-1	+1	+1
26.	-1	+1	0	0
27.	-1	+1	+1	0
28.	+1	+1	0	0
29.	+1	+1	-1	0
30.	+1	+1	0	0
31.	+1	+1	+1	+1
32.	+1	+1	0	0
Average	.41	.25	.06	.34
Average Total Behavior	--			.27

Subj. 25

Observ.	Food	Env.	Peer	Adult
1.	-1	-1	+1	0
2.	+1	-1	+1	0
3.	+1	-1	0	0
4.	+1	+1	0	0
5.	+1	+1	-1	0
6.	+1	+1	0	0
7.	+1	+1	+1	0
8.	+1	+1	0	0
9.	+1	-1	0	0
10.	+1	+1	0	0
11.	+1	+1	0	0
12.	0	-1	+1	0
13.	+1	+1	+1	0
14.	+1	-1	0	0
15.	+1	+1	0	0
16.	+1	-1	-1	0
17.	+1	-1	+1	0
18.	+1	-1	-1	0
19.	+1	-1	-1	0
20.	+1	-1	0	0
21.	+1	+1	+1	0
22.	+1	+1	+1	+1
23.	+1	+1	0	0
24.	+1	-1	0	0
25.	+1	+1	0	+1
26.	+1	+1	+1	0
27.	+1	+1	+1	+1
28.	+1	-1	0	0
29.	-1	+1	+1	0
30.	+1	+1	0	0
31.	+1	+1	0	-1
Average	.84	.16	.23	.07
Average Total Behavior	--			.32

Subj. 26

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	0	0
2.	-1	+1	0	0
3.	+1	+1	0	0
4.	+1	-1	0	0
5.	+1	+1	-1	0
6.	+1	+1	0	0
7.	-1	+1	0	+1
8.	+1	+1	0	0
9.	+1	+1	0	0
10.	+1	+1	0	0
11.	+1	+1	+1	0
12.	+1	-1	-1	0
13.	0	-1	0	+1
14.	+1	+1	+1	0
15.	+1	+1	+1	+1
16.	+1	+1	+1	0
17.	+1	+1	0	0
18.	0	+1	+1	0
19.	-1	-1	0	0
20.	+1	+1	0	0
21.	+1	+1	+1	0
22.	+1	+1	-1	0
23.	0	-1	0	0
24.	+1	+1	0	0
25.	0	-1	+1	+1
26.	+1	-1	0	+1
27.	-1	-1	0	+1
28.	+1	-1	-1	0
29.	+1	-1	+1	+1
30.	0	-1	-1	0
31.	+1	-1	0	+1
32.	0	-1	+1	0
Average	.56	.19	.13	.25
Average Total Behavior	--			.28

Subj. 27

Observ.	Food	Env.	Peer	Adult
1.	-1	-1	-1	0
2.	+1	-1	0	0
3.	-1	+1	0	0
4.	+1	-1	-1	0
5.	0	-1	0	0
6.	+1	+1	0	0
7.	+1	-1	-1	0
8.	+1	+1	-1	+1
9.	+1	+1	0	0
10.	-1	+1	0	0
11.	-1	+1	0	0
12.	+1	+1	0	0
13.	+1	-1	-1	0
14.	0	-1	0	0
15.	+1	-1	0	+1
16.	+1	+1	0	0
17.	0	-1	+1	0
18.	+1	+1	0	0
19.	+1	-1	0	0
20.	0	+1	-1	0
21.	+1	-1	0	0
22.	+1	+1	0	+1
23.	0	+1	+1	0
24.	-1	+1	0	0
25.	+1	+1	+1	0
26.	-1	-1	0	0
27.	+1	+1	+1	0
28.	+1	+1	0	0
29.	-1	-1	-1	+1
30.	+1	+1	+1	0
31.	+1	-1	0	0
Average	.45	.16	-.07	.16
Average Total Behavior	--			.18

Subj. 28

Observ.	Food	Env.	Peer	Adult
1.	+1	+1	-1	0
2.	+1	+1	0	0
3.	+1	-2	0	+1
4.	0	-1	0	0
5.	+1	-1	-1	0
6.	+1	-1	0	0
7.	+1	+1	+1	0
8.	+1	+1	0	0
9.	+1	+1	0	+1
10.	+1	+1	+1	+1
11.	+1	+1	+1	0
12.	+1	+1	0	0
13.	+1	+1	0	+1
14.	+1	+1	+1	0
15.	+1	+1	0	0
16.	+1	+1	0	+1
17.	+1	+1	0	0
18.	+1	+1	0	0
19.	+1	-1	0	0
20.	+1	-1	0	+1
21.	+1	-1	0	0
22.	+1	+1	0	+1
23.	+1	+1	0	+1
24.	+1	+1	0	+1
25.	-1	-1	0	0
26.	-1	+1	0	0
27.	+1	+1	0	+1
28.	+1	+1	0	0
29.	+1	+1	0	0
30.	+1	+1	0	0
31.	+1	+1	0	0
32.	-1	+1	0	0
Average	.78	.47	.06	.31
Average Total Behavior --	.41			

Subj. 29

Observ.	Food	Env.	Peer	Adult
1.	+1	-1	-1	0
2.	+1	-1	-1	0
3.	-1	-1	0	0
4.	+1	+1	0	+1
5.	+1	+1	+1	0
6.	+1	+1	+1	-1
7.	+1	-1	0	-1
8.	+1	+1	0	0
9.	+1	-1	0	+1
10.	+1	+1	0	0
11.	+1	+1	0	0
12.	-1	+1	-1	-1
13.	+1	+1	0	0
14.	+1	+1	-1	+1
15.	+1	+1	+1	0
16.	-1	+1	0	+1
17.	0	-1	0	-1
18.	+1	-1	0	+1
19.	0	+1	+1	0
20.	+1	+1	+1	0
21.	+1	-1	+1	+1
22.	+1	+1	0	0
23.	0	-1	0	-1
24.	+1	-1	-1	0
25.	+1	+1	+1	0
26.	+1	+1	0	0
27.	+1	+1	0	0
28.	0	+1	0	+1
29.	+1	+1	0	+1
30.	+1	+1	0	-1
Average	.67	.33	.07	.07
Average Total Behavior --	.28			

Subj. 30

Observ.	Food	Env.	Peer	Adult
1.	+1	-1	-1	0
2.	0	-1	-1	-1
3.	+1	-1	-1	+1
4.	+1	+1	-1	+1
5.	+1	+1	+1	0
6.	+1	+1	+1	0
7.	+1	+1	+1	0
8.	0	-1	-1	0
9.	+1	-1	-1	-1
10.	+1	-1	-1	0
11.	+1	-1	-1	0
12.	+1	-1	-1	0
13.	-1	-1	-1	0
14.	+1	+1	+1	+1
15.	+1	+1	-1	+1
16.	-1	+1	+1	+1
17.	+1	+1	+1	0
18.	+1	+1	+1	-1
19.	+1	-1	-1	+1
20.	-1	+1	+1	0
21.	+1	+1	+1	+1
22.	+1	-1	-1	0
23.	+1	+1	+1	+1
24.	+1	+1	+1	0
25.	+1	-1	-1	+1
26.	-1	+1	-1	+1
27.	+1	+1	+1	0
28.	+1	+1	+1	0
29.	+1	+1	+1	0
30.	+1	+1	+1	0
31.	+1	+1	+1	0
Average	.68	-.03	-.03	.29
Average Total Behavior --	.23			

PRESCHOOL CHILDREN'S MEALTIME BEHAVIOR RELATED TO GROWTH

by

MARY KAY SHERLOCK

B.S., Kansas State University, Manhattan, Kansas, 1978

———————————

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Foods and Nutrition

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1980

The purpose of this study was to observe mealtime behavior of children in a university daycare center and relate this to the nutritional status of the children. The Dugdale Index, [weight (kg)/ height (cm)$^{1.6}$] X 10^4, an age-independent anthropometric index of nutritional status for children ages 1 to 5, and hemoglobin were used as the indicators of nutritional status. Thirty children, ranging from 2 to 5 years, were observed during their noon meal at the Stone-house daycare center. Preliminary work established the behavior variables, observation guidelines and the different instruments that were used during data collection. A child's interaction with food, environment, peers and adults were the four mealtime behavior variables established. Guidelines for observing the food and environment variables were based on whether the behavior interfered with food ingestion. The peers and adult behavior guidelines were based on whether the act was prosocial or antisocial behavior. Behavior was scored either as appropriate (-1), no behavior (0), inappropriate (-1) or very inappropriate (-2). The scores were recorded on a four by four grid using a time sampling method of observation. Measurements of height and weight were taken for each child and the Dugdale Index computed. Hemoglobin values were obtained on 16 of the children. A questionnaire was sent out to all households to obtain socioeconomic information.

The study indicated 5 children were at risk of being under-weight and 5 at risk of being overweight according to the Dugdale Index. All children for whom blood was obtained (16) had normal hemoglobin

levels. Pearson product-moment correlations were made. All independent variables were significantly correlated to the Dugdale Index except birth order and the child's mealtime environment behavior score. The Dugdale Index correlated with the overall behavior score ($P \leq 0.001$). The correlation matrix indicated food and peer behavior scores were significantly correlated at the $P \leq 0.001$ level. The stepwise multiple regression equation indicated that only the peer mealtime behavior score was highly significant ($P \leq 0.001$). The peer behavior score explained 37% of the variation in the Dugdale Index.