A Behavioral Approach to the Establishment of Nutritional Eating Habits in Young Children

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A BEHAVIORAL APPROACH TO THE ESTABLISHMENT OF NUTRITIONAL EATING HABITS IN YOUNG CHILDREN

by

Paul Joseph Smith Knight, II

A Dissertation Submitted to the Faculty of The Graduate College in partial fulfillment of the requirements for the Degree of Doctor of Philosophy Department of Psychology

Western Michigan University Kalamazoo, Michigan December 1982
A BEHAVIORAL APPROACH TO THE ESTABLISHMENT OF
NUTRITIONAL EATING HABITS IN YOUNG CHILDREN

Paul Joseph Smith Knight, II, Ph.D.
Western Michigan University, 1982

The present study attempted to delineate the effects of several
variables on the development of nutritionally desirable food choices
in preschool children. These included: (1) increasing the children's
food knowledge through the use of the Nutrition Education Instructional
System (NEIS), (2) increasing the children's verbal behavior about
food selection prior to making food choices at lunch by requesting the
children in a pre-lunch interview to say the rules learned through the
NEIS, (3) increasing the children's verbal behavior following lunch by
having them identify the foods chosen, and then requesting them to
identify whether they had applied the rule, and (4) by introducing
token and social reinforcement contingencies for (a) adequately reciting
rules during a pre-lunch interview, (b) making a more nutritional
food choice at lunch, (c) eating a variety of foods at lunch, and (d)
the accuracy of verbal statements during a post-lunch interview. Ex-
perimental conditions were arranged to evaluate the effects of the
NEIS alone, the NEIS with interviews, and the NEIS with interviews and
reinforcement contingencies. Data were recorded on the children's
progress through the NEIS, the accuracy of the children's rule state-
ments in the pre-lunch interview, the children's food choices at
lunch, and the accuracy of the children's responses in the post-lunch
interview. The results indicated that the children proceeded through the NEIS at the same rate. In addition, as reflected in the changes of food choice at lunch, little or no effect was observed when the NEIS was used alone, or in combination with the interviews. However, an increase in the proportion of nutrition food choices was obtained when either the token or social reinforcement system was added. These results tend to suggest that nutrition knowledge alone may not be adequate to change food selection habits in young children. Reinforcement for applying the nutrition knowledge is probably required if the children's food selection habits are to be changed.
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ACKNOWLEDGEMENTS

I would like to dedicate this manuscript to the memory of my father, Paul J. S. Knight, and to my mother, Mary M. Knight, for their encouragement and support in my pursuit of a higher education. Special recognition goes to my colleagues Michael F. Masters and Daniel C. McCallum for their valuable assistance during the development and implementation of this project and their editorial comments on earlier versions of this manuscript. I would especially like to thank Dr. Neil D. Kent in his role as my graduate advisor, in his role as Director of Child Development Center for the duration of this project, and for his valuable assistance in the preparation of this manuscript. I would also like to thank the other members of my graduate committee, Dr. Paul T. Mountjoy and Dr. Frederick P. Gault and Dr. Howard Poole for the editorial comments on the original manuscript; Dr. Ronald Hutchinson of the Foundation for Behavioral Research for permission to use the Nutrition Education Instructional System in this study; Sue Kent and her staff for preparing the additional foods used in this study; and finally, the many undergraduate research assistants that provided the manpower to carryout the procedures of this study.

Paul Joseph Smith Knight, II
TABLE OF CONTENTS

ACKNOWLEDGEMENTS ......................................................... ii
LIST OF TABLES ............................................................... iv
LIST OF FIGURES ............................................................. v

Chapter

I. INTRODUCTION ............................................................ 1
II. METHOD ................................................................. 7
   Subjects ................................................................. 7
   Setting ................................................................. 7
   Procedure ........................................................... 9
III. RESULTS AND DISCUSSION ...................................... 19
   Acquisition Rate of NEIS Lessons ......................... 19
   Proportion of Nutritionally Correct Food Choices .... 19
IV. SUMMARY AND CONCLUSIONS ................................. 30
REFERENCES NOTES ..................................................... 32
REFERENCES .............................................................. 33
APPENDIX ................................................................. 35
BIBLIOGRAPHY .......................................................... 52
**LIST OF TABLES**

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Trial block at which food rules were introduced during the course of the study</td>
<td>11</td>
</tr>
<tr>
<td>2.</td>
<td>Opportunities for food comparisons made during each phase of the study</td>
<td>12</td>
</tr>
<tr>
<td>3.</td>
<td>Sequence of treatment conditions</td>
<td>13</td>
</tr>
<tr>
<td>4.</td>
<td>Mean proportion of correct food choices during the various treatment conditions</td>
<td>22</td>
</tr>
<tr>
<td>5.</td>
<td>Response accuracy during post-lunch interviews</td>
<td>26</td>
</tr>
<tr>
<td>IA.</td>
<td>NEIS scope and sequence chart showing content of all lessons</td>
<td>38</td>
</tr>
<tr>
<td>IB.</td>
<td>Relevant rules from the NEIS</td>
<td>39</td>
</tr>
<tr>
<td>2A.</td>
<td>Food served and food comparisons made during each phase of the study</td>
<td>49</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Arrangement of the room used for NEIS instruction and during the lunch period</td>
<td>8</td>
</tr>
<tr>
<td>2.</td>
<td>A cumulative record of the lesson numbers completed for NEIS instruction groups (N-1, N-2, N-3) by two-day blocks for the duration of the study</td>
<td>20</td>
</tr>
<tr>
<td>3.</td>
<td>The proportion of nutritional food choices at lunch by two-day blocks for all subjects</td>
<td>21</td>
</tr>
<tr>
<td>4.</td>
<td>An example of an activity from the NEIS presented when teaching the children rules about meat selection taken from Lesson 67</td>
<td>41</td>
</tr>
<tr>
<td>5.</td>
<td>An example of an activity from the NEIS presented when teaching the children the rule about dairy product selection taken from Lesson 73</td>
<td>42</td>
</tr>
<tr>
<td>6.</td>
<td>Two examples of activities from the NEIS presented when teaching the children the rule about any food with harmful parts selection taken from Lesson 78</td>
<td>43</td>
</tr>
<tr>
<td>7.</td>
<td>Examples of activities from the NEIS presented when teaching the children the rules about packaging selection taken from Lessons 77 and 78</td>
<td>45</td>
</tr>
<tr>
<td>8.</td>
<td>Examples of activities from the NEIS presented when teaching the children the rules about cooking selection taken from Lesson 86</td>
<td>47</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

The present study was conducted as a component of a multi-year effort to develop and validate strategies to teach young children pro-health lifestyles in the areas of nutrition, harmful substances and health advocacy. The need to establish nutritional lifestyles at a young age (18 to 60 months) has been recommended by nutrition researchers (e.g., Birch, 1979a) and nutrition educators (e.g., Sipple, 1970). Early research on food selection and eating habits in infants and young children suggested a genetically programmed "body wisdom" in "self-selection" of a nutritional diet (Davis, 1928). There was some evidence that children, when presented with foods good to eat, tended to select adequate diets without adult supervision or suggestion. In the 1940s, however, researchers (McKay, Waring, & Krush, 1940) were rejecting such conclusions because of: (1) the limited number of children participating in the research; (2) the limited number of observations in the research; and (3) the failure to control for supervision and training outside of the research setting.

Research turned to learned social behavior patterns (e.g., Duncker, 1938). The more recent perspective on changes in eating patterns (e.g., Evans & Hill, 1979) suggest that lifestyle is closely related to eating behavior. The genetically programmed "body wisdom," if it exists, is overridden by cultural influences as soon as the child is old enough to be influenced by information on nutritional lifestyles.

The present study attempts to delineate the effect of several
variables on the development of nutritionally desirable food choices in preschool children. This study follows a suggestion presented by Harshbarger and Malley (1974) concerning the use of multiple intervention strategies so that an attempt is made to analyze the effects of certain combinations of variables. After reviewing the literature pertinent to the eating habits of young children, the writer (Knight, Note 1) has concluded that much information is available on the foods children tend to eat and/or ignore (Lamme & Lamme, 1980; Twardoz, Cataldo, & Risley, 1975); the verbal report of children's food likes and dislikes (Birch, 1979b); and factors correlated with the establishment of children's food habits (e.g., Yperman & Vermeersch, 1979).

Only sparse research on variables controlling eating behavior has been reported (Duncker, 1938; Birch, 1980b; Harrill, Smith, & Gangever, 1972; Lovaas, 1964; Ireton & Guthrie, 1972; Madsen, Madsen, & Thompson, 1974). Harrill et al. (1972) found that when information on a food is presented prior to a meal, increases in consumption of that food occurred. Lovaas (1964) reported that reinforcement of verbal behavior denoting a particular food functioned to increase the consumption of that food. Ireton and Guthrie (1972) found that a token economy increased the amount of vegetables consumed, while the method of food preparation did not. In another study involving reinforcement of eating behaviors, Madsen et al. (1974) were able to increase the proportion of meals consumed by presenting small candies and sugar-coated cereals, paired with adult praise, contingent upon eating behavior and portion completion. Knight (Note 1) found that serving less preferred vegetables, when alternative foods were not present, was sufficient to
increase the amount of less preferred vegetables consumed.

Although nutrition education programs have also purported to affect nutritional habits, few have demonstrated substantial or durable changes in nutritional habits if direct measures of eating behavior are reported (e.g., Fisk, 1979). Coates, Jeffery, and Slinkard (1981) evaluated the effects of nutrition education on the nutritional practices of fourth and fifth graders in the home and at school. The effects reported persisted over a four-month period and led these authors to conclude that specific instruction could be effective in altering nutritional habits of primary grade children.

In summary, interventions have been established to change children's food habits through: (1) applying reinforcement contingencies to consumption (e.g., Madsen et al., 1974); (2) increasing the frequency of verbal behavior about a specific food (e.g., Lovaas, 1964); and, (3) nutrition education programs (e.g., Coates et al., 1981). Although positive results have been reported from these procedures taken separately, the combined effects of these techniques have not yet been studied.

In the present multi-year project, a nutrition education program, the Nutrition Education Instructional System (NEIS), was developed (Long, Masters, McCallum, & Snyder, Note 2). The system is based upon the theory of Direct Instruction utilized in the DISTAR systems (e.g., Becker & Engelmann, 1978; Engelmann & Carnine, 1982). The purpose of NEIS is to teach preschool and kindergarten children to: (1) name individual foods and classify these foods into five basic food groups; (2) identify "harmful parts of food" and the foods that contain these
elements; (3) identify types of food packaging and food preparation; and (4) select foods that are good to eat, as defined by a set of food selection rules. The NEIS consists of 110 lessons containing 8-10 activities per lesson. The teacher presents one lesson per day to small groups of children. The activities within a lesson require a high rate of student participation (up to 12 responses per minute) so that frequent practice opportunities are provided.

The goals of the NEIS most relevant to the present study are the food selection rules. These include rules for selection of foods based on food group membership (fruits, vegetables, grains, dairy products, and meats), content of harmful parts (salt, sugar, and fat), the method of packaging (fresh, frozen, boxed, and canned), and the method of cooking (steamed, baked, boiled, fried, and broiled). Following the rules should (1) increase the consumption of complex carbohydrates, (2) result in a greater variety of foods being consumed, and (3) decrease the intake of fat, cholesterol, sodium, sugar, and food additives.

Nutritionists and educators have emphasized the need for programs and interventions which will not only increase the amount of knowledge about nutrition but which will also affect eating habits (e.g., Robinson, 1972; Burgess & Dean, 1962). For example, children must not only obtain knowledge consistent with the goals of decreasing the consumption of fat, sugar, and salt, but must use this information to guide their actual choice of foods (e.g., Lockhart, 1979) and not merely their verbal reports of food preferences (e.g., Birch, 1979b). The measurement of food choice should also be based upon direct
observations in a realistic food selection context in which the child has the opportunity to choose among alternatives (Catania, 1979).

Masters, McCallum, Keenan, Snyder, and Long (Note 3) evaluated the effects of the NEIS on children's responses to a test of nutrition knowledge and on children's responding to a two-choice test of food selection during school snack time. These tests were presented prior to and after completing the NEIS program. The mean proportion of correct responses on the knowledge test increased from .19 to .75 for those children who had completed the program. No change in the proportion of correct responses to the knowledge test were obtained for a control group. The effects persisted in a 16-week follow-up test and were significant at the .05 level. The mean proportion of food choices consistent with the rules taught in the NEIS also increased from .36 to .71 for those children who had completed the program, while the control group increased from .34 to .40. The effects persisted in a 16-week follow-up test and were significant at the .05 level.

In the present study, some of the variables discussed above which have been demonstrated to affect consumption of nutritious food were combined into a multiple intervention package in such a manner as to permit a component analysis. The variables involved were: (1) NEIS instruction (a portion of the NEIS program is presented in the Appendix, pp. 41ff), (2) individual pre-lunch interviews at which the children are instructed to recite the food rules they learned in the NEIS program, (3) individual post-lunch interviews at which the children were instructed to name the foods they had chosen at lunch and the
food rule that resulted in that choice, and (4) a reinforcement system that involved either tangible (token) or social (descriptive praise) reinforcement which was made contingent on (a) adequate recitation of NEIS food rules before lunch, (b) choosing foods to which the rules pertained, (c) consuming a variety of foods at lunch, and (4) making accurate statements after lunch about food consumed and food rule application. The dependent variable of primary interest was the choice behavior emitted by the children in a lunch situation which consisted of a series of choices between foods which conformed to the rules and foods which did not.
CHAPTER II

METHOD

Subjects

Nine children, three males and six females, whose ages ranged from three years, eleven months to five years, five months (mean = 4.33 years) who attended a local preschool, participated as subjects. These children were selected because they (1) attended the preschool regularly four or five days in the morning and stayed through lunch and (2) placed at or above Lesson 30 in DISTAR Language I (Engelmann & Osborne, 1976).

Setting

The various phases of the study were conducted in a large room in the building which housed the preschool. Figure 1 illustrates the arrangement of the room. NEIS instruction was conducted in Areas C, D, and E. These areas contained a table and chairs and were separated by 4' x 8' x 2' bookcases. During the lunch period the three lunch intervention groups ate in these areas. During lunch, radio speakers were placed as indicated on the diagram to mask conversations occurring within the lunch areas. Also during the lunch period, Area A served as an intervention area; Area B contained a self-serve cafeteria-type table where the children selected the components of their lunch; and Area F functioned as a tray drop-off and exit interview area. Area G served as a play area at all times. Details of the events which
Arrangement of the room used for NEIS instruction (Areas labeled C, D, and E) and during the lunch period. During the lunch period Area A served as an intervention area, Area B contained a cafeteria-type table where the children selected the components of their lunch Areas C, D, and E were where the children ate their lunch, Area F functioned as a tray drop-off area, and Area G served as a play area.
occurred during the intervention and interview phases are described in the Procedure section which follows.

**Procedure**

**NEIS instruction**

Groups of three children were given 30-45 minutes of NEIS instruction each morning. The instruction was monitored daily by two persons who developed the program. When the study began, Group N-1 ($S_2, S_5, S_9$) had completed a mean of 42 lessons; Group N-2 ($S_4, S_{10}, S_{11}$) had completed a mean of 37 lessons; Group N-3 ($S_3, S_7, S_8$) had completed a mean of 31 lessons. The reader may determine which concepts had been mastered by each group by referring to Table 1A in the Appendix.

During the course of the present study, the children were taught up to six food rules (after having learned the harmful parts of food - salt, sugar, and fat, types of cooking, and types of packaging) using the NEIS instructional method and materials. The six rules taught were as follows:

(a) Rule I: The Meat Rule - Meat that has a lot of harmful parts is a food that is not good to eat.

(b) Rule II: The Dairy Rule - Dairy products that have a lot of harmful parts are foods that are not good to eat.

(c) Rule III: The Harmful Parts Rule - Any food that has harmful parts is a food that is not good to eat.

(d) Rule IV: The Fresh Food Rule - Fresh food is better to eat than frozen, boxed, or canned foods.
(e) Rule V: The Frozen Food Rule - Frozen food is better to eat than boxed or canned foods.

(f) Rule VI: The Cooking Rule - Steamed or baked is better to eat than boiled, fried, or broiled foods.

Table 1 shows the point during the study (in terms of two-day trial blocks) at which these concepts were introduced.

During the course of the study, the children were presented several food choices during each lunch period which tested the appropriate application of the above rules. The general comparisons which were made during the course of the study and the frequency with which the choices were presented during each phase are presented in Table 2, which also presents an example of each comparison. The specific foods which were used in the various comparisons are given in Table 2A in the Appendix.

Experimental design

The sequences of treatment conditions to which the subjects were exposed and the two-day trial blocks over which the treatment conditions extended are shown in Table 3. Details of these conditions follow.

Condition A: Interview. Children in this condition were interviewed twice during each lunch period: prior to making their food choices and after they finished lunch. The purpose of the pre-lunch interview was to review all of the rules that the children had been taught by NEIS instruction up until that point in time. The purpose of the post-lunch interview was to determine if the child understood
<table>
<thead>
<tr>
<th>Rule</th>
<th>Group N-1</th>
<th>Group N-2</th>
<th>Group N-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Meat Rule</td>
<td>12</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>II. Dairy Rule</td>
<td>15.5</td>
<td>19.5</td>
<td>27.5</td>
</tr>
<tr>
<td>III. Harmful Parts Rule</td>
<td>16.5</td>
<td>20.5</td>
<td>30</td>
</tr>
<tr>
<td>IV. Fresh Food Rule</td>
<td>16.5</td>
<td>20.5</td>
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</tr>
<tr>
<td>V. Frozen Food Rule</td>
<td>20.5</td>
<td>24</td>
<td>--</td>
</tr>
<tr>
<td>VI. Cooking Rule</td>
<td>25</td>
<td>30</td>
<td>--</td>
</tr>
<tr>
<td>Rule</td>
<td>Comparisons</td>
<td>Number of Opportunities to Compare</td>
<td></td>
</tr>
<tr>
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<td>--------------------------------------------------</td>
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<td>Phases</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Rule I: Meat Rule</td>
<td>Fat vs. No Fat&lt;br&gt;Ex: Tuna (in Oil vs. Water)</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Rule II: Dairy Rule</td>
<td>Fat vs. No Fat&lt;br&gt;Ex: Whole Milk vs. Skim Milk</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Rule III: Harmful Parts Rule</td>
<td>Fat vs. No Fat&lt;br&gt;Ex: Potato (Butter vs. No Butter)&lt;br&gt;Sugar vs. No Sugar&lt;br&gt;Ex: Milk (Chocolate vs. White)&lt;br&gt;Salt vs. No Salt&lt;br&gt;Ex: Soda Crackers</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Rule IV: Fresh Food Rule</td>
<td>Fresh vs. Canned&lt;br&gt;Ex: Tomatoes&lt;br&gt;Fresh vs. Frozen&lt;br&gt;Ex: Spinach</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Rule V: Frozen Food Rule</td>
<td>Frozen vs. Canned&lt;br&gt;Ex: Green Beans</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Rule VI: Cooking Rule</td>
<td>Fried vs. Baked&lt;br&gt;Ex: Turkey Roll&lt;br&gt;Steamed vs. Boiled&lt;br&gt;Ex: Carrots&lt;br&gt;Broiled vs. Baked&lt;br&gt;Ex: Tuna Casserole</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Groups (Subjects)</th>
<th>Phases</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-1 (S₂, S₃, S₄)</td>
<td>Condition A</td>
<td>Interview</td>
<td>Condition B</td>
<td>Token</td>
</tr>
<tr>
<td>Two-Day Blocks</td>
<td>1-8</td>
<td>9-24</td>
<td>25-32</td>
<td></td>
</tr>
<tr>
<td>L-2 (S₅, S₇, S₈)</td>
<td>Condition A</td>
<td>Interview</td>
<td>Condition C</td>
<td>Social</td>
</tr>
<tr>
<td>Two-Day Blocks</td>
<td>1-8</td>
<td>9-24</td>
<td>25-64</td>
<td></td>
</tr>
<tr>
<td>L-3 (S₉, S₁₀, S₁₁)</td>
<td>Condition D**</td>
<td>Baseline</td>
<td>Condition A***</td>
<td>Interview</td>
</tr>
<tr>
<td>Two-Day Blocks</td>
<td>Varied</td>
<td>Varied</td>
<td>25-64</td>
<td></td>
</tr>
</tbody>
</table>

* S₅ was excluded.

** This period was part of a multiple baseline.

*** A Condition B probe was administered to S₉ for 4 trial blocks.
whether or not the foods he/she had chosen that day were consistent with the rules.

**Pre-Lunch Interview.** The child was required to state only the rules learned during NEIS instruction. Children were first instructed: "Say the rules you know about eating." If the child did not recite all the rules learned to date, a specific question was asked. This question identified the food specifically stated in the rule, "Tell me the rule about eating meat." If the child still did not say the rule, the rule was recited for him/her. The child was then asked to recite the rule. The child's responses were recorded as Level 1 when the child recited a rule to the first question, as Level 2 when the child recited a rule to the second question, as Level 3 when the child required a model, and as Level 4 when the child did not recite a rule correctly after it was modeled twice. If a child had not yet received instruction on a rule in the NEIS, requests for a rule statement beyond Level 1 were not made for that rule. Whenever a child had completed reciting a rule, and there were still others to be recited, the child was asked, "Do you know anymore?" If no response occurred within 10 seconds, a Level 2 question was given. If errors were made in rule recitation at Level 1, the Level 2 question was skipped and the Level 3 model was given. When the child had recited all the rules and/or attained Level 4, he/she was sent to the serving area (B).

**Post-Lunch Interview.** The post-lunch interview consisted of two questions for each food choice presented that day. Question Type 1 asked what food choice the child had made; Question Type 2 asked whether that choice was consistent with the rules. For example, the child was
asked:

Today we had whole milk with a lot of fat, and skim milk without a lot of fat. Which did you choose?

Following the child's response, he/she was then asked, "Did you follow the food rule when you chose (skim/whole) milk?" Responses were recorded verbatim. Incorrect responses to either question were not corrected. Several times during this condition, a second observer recorded responses for reliability purposes.

**Condition B: Token Reinforcement.** The children to whom this treatment condition was administered were given token reinforcement in the form of marks on a card for adequately reciting rules during the pre-lunch interview, making the more nutritional food choice at lunch, food consumption, and accuracy of verbal statements during the post-lunch interview. The opportunity to earn tokens increased as the children went through this treatment condition. During the first stage of this condition (Trial Blocks 9 through 15), tokens were given for all of the following: (1) correctly stating rules during the pre-lunch interview, (2) making nutritional food choices at lunch, (3) eating a variety of foods at lunch, and (4) accurate responses during the post-lunch interview. During the second stage of this condition (Trial Blocks 15 through 19), the number of tokens awarded for nutritional choices was increased. During the third stage (Trial Blocks 20 through 24), the children were praised whenever tokens were given and they were corrected whenever they made inaccurate statements during the post-lunch interview.

The children were able to exchange their tokens on a daily basis
for a play activity, or, after a number of tokens had been accumulated, for an object.

**Condition C: Social Reinforcement.** Social reinforcement in the form of descriptive praise was given contingently on the occurrence of the same behaviors enumerated above (Condition B).

**Condition D: Baseline.** No interviews were conducted nor were any tangible or intentional social reinforcers given. All children were simply served the food of their choice, directed to eat at the assigned table, and dismissed back to their classroom following lunch. They were, of course, informed by the person serving the food what the difference was between the choices to be made, as described in the following section.

**General lunch procedure**

Each day of the study, from 12:00-12:45 p.m., the children were served lunch in the experimental room (see Figure 1). At the beginning of the lunch period, the children waited in the hallway outside the room. A research assistant read or told a story to the children while they waited to be called, one at a time, to be served lunch.

When called into the lunch room, children in treatment conditions requiring interviews stopped first in Area A, then proceeded to Area B, where food choices were presented. After food selection, children in Group L-1 were sent to Area E, children in Group L-2 were sent to Area C, and children in Group L-3 were sent to Area D. When a child was finished with lunch, research aides at the tables released them such that one child at a time would take his/her food tray to Area F.
children in treatment conditions including interviews were questioned individually in Area F and released to their rooms, unless they were also involved in token exchange. These children were sent to Area G first, where token exchanges were completed.

Children in Condition D went from the hallway to Area B, then to the assigned table (Area D). After eating, they were told to return their trays to Area F and from there were released to their classrooms.

At the serving area (B) a child was given a choice of 3-5 menu items each day. Foods for which a choice was possible were presented by research aides using the same general wording for each food. For example:

This is whole milk. It has a lot of fat. This is skim milk. It does not have a lot of fat. Which would you like?

These peaches were frozen. These peaches were canned. Which would you like?

These green beans were boiled. These green beans were steamed. Which would you like?

The children were required to name the food they wanted (e.g., say "skim milk"). The order in which foods were presented within a choice was randomly alternated between foods and children. The children were required to take one portion of each food served and thereby required to make a choice on all items presented. A second research aide in this area recorded the choices made by each child. Several times throughout the study, a third research aide independently recorded the choices made by each child for reliability.
Data recording

**Pre-Lunch Interview.** The levels (1-4) at which each rule was stated were recorded daily by the interviewers. Mean accuracy of rule statements was computed for any two-day block by adding together the rule statement scores for that block and dividing by the number of scores added.

**Food Choice.** For each nutritional food choice presented, the actual choice was recorded. The proportion of nutritional food choices per two-day block was calculated by dividing the number of nutritional/food-choice responses by the total number of food-choice responses made in that two-day block. If subjects were absent for one of the two days in a block, data were recorded for one day only.

**Post-Lunch Interview.** Data in the Post-Lunch Interview were recorded verbatim and classified as correct or incorrect. Mean accuracy of responses to Question Type 1 was computed by adding the number of responses classified in Category 1 to the number classified as Category 4, and dividing by the total number of responses to Type 1 questions. Similarly, mean accuracy of responses to Questions Type 2 was calculated by adding the number of response classified in Category 1 to Category 8 and dividing by the total number of responses to Questions Type 2.

**Reliability.** Observers with identical data sheets recorded the same events in each area. These data sheets were used to compare agreements (A) and disagreements (D). Reliability data were taken approximately 30% of the time in each condition and in each area. Reliability was calculated with the formula \[ \frac{A}{A + D} \times 100 \]. The average reliability was above 90% for all measures.
CHAPTER III

RESULTS AND DISCUSSION

Acquisition Rate of NEIS Lessons

Figure 2 depicts the rate at which the three instructional groups proceeded through the NEIS program. As indicated previously, these groups were at different points in the program when the experiment began. This, of course, is reflected by the difference on the ordinate-intercept. The important point about the data depicted in this figure is that all three acquisition curves are parallel. This indicates that the three groups proceeded through the NEIS program at the same rate so that the three groups can be regarded as homogeneous so far as acquisition of this information is concerned.

Proportion of Nutritionally Correct Food Choices

Figure 3 is a summary of the principal results of this study. The figure shows the mean proportion of correct food choices by two-day blocks for each subject in the study. For purposes of the comparisons which follow, the data from two subjects will not be considered: $S_3$ and $S_8$. These two subjects should not have participated in the study but the information which was relevant to make such a decision was not available at the beginning of the study. Subject 3 was a male whose physician notified the experimenter that, because of a tendency toward obesity, the child's food intake should be limited to
A cumulative record of the lesson numbers completed for NEIS instruction groups (N-1, N-2, N-3) by two-day blocks for the duration of the study.
The proportion of nutritional food choices at lunch by two-day blocks for all subjects. Conditions: A - Interview, B - Token Reinforcement, C - Social Reinforcement, D - Baseline are shown. Open data points indicate when the first NEIS rule (meat) was introduced, the open triangle indicates when the last NEIS rule (cooking) was introduced.
TABLE 4
MEAN PROPORTION OF CORRECT FOOD CHOICES DURING THE VARIOUS TREATMENT CONDITIONS

<table>
<thead>
<tr>
<th>Groups &amp; Subjects</th>
<th>Conditions</th>
<th>B</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>Blocks 16-24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>L-1</td>
<td>S₂</td>
<td>.62</td>
<td>.85</td>
</tr>
<tr>
<td></td>
<td>S₄</td>
<td>.32</td>
<td>.62</td>
</tr>
<tr>
<td></td>
<td>(S₃)</td>
<td>(.45)</td>
<td>(.49)</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>.47</td>
<td>.74</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-2</td>
<td>S₅</td>
<td>.49</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td>S₇</td>
<td>.75</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td>(S₈)</td>
<td>(.43)</td>
<td>(.50)</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>.62</td>
<td>.77</td>
</tr>
<tr>
<td></td>
<td>Mean (L-1+L-2)</td>
<td>.54</td>
<td>.76</td>
</tr>
<tr>
<td>L-3</td>
<td>S₉</td>
<td>.53</td>
<td>.59</td>
</tr>
<tr>
<td></td>
<td>S₁₀</td>
<td>.76</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>S₁₁</td>
<td>.72</td>
<td>.53</td>
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<tr>
<td></td>
<td>Mean</td>
<td>.67</td>
<td>.61</td>
</tr>
</tbody>
</table>
one portion (no seconds). The experimenter observed that the child would apparently eat any food nondiscriminantly. It seems reasonable to conjecture that, in view of this level of motivation, almost no variable would produce an effect. This is precisely what his performance indicates as shown in Figure 3. Except for becoming less variable, his choice behavior did not significantly change over the entire duration of the study. Subject 8 was a female who had a hearing loss which was not detected until the termination of the experiment. This would be particularly important since she was assigned to the social reinforcement (Group L-2) condition. Although cognizant of the inferential difficulties involved in differentially disregarding data, it would seem that in these cases there is more than a rational basis for regarding the subjects in question as non-representative. The data from these two subjects are shown in parentheses in the data presentations which follow but their data were not used in any computations.

Table 4 summarizes the data presented in the individual curves in Figure 3. From these data it can be seen that Group L-3 appears to have a higher baseline of correct choices than do the other groups. This may be seen by comparing the mean percent correct choices during initial baseline (first Condition D) for this group ($\bar{x} = .67$) to the combined mean proportion of correct choices during the initial condition (Condition A: Interview Alone) of the other two groups, L-1 and L-2 ($\bar{x} = .54$). Since nothing in the data suggests that Condition A alone produces any effect, a point to be elaborated on later, this initial condition in Groups L-1 and L-2 can simply be regarded as a baseline. Consequently, when the question is asked if there is any
overall change from the initial baseline to the final baseline in any of the treatment groups, it may be seen that whereas Groups L-1 and L-2 change to approximately the same degree, they differ from Group L-3. Whereas the mean increase in proportion of correct choices for Groups L-1 and L-2 combined is .39 (.93 - .54), the mean increase for Group L-3 is only .11 (.78 - .67). In other words, the manner in which Groups L-1 and L-2 were treated differently than Group L-3 after the initial period (interview or baseline) produced a difference in proportion of correct choices that was four times as great. When the data during Condition A for S₂, S₄, S₅, and S₇ are examined on an individual basis, it is clear that there is no systematic increase or decrease. The same conclusion appears justified when the individual data from S₉, S₁₀, and S₁₁ are scrutinized; no systematic trend is evident.

If Condition A produced an effect, it was certainly not a very substantial one. When the individual curves generated by Condition A for S₂, S₄, S₅, and S₇ are examined on an individual basis, it is clear that no systematic increase or decrease occurred during this period. The same conclusion appears justified when the individual curves for S₉, S₁₀, and S₁₁ during Condition A are scrutinized. The only data which might suggest that Condition A produced an effect is the difference between the mean proportion correct during the first baseline (x = .67) and the mean proportion correct during the second baseline (x = .78). It may be seen from Table 4, however, that this difference is primarily due to S₉'s performance. Reference to Figure 3 shows that this was the subject in Group L-3 that was administered a tangible reinforcement probe during Condition A.
Given that the interviews produced little or no effect on food choice behavior, was this because the children did not know the rules very well? If this were so, the pre-lunch interview data should reflect this fact. When these data were analyzed, however, this conjecture did not appear to have support. Recalling that a Level 1 response was correctly answering the question, "Say the rules you know about eating," and a Level 2 response was correctly answering the question, "Tell me the rule about eating meat (or dairy products or fresh food, etc.)," the overall mean number of rules recited by the children was 5.1 and the overall mean accuracy level was 1.4. There was a total of only three instances where a child could not produce the rules before lunch.

The post-lunch interview data possibly yield a different perspective on the children's application of the food rules. Table 5 shows the accuracy with which the children responded to the two questions asked in the interview. These accuracy measures were computed as described on page 18. From these data it may be seen that the children remembered the choices that they had made during lunch fairly well. There was also an improvement over time. In Groups L-1 and L-2, this improvement is seen by comparing the initial period (Condition A) with the subsequent period (Condition B or C). It does not appear possible to tease out any variable that may have produced this effect. It certainly does not appear to be due to reinforcement conditions since Group L-3 had the highest level of accuracy and they did not experience either reinforcement condition.

Although the children could remember what they had chosen for
# TABLE 5
RESPONSE ACCURACY DURING POST-LUNCH INTERVIEWS

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Group &amp; Subjects</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
<th>A</th>
<th>B</th>
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<tr>
<td></td>
<td>L-1 S₂</td>
<td>.83</td>
<td>.96</td>
<td>.51</td>
<td>.88</td>
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<tr>
<td></td>
<td>S₄</td>
<td>.53</td>
<td>.71</td>
<td>.24</td>
<td>.49</td>
<td></td>
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<tr>
<td></td>
<td>(S₃)</td>
<td>(.78)</td>
<td>(.75)</td>
<td>(.35)</td>
<td>(.33)</td>
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</tr>
<tr>
<td>Mean</td>
<td>.68</td>
<td>.84</td>
<td></td>
<td>.38</td>
<td>.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L-2 S₅</td>
<td>.78</td>
<td>.89</td>
<td>.40</td>
<td>.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S₇</td>
<td>.89</td>
<td>.94</td>
<td>.10</td>
<td>.39</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(S₈)</td>
<td>(.50)</td>
<td>(.48)</td>
<td>(.29)</td>
<td>(.30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>.84</td>
<td>.92</td>
<td></td>
<td>.25</td>
<td>.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L-3 S₉</td>
<td>--</td>
<td>.86</td>
<td>--</td>
<td>.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S₁₀</td>
<td>--</td>
<td>.98</td>
<td>--</td>
<td>.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S₁₁</td>
<td>--</td>
<td>1.00</td>
<td>--</td>
<td>.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>.95</td>
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<td></td>
<td>.57</td>
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</table>

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lunch fairly well, with better than 90% accuracy toward the end of the second period, they did not do as well in terms of remembering that they had followed a rule in making their choices. Initially, even the best performance was only about 50% accurate. As with the responses to the first question, there was improvement over time but it is not apparent to what this improvement may have been due. Again, the data from Group L-3 suggest that it is not due to either reinforcement condition.

Reference is now made to Figure 3 and Table 4 to ascertain if the reinforcement conditions, (Conditions B or C) produced an increment in correct food choices and if so, did the type of reinforcement produce a differential effect?

To answer the first question, two comparisons can be made using the data presented in Table 4. (1) Regarding Condition A as a baseline for Groups L-1 and L-2, since there were no systematic changes during this period, the overall mean of the two groups combined ($\bar{x} = .54$) is used as an estimate of the mean proportion of correct choices prior to the groups being exposed to the reinforcement contingencies. Behavior during the final eight trial blocks is used as a measure of the effect produced by reinforcement (since the individual curves indicate that this is measuring through the period when Condition B and Condition C are in effect). The overall mean proportion of correct choices during Trial Blocks 16-24 for both groups combined is .84. This is a mean increase of .30, an increase which is ostensibly due to reinforcement alone. (2) When the above mean increase in proportion of correct responding ($\bar{x} = .30$) is compared to the increase shown by a control group (Group L-3), it will be seen that the difference is striking. The mean
proportion of correct responses declined slightly (.67 - .61) from the first period to the second. It is inferred, therefore, from within-group and between-group comparisons that the reinforcement conditions did produce an effect.

An examination of the acquisition curves for individual subjects shown in Figure 3 appears to substantiate the above inference. The subjects of interest are $S_2$, $S_4$, $S_5$, and $S_7$. When these data are examined, it is only $S_7$ who fails to show a systematic increase during the reinforcement condition. In the case of $S_7$, there was an increase in mean proportion of correct responses from his baseline ($\bar{x} = .75$) through his reinforcement period ($\bar{x} = .80$) (see Table 4). The reason why the increase in correct responding is not so apparent in this case is because he had such a high level of correct responding (the highest of any subject during the first phase of the experiment) during the baseline period.

Given that the reinforcement operations used in this experiment increased correct responding, what can be said concerning the relative effect produced by tangible reinforcers (tokens) versus verbal reinforcers (descriptive praise). Intuitively and empirically it would be expected that, particularly with small children, the former would produce the larger effect. An examination of Table 4 indicates that this is true. Although there are only four subjects involved, when the mean proportion of correct responding during the initial period (Condition A) is compared with the terminal trial blocks (16-24) during the reinforcement period, those two subjects who received tangible reinforcers (Group L-1) showed a mean increase of .40 whereas
those two subjects who were only given descriptive praise showed a mean increase of .19.

The effect of tangible reinforcement can also be seen in the data generated by the probe administered to $S_9$ during the latter part of his Condition A period. An examination of his individual acquisition curve in Figure 3 shows an increase in correct responding as a consequence of the probe; an increase which was maintained through the second baseline period.

The results of this study do not suggest that NEIS instruction had any effect on increasing correct responding in a food choice situation. There appears to be nothing discernable in the acquisition curves of individual subjects that points to any effect. The data from the subjects who experienced NEIS instruction at approximately the same time relatively early in the study ($S_2$, $S_4$, $S_5$, $S_9$, $S_{10}$, $S_{11}$) were grouped and examined. The first three subjects were exposed to reinforcement contingencies and interviews; the last three were exposed to interviews alone; all were exposed to NEIS for the same period of time. The mean proportion of correct responses for the first group was .48 during the first phase of the study and .90 during the last phase (a mean difference of .42) whereas the last three subjects had a mean proportion of correct responses of .67 during the first phase and .78 during the last phase (a mean difference of .11). Recalling that $S_9$ experienced a tangible reinforcement probe during the second phase which ostensibly had an effect, we inquire as to what the effect of NEIS would look like, if that subject was excluded from this analysis. When this is done, the remaining two subjects had a mean proportion of correct responding of .74 in the first phase and .76 in the last.
CHAPTER IV

SUMMARY AND CONCLUSIONS

The present study was conducted as a component of a multi-year effort to develop and validate strategies to teach young children pro-health lifestyles in the areas of nutrition, harmful substances and health advocacy. The present study attempted to delineate the effects of several variables on the development of nutritionally desirable food choices in preschool children. These included: (1) increasing the children's food knowledge through the use of the NEIS educational program, (2) increasing the children's verbal behavior about food selection prior to making food choices at lunch by requesting the children in a pre-lunch interview to say the rules learned through the NEIS, (3) increasing the children's verbal behavior following lunch by having them identify the foods chosen, and then requesting them to identify whether they had applied the rule, and (4) introducing token and social reinforcement contingencies for (a) adequately reciting rules during a pre-lunch interview, (b) making a more nutritional food choice at lunch, (c) eating a variety of foods at lunch, and (d) the accuracy of verbal statements during a post-lunch interview.

Experimental conditions were arranged to evaluate the effects of NEIS alone, the NEIS with interviews, and the NEIS with interviews and reinforcement contingencies. Data were recorded on the progress through the NEIS, the accuracy of children's rule statements in the pre-lunch interview, children's food choices at lunch, and the
accuracy of the children's responses in the post-lunch interview.

The data indicate that the children proceeded through the NEIS at the same rate. In addition, as reflected in the changes of food choice at lunch, little or no effect was observed when the NEIS was used alone, or in combination with the interviews. However, an increase in the proportion of nutrition food choices was obtained when either the token or social reinforcement system was added. These results tend to suggest that nutrition knowledge alone may not be adequate to change food selection habits in young children. Reinforcement for applying the nutrition knowledge is probably required if the children's food selection habits are to be changed.

As all the children in the present study received NEIS training, what has not been answered is whether the same results would be obtained if only a reinforcement system was applied. Previous research (Madsen et al., 1974; Ireton & Guthrie, 1972) has shown that reinforcement alone can be used to increase consumption. However, the reinforcement of children's food consumption is different than the reinforcement of children's food selection which requires a discrimination between more or less nutritional foods of the same type. It may be the case that without NEIS or other forms of nutrition education, the effects of reinforcement contingencies would not be as powerful. Further research is required to answer this question.
REFERENCE NOTES


REFERENCES


Birch, L. L. The effects of peer models' food choices and eating behaviors on preschoolers' food preferences. Child Development, 1980, 51, 489-496. (b)


APPENDIX

AN OVERVIEW OF THE NEIS

The NEIS consists of 110 lessons with each lesson containing 8-10 activities that can be taught in 20 to 30 minutes of small group instruction. Characteristic of the small group instruction (no more than 10 children) is the use of unison responding by the children to the teacher's presentations. The children's responses are cued by a teacher "signal" (e.g. a finger-snap) to insure that the group starts together, to minimize copying. Individual turns are given at the end of the activity to be sure that a child can respond independently of the group. The children respond in an active way to the teacher presentation at a rate of about 8-12 responses per minute. Any errors are corrected immediately. An activity is considered mastered, or "firmed," when the children can complete the entire activity without errors during unison or individual time.

The NEIS program is organized into "tracks". A track is a set of activities presented across successive lessons to teach the related skills described by that track's objectives. The tracks and objectives of the NEIS program are as follows:

1. Actions
   To teach the child:
   . how to respond to basic instructions.
   . how to respond to signals using actions that are already known.

2. Body Parts
   To teach the child:
   . how to respond to basic instructions.
3. Food/Not Food

To teach the child:
- how to respond to instructions.
- to learn to label and identify what is and what is not food.

4. Food Groups

To teach the child:
- to identify members of the food groups: (1) vegetables, (2) meats, (3) fruits, (4) dairy products, and (5) grains.

5. Food Names

To teach the child:
- to identify and label foods within the five food groups.
- to identify the food group.
- to learn the names of 41 items: 17 vegetables, 14 meats, 10 fruits, 6 dairy products, and 4 grains.

6. All, Some, or None

To teach the child:
- to quantify items using the adjectives all, some, or none.

7. Cooking and Cooking Names

To teach the child:
- to discriminate between cooking and other food preparation activities.
- to label five types of cooking.

9. Cooking Selection

To teach the child:
- a rule that guides selection of more nutritional foods based on preparation methods.
- to make logical deductions from the rule.
- how to apply the rule in everyday food selection situations.

10. Food Selection I, II, & III

To teach the child:
- rules and guidelines for choosing more nutritional foods.
- to make simple verbal deductions about a single food.
.to apply the rule to a choice between two foods.
.how to apply these rules in everyday food selection situations.
.to integrate knowledge of food groups, food names, cooking names, etc. within the food selection guidelines when more than one guideline is applicable.

11. Harmful Parts of Food I, II, III & IV
To teach the child:
.to identify and label three harmful parts of food (salt, sugar, and fat).
.to discriminate which dairy and meat products contain these harmful parts.

12. Packaging
To teach the child:
.to discriminate between fresh and packaged foods.
.to label and discriminate between four types of packaged foods.

13. Packaging Selection
To teach the child:
.to state two rules to use as guidelines in selecting foods that are fresh and packaged.
.to make logical deductions from these rules.
.how to apply these rules in everyday food selection situations.

14. Grain Products
To teach the child:
.to discriminate between whole and crushed grains.
.to identify and label types of flour and other grain products (bread, muffins, noodles, etc.).

15. Snack Foods
To teach the child:
.to identify and label foods that are eaten as snacks.
.to identify and label snack foods that have harmful parts.

Table 1A is a "scope and sequence chart" that shows in what lesson the activities for a track are presented. The tracks most relevant to
TABLE 1A
NEIS SCOPE AND SEQUENCE CHART SHOWING CONTENT OF ALL LESSONS

Tracks | Lesson Numbers
---|---
1. ACTIONS | Actions
2. BODY PARTS | Body Parts
3. FOOD/NOT FOOD | FP/NF
4. FOOD GROUPS | Food Groups
5. FOOD NAMES | Food Names
6. ALL, SOME, OR NONE | All, Some, Or None
7. COOKING/NOT COOKING | Cooking/Not Cooking
8. COOKING NAMES | Cooking Names
9. COOKING SELECTION | Cooking Selection
10. FOOD SELECTION I | Food Selection I
   FOOD SELECTION II | Food Selection II
   FOOD SELECTION III | Food Selection III
11. HANDFUL PARTS OF FOOD | Handful Parts of Food
   III | III
   IV | IV
12. PACKAGING | Packaging
13. PACKAGING SELECTION | Packaging Selection
14. GRAIN PRODUCTS | Grain Products
15. SNACK FOODS | Snack Foods
CUMULATIVE REVIEWS | CUMULATIVE REVIEWS

FOOD GROUPS, NAMES, AND COMBINATIONS
### TABLE 1B
**RELEVANT RULES FROM THE NEIS**

<table>
<thead>
<tr>
<th>RULES</th>
<th>INTRODUCTORY LESSON NUMBERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat that has a lot of harmful parts of food is a food that is not good to eat.</td>
<td>60</td>
</tr>
<tr>
<td>Dairy products that have a lot of harmful parts are foods that are not good to eat.</td>
<td>67</td>
</tr>
<tr>
<td>Any food that has harmful parts is a food that is not good to eat.</td>
<td>69</td>
</tr>
<tr>
<td>Fresh food is better to eat than frozen, boxed, or canned food.</td>
<td>69</td>
</tr>
<tr>
<td>Frozen food is better to eat than boxed or canned food.</td>
<td>75</td>
</tr>
<tr>
<td>Steamed or baked food is better to eat than boiled, fried or broiled food.</td>
<td>80</td>
</tr>
</tbody>
</table>
the present study are Food Selection (Number 10), Packaging Selection (Number 13), and Cooking Selection (Number 9). It is in these tracks that the rules requested in the interview conditions are taught. A statement of each of these rules, and the lesson number at which the rules is introduced within the NEIS, are presented in Table 1B. Samples of some of the activities used within the NEIS to teach the children about the rules are presented in Figures 4-8. Figure 4 shows an example of an activity presented when teaching the children rules about meat selection. Figure 5 shows an activity presented when teaching the children the rule about selecting dairy products. Figures 6A and 6B show activities presented to teach the children a rule about selecting any food with harmful parts. Figures 7A and 7B show the activities used in teaching the children the rule about selecting fresh or frozen versus other packaged foods. Figures 8A and 8B show activities used to teach food selection based on cooking type. Note that what the teacher says is in all capital letters, what the teacher does is in parentheses, and what the children are to do for a correct response to the teacher presentation is in lower case letters.

Throughout this study, foods were added to the lunch such that the children had choices between foods that were consistent with the NEIS rules and foods that were not. Table 2A shows the specific foods which were used in the various two-choice comparisons in each experimental phase of the study.

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Format: Harmful Parts of Food III 2.3m
Task 8.2

a. WE ARE GOING TO TALK ABOUT FOOD THAT HAS A LOT OF HARMFUL PARTS.

b. SAY THE RULE ABOUT MEAT THAT HAS A LOT OF HARMFUL PARTS
   (signal) meat that has a lot of harmful parts is food that is not good to eat.
   (repeat until firm)

c. (point to beef)
   TELL ME WHAT YOU KNOW ABOUT EATING THIS FOOD.
   beef is a food that is good to eat.
   HOW DO YOU KNOW? (touch) because it is a meat that does not have a lot of harmful parts.

d. (repeat step "c" for all examples until firm)
a. WE ARE GOING TO TALK ABOUT FOOD THAT HAS A LOT OF HARMFUL PARTS.

b. SAY THE RULE ABOUT DAIRY PRODUCTS THAT HAVE A LOT OF HARMFUL PARTS.
   (signal) dairy products that have a lot of harmful parts are food that is not good to eat.
   (repeat until firm)

c. (point to cheese)
   TELL ME WHAT YOU KNOW ABOUT EATING THIS FOOD.
   cheese is a food that is good to eat
   HOW DO YOU KNOW? (touch) because it is a dairy product that does not have a lot of harmful parts.

d. (repeat step "c" for all examples until firm)
Format: Harmful Parts of Food IV 1.2  
Task 10.1

a. WE ARE GOING TO TALK ABOUT HARMFUL PARTS OF FOOD.

b. SAY THE RULE ABOUT FOOD THAT HAS HARMFUL PARTS.
   (signal) any food that has harmful parts is a food that is not good to eat.

c. (repeat step "b" until firm)

d. NOW YOU'RE GOING TO USE THE RULE ABOUT FOOD THAT HAS HARMFUL PARTS TO ANSWER SOME QUESTIONS.

e. ANY FOOD THAT HAS HARMFUL PARTS IS A FOOD THAT IS NOT GOOD TO EAT.
   TURKEY WITH SALT is a food that has harmful parts.
   SO...(pause) (signal) turkey with salt is a food that is not good to eat.

f. ANY FOOD THAT HAS HARMFUL PARTS IS A FOOD THAT IS NOT GOOD TO EAT.
   TURKEY is a food that does not have harmful parts.
   SO...(pause) (signal) turkey is a food that is good to eat.

g. (repeat steps, as indicated, for the following examples)

<table>
<thead>
<tr>
<th>step</th>
<th>example</th>
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<tr>
<td>f.</td>
<td>grapefruit</td>
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<tr>
<td>e.</td>
<td>grapefruit with sugar</td>
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<tr>
<td>f.</td>
<td>butter</td>
</tr>
<tr>
<td>e.</td>
<td>millet</td>
</tr>
<tr>
<td>e.</td>
<td>wheat</td>
</tr>
</tbody>
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FIGURE 6A
a. We are going to talk about harmful parts of food.

b. Say the rule about food that has harmful parts. (signal) Any food that has harmful parts is a food that is not good to eat.

c. (Repeat step "b" until firm)

d. Now you're going to use the rule about food that has harmful parts to tell me about these foods.

e. (Point to peaches)
   Look at these foods. Tell me about the food that is good to eat. (signal) Peaches without sugar is a food that is good to eat. How do you know? (signal) Because it is a food that does not have harmful parts.

f. (Repeat step "e" for all pairs of pictures)
   Cot. cheese --- salt
   Potato --- oil
WE ARE GOING TO TALK ABOUT WAYS YOU SEE FOOD.

WHAT KINDS OF PACKAGING HAVE YOU LEARNED?
(signal) wrapped, frozen, boxed, canned
WHAT'S ANOTHER WAY YOU SEE FOOD? (signal) fresh

SAW THE RULE ABOUT FRESH FOOD!
(signal) fresh food is better to eat than frozen, boxed, or canned food.

(touch each example of peas)
THREE ARE WAYS YOU SEE PEAS
SAY THE WHOLE THING ABOUT THE WAYS YOU SEE PEAS.

(point to canned peas)
GET READY!
(touch) THIS IS CANNED PEAS.

(repeat step "f" for each example of peas)

NOW YOU ARE GOING TO TELL ME WHICH PEAS ARE BETTER TO EAT (pause) ...

GET READY! (signal) FRESH PEAS.

SAY THE WHOLE THING ABOUT WHICH PEAS ARE BETTER TO EAT! (signal)
FRESH PEAS IS BETTER TO EAT THAN CANNED PEAS
(repeat until firm)

TELL ME THE RULE YOU USED!
(signal) FRESH FOOD IS BETTER TO EAT THAN FROZEN, BOXED, OR CANNED FOOD.

(Repeat steps "e" - "k" for: fish and or. bean examples)

FIGURE 7A
Format: Packaging Selection 3.2

Task: 14

a. WE ARE GOING TO TALK ABOUT WAYS YOU SEE FOOD.

b. WHAT KIND OF PACKAGING HAVE YOU LEARNED?
   (signal) wrapped, frozen, boxed, canned
   WHAT'S ANOTHER WAY YOU SEE FOOD? (signal) fresh

c. (repeat step "b" until firm)

d. SAY THE RULE ABOUT FRESH FOOD!
   (signal) fresh food is better to eat than frozen,
   boxed, or canned food.

e. SAY THE RULE ABOUT FROZEN FOOD!
   (signal) frozen food is better to eat than boxed
   or canned food.

f. (touch each example of potatoes)
   THESE ARE WAYS YOU SEE POTATOES.
   NOW YOU ARE GOING TO TELL ME WHICH POTATOES ARE
   BETTER TO EAT (pause) ...

g. GET READY! (signal) frozen potatoes.

h. SAY THE WHOLE THING ABOUT WHICH POTATOES
   ARE BETTER TO EAT! (signal)
   frozen potatoes are better to eat than boxed potatoes
   (repeat until firm)

i. TELL ME THE RULE YOU USED!
   (signal) frozen food is better to eat than boxed
   or canned food.

j. (repeat steps "f" - "i" for: blueberries (fresh-frozen)
   or beans (frozen-canned)

FIGURE 7B
Format: Cooking Selection 2.3 (page 2)

Task 9

h. EVERYBODY LISTEN!
SAY THE RULE ABOUT COOKED FOOD. (signal)
steamed and baked food is better to eat than
boiled, fried and broiled food.

i. (touch each example of squash) LOOK AT THESE.

j. TELL ME WHICH IS BETTER TO EAT (pause)...

k. GET READY! (signal) BAKED SQUASH

l. SAY THE WHOLE THING ABOUT WHICH IS BETTER TO EAT! (signal)
baked squash is better to eat than
fried squash
(repeat until firm)

m. (repeat steps "i" - "l" for: green beans, celery, and chicken)

FIGURE 8A
a. WE ARE GOING TO TALK ABOUT COOKED FOOD.

b. TELL ME WHAT KINDS OF COOKED FOOD YOU KNOW! (signal)
boiled, baked, fried, steamed and broiled food.

c. SAY THE RULE ABOUT COOKED FOOD! (signal)
steamed and baked food is better to eat than
boiled, fried or broiled food.

d. (touch each example of beans) LOOK AT THESE.
TELL ME WHICH IS BETTER TO EAT (pause)...

e. GET READY! (signal) baked beans

f. SAY THE WHOLE THING ABOUT WHICH IS BETTER TO EAT! (signal)
   baked beans are better to eat than
   fried beans
   (repeat until firm)

g. (repeat steps "c" - "f" for: sweet potato)
TABLE 2A
FOOD SERVED AND FOOD COMPARISONS MADE DURING EACH PHASE OF THE STUDY

<table>
<thead>
<tr>
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<th>Phase I (Blocks 1-8)</th>
<th>Phase II (Blocks 9-24)</th>
<th>Phase III (Blocks 25-32)</th>
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<td><strong>I. Meat Rule</strong></td>
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<td>Turkey vs. Bologna</td>
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### IV. Fresh Food Rule

#### A. Fresh vs. Canned

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#### B. Fresh vs. Frozen

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### V. Frozen Food Rule

#### A. Frozen vs. Canned

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Birch, L. L. *Dimensions of preschool children's food preferences.* *Journal of Nutrition Education,* 1979, 11, 77-79. (b)

Birch, L. L. *The relationship between children's food preferences and those of their parents.* *Journal of Nutrition Education,* 1980, 12, 14-18. (a)

Birch, L. L. *The effects of peer models' food choices and eating behaviors on preschoolers' food preferences.* *Child Development,* 1980, 51, 489-496. (b)


