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ABSTRACT

This paper reports the results of formative research conducted by the Children's Television Workshop from the time of the initial staffing of the "Sesame Street" project in 1968 until the end of the program's first broadcast season, two years later. Chapter I describes prebroadcast research, which was centered around three major problem areas: (1) establishing instructional goals; (2) testing for the determinants of appeal, and (3) testing for achievement. A description of evaluation research on five 1-hour pilot shows is included. Chapter II reports on progress testing conducted during the broadcast period with 200 3- to 5-year-old viewers (experimental group) and nonviewers (control group) of "Sesame Street" in day care centers. Detailed appendixes, tables and figures are included. (NH)

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THE FIRST YEAR OF SESAME STREET:

THE FORMATIVE RESEARCH

Barbara Frengel Reeves

Foreword by Edward L. Palmer

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FOREWORD

The results reported here reflect the bulk of the work accomplished by the Research Department of the Children's Television Workshop between the time of the initial staffing of the project in the Summer of 1968 and the end of the first broadcast season of "Sesame Street," two years later. The "Sesame Street" series represents not one experiment, but several. It is an experiment in preschool instruction, in public television networking, in film and television production, in the use of professional audience building techniques, and in formative research and evaluation. This report presents the results of the formative research effort, or that research undertaken directly by the in-house research staff in response to the practical and urgent needs of production. From the outset, the experimental character of the formative research was seen to lie not only in the search for data on effective uses of the television medium with young children, but also in the search for a model of researcher-producer collaboration.

The style of the report presented here, as ably prepared by Mrs. Barbara Reeves, who was Assistant Director of Research throughout the period of the experiment, reflects this dual experimental emphasis. It presents the framework within which research decisions were made, including specific criteria used in determining the substance and priorities of the various studies completed, as well as the usual reviews of problem, method, results, and conclusions. The overall result is a succession of technical topics woven into an unusually frank, discursive treatment of the formative research process.

Other treatments of the Workshop's formative research appear elsewhere.[a,b,c] Taken in combination with the report of the national "Sesame Street" achievement study completed by Dr. Samuel Ball and Gerry Ann Bogatz of Educational Testing Service of Princeton, New Jersey,[d] the "Sesame Street" project constitutes an unusual, coordinated program of formative-summative research and evaluation.

It is somewhat encouraging that one researcher, in proposing a study of successful and unsuccessful research efforts associated with the development of various educational products, listed the "Sesame Street" research in the "Successful" column. It is a pleasure to share any credit due for the Workshop's research effort with those who participated in planning and carrying it out. First mention rightly goes to Mrs. Barbara Reeves, Assistant Research Director. Others whose contributions date back to the start of the project are Researchers Miss Sharon Lerner, who is now Senior Curriculum Specialist, and Mr. Richard Polsky. Researchers who served terms of various lengths during the first experimental season, all of whom made substantial contributions, are Mrs. Hylda Clarke, Miss Patricia Hayes, Miss Lydia Kleiner, Mrs. Judy Minton, and Mr. Bruce Samuels.

A special category of credit is due to the production staff,

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[a] Palmer, Edward L. "Can Television Really Teach?" American Education, August-September, 1969, pp. 2-6.

[b] Gibbon, Samuel Y. and Edward L. Palmer. "Prereading on Sesame Street," invited article submitted to the Committee on Reading of the National Academy of Education, June 1, 1970.

[c] Palmer, Edward L. and David D. Connell. "Remarks before the International Seminar on Broadcaster/Researcher Cooperation in Mass Communication Research," University of Leicester, Leicester, England, December, 1970.

[d] Ball, Samuel and Gerry Ann Bogatz. "The First Year of Sesame

especially Executive Producer David D. Connell, and Producers Samuel Y. Gibbon, Jon Stone, and Lutrelle Horne, who worked hard to learn our language and whose language we tried to learn, in working together to identify the information needs of production.

In the category of out-of-house consultation and cooperation, special recognition is due to Dr. Gerald S. Lesser, Bigelow Professor of Education and Developmental Psychology at Harvard University in his role as Chairman of the Workshop's Research Advisory Committee. Our work also benefited from cooperation with the summative research group under the direction of Dr. Samuel Ball of Educational Testing Service; Drs. William Donnell and Alan Benn of UNCO, Inc., in Washington, D.C.; and Dr. Jack Miller and Mr. Rom Skavarcius of George Peabody College in Nashville, Tennessee.

December, 1970

Edward L. Palmer, Ph.D
Vice President and Director
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CHAPTER I:

FORMATIVE RESEARCH DURING

THE PREBROADCAST SEASON

BY: BARBARA FRENGEL REEVES

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CHAPTER I: FORMATIVE RESEARCH DURING THE PREBROADCAST SEASON

A unique aspect of the "Sesame Street" experiment was the inclusion of an 18 month prebroadcast season. This was a time of research and development. During this period the Workshop would formulate the objectives of the program, establish its format and produce experimental films for field evaluation.

Equally important, the prebroadcast season was a period of adjustment for production and research, a time when these two diverse groups would learn to work together, each becoming acquainted with the capacities and the limitations of the other.

Relating to Production

The formative research staff was organized to service production. Prior to the experiment we had never worked with producers, nor had the producers ever before been assisted by a research department. Not being familiar with the problems of production, we didn't know what questions to ask; and not being familiar with the methods of research, they didn't know what kinds of information we could provide.

Within several months, however, the frequency of words like "live action" and "pace" increased in researchers' vocabularies while producers began asking about the percentage of children passing a particular test item. As we became engrossed in the activities of the prebroadcast season the role of formative research crystallized and the lines of communication between research and production were established.

The Focus of Prebroadcast Research

Children's Television Workshop was committed to the production of a program that was both entertaining and educational. The decision to hire successful commercial producers for an educational show reflected a deliberate effort to apply the techniques of popular programming to a preschool curriculum. The audience would be the three-to-five-year-old child, with a special emphasis on the urban disadvantaged.

Formative research did not proceed systematically according to some predetermined plan, rather it evolved from the problems that arose during the prebroadcast time. A chronological review of the major research activities during this period thus provides a good picture of how the program developed.

Looking back over the prebroadcast research, it is clear that our efforts centered around three major problem areas. These were, in turn: (1) the establishment of the instructional goals, (2) testing for the determinants of appeal, and (3) testing for achievement.

THE INSTRUCTIONAL GOALS

It is important at this point to remind the reader that "Sesame Street" is an experiment in preschool education. Its uniqueness lies in its attempt to harness the power of the television medium and direct it toward constructive ends. As an experiment, "Sesame Street" was not designed to provide a complete preschool curriculum, nor even restricted in purpose to the same ends. Television is not a classroom. In some ways it faces limitations that a classroom does not, in others if offers unique opportunities for instruction. The curriculum for "Sesame Street" had to be developed with television in mind.

The Summer Seminars

As the initial step toward the establishment of its goals, Children's

Television Workshop sponsored a series of five three-day seminars. These seminars were held during the summer of 1968 and dealt with the following topics: (1) Social, Moral and Affective Development, (2) Language and Problem Solving, (3) Mathematical and Numerical Skills, (4) Reasoning and Problem Solving, and (5) Perception. Each of these seminars was attended by representatives of a variety of professions. The attendees included film-makers, psychologists, television producers, educators, animators, authors of children's books, teachers, psychiatrists, sociologists and advertising personnel.

Armed with the minutes from these seminars together with recommendations from the Board of Advisors, the full Workshop staff met to establish the basic objectives of the program.

The objectives were first broadly stated and later redefined in behavioral terms by the formative research department (See Goals Document, Appendix A .) Operational definitions of the goals were important because they served as a common ground for those who were to formulate the program and those who were to evaluate its effectiveness.

The ETS Battery

Educational Testing Service, responsible for the summative evaluation of "Sesame Street", began developing tests to measure achievement in the various goal categories. By the end of the prebroadcast season, a battery of eight tests had been developed and administered as a pretest to over 1000 children in six areas of the United States. The tests that comprised the battery dealt with the child's knowledge of: (1) body parts, (2) letters, (3) relational terms, (4) numbers, (5) geometric forms, (6) sorting, (7) classifying and (8) puzzles.

The Writer's Workbook

Despite the operational definition of the objectives, many of the specific instructional aims were still somewhat confusing to the writers. To further clarify these objectives the formative research staff developed the Writer's Workbook.

In the workbook each objective is treated separately. Strategies for achieving the objective are offered and a variety of instances of the objective are discussed. For example, to help the child develop an awareness of other points of view the following teaching strategies are suggested: (1) Start off with the child's point of view and then present the opposing viewpoint in juxtaposition with his, (2) Have the child pretend he is someone whose point of view is obviously different than the child's, (3) Start off with a two-person situation where one individual is totally oblivious to another's point of view and develop a need for communication, (4) Keep the situation constant and have several characters enter, in turn, and react differently in the same situation.

Numerous instances are then suggested where children actually do encounter problems arising from the inability to take another's point of view.

The Writer's Workbook is continuously supplemented as writers encounter problems in any given goal area.

Testing for Competence

Once the goals were formulated and the objectives of the Workshop clearly defined, the attention turned to the program itself. As the production staff began planning program elements they confronted us with a variety of questions. The goals provided a clear idea of where production should be going, but did not specify where it should begin. The producers

desparately needed some indication of the level of competence of their potential audience.

Item-level data were available on a substantial sample of children from our target population in the area of Relational Concepts. The Harlem Training Study, conducted by Francis H. Palmer, was designed to evaluate the effectiveness of individual training in relational concepts. Performance data were available on three groups of boys, all three years-eight months at the time of testing. Group I (N=58) had attended the center for eight months and had received individual instruction on these conepts. Group II (N=58) had also attended the center and was exposed to the same instructors and materials, but received no training on concepts. Group III (N=57) attended the center only for assessment.

Three pieces of information from this study were used to determine the value of teaching any given concept on "Sesame Street". These were: (1) The percentage of children passing the concept in the absence of training. No concept was chosen if over 70% of the untrained children were already familiar with it. (2) The difference in the percentage passing in Groups I and II. (3) The difference in percentage passing between Groups I and III.

These data were extremely valuable, for they not only gave us an indication of how much the target child already knew about a given concept, but also provided important information on the "teachability" of that concept.

Item-level performance data on the Stanford-Binet were also available on this sample. Similar data on the Stanford-Binet were provided by Marion Blank of the Albert Einstein College of Medicine. Her sample contained 50 children from lower-income homes and it included girls as well as boys.

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For most goal areas, however, little normative data were available from other sources, particularly where the target child was from an urban disadvantaged neighborhood. The information had to be gathered first-hand. Since the ETS battery was only in the planning stages, the research department developed its own General Ability Measures. These measures were constructed solely for the purpose of providing base-line data on competence in the major goal areas.

In February of 1969 we reported the results of the testing of 68 four-year-olds from three New York City Day Care Centers. A summary of the results from this testing and a description of the test items is presented in Appendix B (Sections I and II).

We were still not satisfied that we had provided the producers with a true picture of their potential audience. The children we had tested were in established day care centers and were receiving some level of instruction. The target child was one who did not have the opportunity to attend an established preschool program.

At this point we were extremely fortunate in the cooperation we received from the Family Day Care Program. We were welcomed into over 40 homes to test children who were much closer to the population for whom the program was being prepared. In July of 1969 we reported the results from this testing (See Appendix B, Section III).

THE DETERMINANTS OF APPEAL

A major concern of the prebroadcast season was the development of a popular program. No matter how effective the show would be in teaching the child, it had to reach him first. The program would have to win an audience and it would have to win it over programs aired on much more familiar commercial television channels.

Numerous questions dealing with appeal were raised. These included questions like: "What programs do preschoolers like best?" "Do they like animation better than live action?" "How about animals?" "What's the best time for a program to be on the air?" "How long will a child this age watch at one sitting?" "Do they like to see other children on TV?"

Of particular concern were the likes and dislikes of the urban disadvantaged child. This socio-economic level is not well represented in rating services such as the N.B.C. - Nielson Ratings. Little information was available on the television habits of these children.

The Distractor Method

The producers were experienced in programming for children. With their experience they brought to the Workshop highly developed notions of what makes for good preschool entertainment. They were eager to have some of their "gut reactions" and "seat-of-the-pants hunches" tested out by the research department. In order to check on these assumptions we needed a method of obtaining highly specific attentional data. The distractor method was developed to provide this type of information.

After considering a variety of response measures we selected "eyes on the TV set" as our dependent variable. Outside distractions were reduced to a minimum by having children view individually, with an observer. This created a new problem. When children were taken individually to a room to watch TV, they tended to be overly cooperative and do just that. By reducing distractions to a minimum we had effectively reduced the variability we could obtain from our response measure. The child's eyes rarely left the set.

A child watching television under normal conditions is subject to frequent interruptions and distractions. The TV must vie for his attention.

In order to simulate this condition, we decided to program distractions into the laboratory situation. In an earlier study Palmer (1968) had intermittently projected kaleidoscopic patterns onto a wall in the viewing room while the child watched TV, using a signal to alert the child that the pattern was coming on. Although this technique did provide distractions there was some evidence that the distractability of the pattern decreased with time.

A slight modification of this technique proved to be satisfactory. A carousel slide projector housed in a rear-end projection box had several advantages. A random selection of slides could be used to fill the slide tray and they could be projected automatically, at regular intervals, onto a screen similar to that of the television set. The carousel projector allows the viewer to choose three exposure times. The 7.45 second interval proved most satisfactory with the preschool children. Each slide would come on and remain exposed for 7.45 seconds, then a new slide would come onto the screen. The projector emitted a distinct click each time the slide changed that could alert the child when a new slide was coming on.

In the experimental situation the child was seated four feet from the television set, directly facing its screen. He was also four feet from the projection screen which was located to the right of the TV forming a 45 degree angle with the child as the focal point. The observer sat beside the child on his right (See Fig. 1).

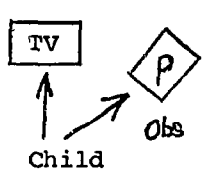


Fig. 1. The Distractor Set-up

The observer was equipped with a push-button which he depressed when the child's eyes left the TV and released when they returned to the

television. The observations were automatically recorded. From this data it was possible to determine what portion of each 7.45 second interval the child's eyes were on the television set. The child was assigned a 3 for an interval if his eyes never left the set, a 2 if they were on the set more than half of the interval, a 1 if less than half, and a 0 if the child's eyes were never on the TV. The distractions were programmed such that every viewer was subject to the same distraction at the same point in each film. Cumulative graphs were constructed showing the attention fluctuations of a group of children for each 7.45 second interval of the piece being tested.

Once the graphs were constructed producers and researchers would follow the graphs while they watched the experimental production piece, noting at which points attention was high and low. The most interesting thing about these data was the degree to which the producer's original "gut feelings" were confirmed.

An example of the cumulative graphs prepared at the conclusion of a distractor study is provided in Appendix C. This graph shows the cumulative attention of three girls and three boys over the course of a television program, What Am I? If all the children in each group (three) had their eyes on the set during the entire observation level (assigned score of three), the maximum score for the interval would be nine.

An average attention level was also computed for each piece of material used in the distractor studies. This average reflects the attentiveness of the entire group of viewers over the course of the program studied.

A table summarizing the average visual attention levels obtained for a variety of material tested during the prebroadcast season is presented below. To interpret these figures the reader should know that, in general, a difference of about 10 points can be considered to reflect quite

a reliable difference in levels of visual attention.

TABLE 1. Average visual attention levels for a variety of program material tested during the prebroadcast period.

PROGRAM TESTED	LENGTH	AVERAGE VISUAL ATTENTION LEVEL
Animal	9:45	.92
The Monkees	20:00	.91
Neighbors	7:45	.91
Pixie and Dixie	6:45	.89
Yogi Bear	6:45	.88
Captain Kangaroo (18)	14:00	.87
Man From Alphabet (clocks)	5:47	.84
Huckleberry Hound	6:45	.81
Lost in Space	30:00	.80
Man From Alphabet (penny)	5:47	.78
Dance Squared	3:20	.77
Saturday Safari	5:55	.76
Man From Alphabet (calendar)	5:57	.73
Captain Kangaroo (19)	14:00	.72
Captain Kangaroo (19)	56:45	.71
Alphabet	6:12	.71
Roundabout	14:33	.71
Quaker Oats Ad	1:00	.69
Rowan and Martin	17:00	.68
Birthday for Bird	6:18	.67
Misterogers	28.00	.65
Rich Cat Poor Cat	7:15	.64
Roger Ramjet	5:17	.63
Friendly Giant	15:00	.63
Rock in the Road	6:00	.61
What Am I?	11:30	.59
Eggs to Market	11:00	.57
A Ship Needs a Harbor	12:00	.51
Two Knots	9:00	.44

A Review of the Distractor Research

The distractor method was used to provide information on appeal for over 30 pieces of existing program material in addition to original pieces of production. Some of the findings from this series of studies have relevance only to the specific program pieces tested. The observations that have a more general application are summarized below:

1. Dramatic changes in visual attention were observed from child to

child, program to program, and moment to moment within a program.

Some children can view television for hours with their eyes rarely leaving the set. We were so struck by this viewing style when we first began doing research on appeal, that we coined the term "zombie viewer" to refer to the child that sat seemingly hypnotized, in front of the set. Other children constantly keep a check on all outside activity in the room while they view. We found these styles to be no guarantee of how much the child was absorbing from the program.

Moreover, a given child's attention will vary from moment to moment within a program. For example, the entrance of a new character usually attracts the childs attention. Whether or not the attention is maintained will depend on the subsequent programming.

In addition to the variance in attention within a program, different programs vary in their ability to attract and maintain a child's attention. Some programs are so unappealing the children will want to "change the channel". If asked what they would like to watch, the children generally answer, "Cartoons".

2. Attention is generally higher for animated segments. This finding is not as simple to interpret as one would think. So many other variables related to attention are included in most cartoons, that it is difficult to assess the effect of animation as a style. Cartoons are generally short, full of action and have a minimum of "visual noise". All of these variables have been found to effect attention. It is possible that animated and live-action segments can be equally effective if all the critical variables were known and could be kept constant.

3. Segments which show adults talking are generally low.

This was a very consistent finding. Excess adult verbiage resulted in a loss of attention in a variety of types of programming. For example,

Roger Ramjet is an animated Super-Hero cartoon. Roger talks too much and the children stop watching. The Man From Alphabet was a piece of original programming featuring a bumbling kind of hero who also talked too much. He also lost the attention of his viewers. It is also worth noting that both Roger Ramjet and the Man from Alphabet made excessive use of punnery. Four-year-olds simply do not follow these often complicated double meanings.

In the CTW Promotion Film, the muppets told the story of how the Workshop developed. They were talking on an adult level in this film. When they first came on, the children were very attentive. This attention gradually but dramatically decreased as "the children seemed to realize this wasn't meant for them."

Adult talk could be attention sustaining if one of the following conditions prevailed: (1) Rather than showing the speaker on the screen, the referent was shown. In this way an adult could say much more about a subject and still maintain the attention of the viewer. (2) If the talk was directed toward children who also appeared on the screen. We feel the viewer is more attentive when adult talk is directed toward a child for three reasons. The adult is probably using language the viewer can understand if he is already talking to a child; seeing another child may give the viewer the idea that this is something for him to hear; and the viewer may identify with the child on the screen. (3) If the adult spoke directly to the viewer. We have seen children wave back when an adult comes on and directs a wave and a "hello" to his friends at home. This also seems to give the child the idea that this program is for him.

4. Pixilation is an effective attention sustaining technique.

Neighbors, a 7 minute 45 second film with a complicated social message, was the first piece of material utilizing a pixilation technique that was tested.

Pixilation is a film technique whereby a person or object appears

to magically propel himself across the screen. This is accomplished by placing the person and clicking of several frames of film, moving him minutely and clicking of several more frames, etc. When the film is run continuously the end result looks a lot like animation. Attention of the viewers to Neighbors was almost at a maximum throughout the entire length of the film. Consequently pieces of original production using the same technique were tested. Each time, attention was consistently high.

5. Commercials usually bring the attention level up near the maximum.

The results obtained using the distractor technique are consistent with data on commercials that we obtained through interviews and group observations. Commercials are generally exceptionally good pieces of productions. We feel that their attraction for the child viewer stems from several factors: (1) They represent a change of pace. Commercials are, in essence, an interruption. Children respond to interruptions in programming. An unexpected sound, voice, or music will immediately attract the child's attention. (2) Commercials often include jingles. Children enjoy these catchy tunes and know many of them by heart. (3) Many commercials utilize slapstick, a comedy form children this age particularly enjoy. (4) The message the commercial carries is usually simple and straightforward. The child can understand it. Children in day care centers have been known to ask, "Did I give you an Excedrin headache?"

6. There are rather marked sex differences in the appeal of certain program elements, but many have common appeal for preschoolers.

The limited data available on sex differences indicates that although girls may attend to slower paced material more than boys, more rapidly paced material is equally appealing to both girls and boys. When the viewer's sex is the same as that of a child on the set, attention tends to be higher.

7. Children are generally attentive to animals on television.

When animals are active the children are very attentive. They tend to lose interest if there is too much verbiage while the animal is on the screen, for example, a long detailed "lecture" about the animal. The children were especially attentive to monkeys and elephants. This was observed consistently in several films where these animals appeared.

8. Children particularly enjoy seeing other children on television.

If the child performer is actively involved in doing something the viewer is generally very attentive. When the child on the set has been given a problem to solve that the viewer can work through with him, he is particularly attentive.

9. Rapidly paced programming is generally more appealing than slower paced segments.

This is a difficult finding to interpret because a program that is paced more rapidly often contains a variety of material. There is also more action taking place. The children are very attentive to action sequences, particular those of an adventurous nature.

Small Group Observations

The distractor technique provided us with a detailed picture of where children were watching and where they were not. It did not tell us directly why they were attending to certain segments and not others. In the course of a series of studies on "preparatory set," we devised a supplementary observational procedure from which we obtained a clearer understanding of why some of the fluctuations in attention occur.

A concern for the manner in which material was introduced on the program led us to the study of preparatory sets. Simply stated, we felt that a film would be more effective in achieving its instructional objective if the viewer were given a clue, allerting him to watch out for certain

To test this we selected a film, The Animal Movie, and exposed three groups of 12 children each to this film; each with a different set of introductory comments. Group I was given a neutral set; Group II was told to watch for things animals could do that the little boy couldn't; and Group III was encouraged to watch how the boy felt when he met the different animals. After viewing the film each child was asked a series of questions about the story which reflected the three sets. There were no differences in the number of questions or the type of questions the children answered correctly. Although the study did not shed a conclusive light on the problem of "preparatory set," it did alert us to a highly useful technique for observing attention and interest.

To expedite this study we had arranged the children in viewing groups, four to a group. Because of absences the groups actually ranged from two to five. Prior to this study most of our observations had been taken on individual children, pairs, or large groups. We found that in groups ranging in size from three to five, the children behaved quite differently. They were much more overtly reactive to the material they were viewing. By observing not only the visual behavior of such a group (i.e., eyes on or off the TV set), but also the verbal and motoric responses, one could get a very good idea of exactly what the children were looking at in the program and what they thought about it.

In The Animal Movie, for example, we noticed that as each animal was introduced, the children named it and then tried to imitate its action as did the boy in the film. When the boy in the film giggled, the viewers giggled. In addition, there was a high degree of correspondence between positive reactions to what they were viewing and the ability to correctly answer questions related to the film. The questions most frequently missed were about actions which drew little or no verbal or motor response

from the groups. Finally, there was a remarkable degree of correspondence in observations from group to group.

A Review of the Small Group Observations

A variety of material was subsequently shown to similar small viewing groups. The groups were comprised mainly of four-year-olds, all from New York City day care centers and ranged in size from three to five children. The material they viewed included popular children's programs such as Captain Kangaroo, Johnny Quest, Mr. Rogers, Roundabout, Roger Ramjet, Friendly Giant, Lost in Space, and The Flintstones. A number of cartoons featuring animals such as The Bear and the River Inhabitant, Animal Movie, The Magic Stick, and The Alphabet Movie were compared to realistic animal films like Animals in Amboseli. To evaluate the appeal of stories being read on television, a series of films produced by Bank Street featuring well known celebrities as readers were shown to over 20 viewing groups. A summary of the findings reported to production on the basis of these observations is presented below:

1. The children are extremely responsive to the sound track. When a child is not paying attention, one thing that brings him back is the audio track -- a loud noise, music, a song or something of this sort will usually cause the child to glance back at the screen.

a. Music. It is difficult to overemphasize the importance of music in children's programming. They respond differently to various musical styles. Simple melodies such as the "A,B,C Song" tend to effect rocking and swaying in the young viewer. The bouncier the tune, the more intense the physical reactions. With some songs the child almost seems compelled to "get up and dance." The more the child knew the words to a song, however, the greater the verbal response. Thus, a song with a bouncy melody might at first effect dancing; then, as the child is more familiar with it he

is more likely to rock back and forth in his chair while he sings along.

b. Voices. Throughout the screening of various films, we became increasingly aware of the importance of vocal qualities. In several of the cartoons we tested, the voices were poorly done and the children lost interest. When the child hears a voice that "sounds funny" to him, he apparently concentrates on the voice and misses what the speaker is saying. For example, in evaluating the appeal of stories read on television, Lauren Bacall was presented and evoked the following responses from the viewers: "She talks just like a man." "Maybe she's sick. Yeah. She looks sleepy." "She looks sad.""If she put on men's clothes she wouldn't even need a mask." "She sounds like a grandmother."

The children particularly enjoy hearing other children's voices. Several films that evoked only a mild interest from viewers were much more appealing when children's voices were added to the sound track.

c. Musical words. Some words hold a certain magic for children. They seem to be words that "the child can roll around on his tongue and get a tickly feeling." Some examples are "bubble," "vigilante,"Monday," and "neighborhood." When children hear these words they tend to try to repeat them, seemingly deriving pleasure out of both saying and hearing them.

2. Children are confused when familiar TV characters are presented in an unfamiliar context. During the prebroadcast period "I Spy" was a popular program with the preschoolers. When we showed the children a film of Bill Cosby reading a story, they were thoroughly confused. They would say, "That's Scotty. Where's Kelly?" After Bill Cosby finished reading the story (about a cat), one boy was convined that he had just seen "I Spy."

Since the program has been on the air we have had some interesting

reports from our own cast members. Most children believe the cast members really are the people they see on TV, and that they really do live on Sesame Street. They have little conception of "actors." Furthermore, a good many children are convinced that the cast knows them as well as they know the cast. One viewer was very indignant when Bob McGrath asked where he lived. The little boy replied, "You know where I live. You're there every day."

3. Children imitate many actions they see on TV. The imitation tends to be heaviest when the person on television does something with his body. In screening "Roundabout," a program starring Jim Jeffers, Jim was talking about "pairs of things." As he talked he massaged his pair of eyes, pulled his pair of ears and stuck his fingers in his pair of nostrils. Virtually every child that viewed this piece imitated these actions.

On our own program, when a cast member counts on his fingers or uses them to make a "v" most children copy him. One story, in particular, has evoked a remarkable amount of imitation. This is the story about a hand that wanted to make a noise. As the hand tries to snap its fingers and clap, little hands in the audience are doing the same thing.

The children also imitate laughter. Giggling on the set tends to elicit a funny forced laughter in the viewers. They remind the observer of adults trying to laugh at a bad joke. The children also tend to imitate other viewers who are watching TV with them. If one makes a remark or an action, the other will often copy it.

Finally, there is a tendency to imitate comical actions. If a character on TV does something absurd, such as steps in a bucket, children in the viewing audience will get up and pretend to walk around with a bucket on their foot too.

4. Children like to participate in games played on TV. The preschoolers get very involved in "hide and seek" type games. They respond readily to

the idea that something is lost and must be found, particularly if this is carried out in a guessing game style. Children like to guess and thoroughly show their satisfaction when they are proven right. On the other hand, they do not seem to be particularly upset if they have made an incorrect guess. Perhaps this is because television is nonpunitive.

The children like word play but do not respond well to a play on words. Although they get very caught up in games based on word sounds and are extremely responsive to alliteration and rhyming, they are generally incapable of dealing with the double meaning of puns.

5. Children enjoy watching something they can understand. In trying to communicate an idea to children, the less "noise" masking the message, the better. This is true from an appeal as well as an achievement standpoint. The key here is understanding. Presenting a lot of extraneous material, either visually or auditorially just serves to confuse the child. This makes him lose interest.

Animal Movie, a film discussed earlier, was produced in a very simple animation style. In this film, a boy would be paired with an animal. The animal would then be shown alone and would perform an action. The boy would then try to imitate this action. The children watching the film try to imitate with the boy. This film had the highest average attention level of any material tested with the distractor during the prebroadcast period.

The story about the hand that wanted to make a noise was also produced in a very simple style. The only thing that appeared on the screen was the hand. The children were very attentive to both the actions of the hand and the story line.

Another piece that reflects this simplicity is the dot bridge. A series of these segments have been produced. They consist of dots marching

onto the screen, one at a time to a musical background. The dots form a pattern, but a single dot goes awry and spoils it. The children readily understand the problem and find it very amusing.

Finally, the "Story of the Triangle and the Square" presents these two animated geometric forms against a solid background. They each demonstrate what they can do and how they are different from one another. The children find this film very appealing.

6. Slapstick is a favorite with preschoolers. The children have found slapstick more amusing than any comedy form we have tested. They laugh when Ernie outsmarts Bert, and when the Cookie Monster foils one of Kermit's lectures; but they shriek with delight when the chef falls down the stairs with his pies. Early in the first broadcast season some mothers wrote in to say that their children were frightened by the pieman's fall or the muppet "monsters." Other evidence suggests that with repetition of these segments such effects diminished or disappeared altogether. Presumably, children who were initially frightened learned from the behaviors of the "monsters" that they are benevolent characters. They also appeared to view the slapstick falls as intended and funny with repeated exposures.

Perhaps the exaggerated actions characteristic of slapstick are related to its success with the young children. Pantomime which also makes use of exaggerated actions is also an effective comedy form with the preschoolers.

The children don't find spoofs or parodies very funny. Professor Hastings and the take-offs on adult soap operas did not, in general, seem to be very amusing to the children. Moreover, what was funny tended to be physically funny rather than verbally. Stand-up comedians attracted little attention from the preschoolers until they fell down.

Again, understanding may be the key element. You can't laugh at a joke if you don't "get it". Perhaps the jokes the children are most capable

of understanding at this age are those that are extremely exaggerated or absurd.

7. Children attend longer if the material they view is varied. Children have many likes and dislikes. They will gladly watch programs that are slow or fast in pace, quiet or full of action, animated or live-action. Their attention depends on the particular piece they are viewing. A good program could follow any of these styles; yet none of them, alone guarantees that a program will be interesting to the preschooler.

In general the preschooler responds most consistently to a program that offers him variety. A slow, peaceful film like "Hey Cow" is more appealing when surrounded by fast moving number films than when it follows another quiet piece. This holds true for music and production style as well as pace. Interest in any particular film is usually higher if that film looks, sounds and feels different that the one that preceeded it.

8. Certain films are more appealing with repetition. Children seem to like some films better after they have seen them several times. This is particularly true for commercials and films similar to them. A film containing a humorous event, a punch line -- something that the child can anticipate -- is more likely to gain interest with repetition.

One must be careful in dealing with repetition, however, for while it enhances some films, other material becomes very boring to the child when repeated. Interest in slowly paced material tends to decline with repetition. Length of the film seems to be a factor in how well the film stands up to repetition. In general, longer films do not maintain attention as well with repetition as shorter ones.

A key factor in repeatability seems to be the child's initial reaction to a film. If it surprised, challenged or tickled him the first time he

is apt to want to see it again. As he does he will be watching out for that which surprised him, responding to the challenge, or alerting friends about the funny thing that is going to happen next. In general, repeatability offers an opportunity to introduce relatively complex concepts or situations which a child could not easily understand given a single exposure. Thus, far from being simply a vehicle for simple, rote, or memorizable material (although it certainly accomplishes that very well), the repeatable segment can be used as something of a "mind stretcher."

ACHIEVEMENT RESEARCH ON INDIVIDUAL FILM SEGMENTS

The research on appeal had a single purpose behind it -- the building of an entertaining program that could attract and maintain an audience. Now our attention turned to teaching. How do we best accomplish our educational goals?

Participants of the summer seminars and our academic advisors had urged that the workshop apply a variety of teaching approaches toward its curriculum. There was no guarantee that an approach deemed successful in the classroom would be equally successful or even applicable to television. Moreover, we were dealing with a medium utilizing special, often very expensive techniques, that offered instructional conditions differnet from what is even possible in the classroom.

Research directed toward these ends had two major thrusts. The first involved the evaluation of individual film segments. Prototypes of all film series considered for the program were subjected to field evaluation. These film segments can be compared to textbook lessons in the classroom. Just as a teacher reviews various texts and selects materials most appropriate to his ends, the producer determines what films are most appropriate for his program. The research question directed toward the

individual segments was, "What information does the viewer obtain from this film?"

The second thrust of the research involved the way in which the material would be used on the program. Continuing the analogy with classroom education, once a teacher chooses a text he develops a lesson plan which spells out how the text will be used. Comparable programming decisions must be made for televised instruction, when they are closely tied to program format. The research question directed toward those decisions was, "How can the film selected for use best be presented to produce the greatest educational impact?"

Research Methods

In order to provide information on the many programming decisions that had to be made, we were often forced to short-cut traditional research methods. The objective of the research was not rejection or acceptance of a production decision at the .05 level of significance. We wanted to provide information that would increase the probability of a successful decision. The summative evaluation would be the final judge of our success.

Our studies frequently resembled well designed pilot tests. Reduced sample sizes were more often the rule than the exception. We relied heavily upon a simple Pretest-Treatment-Post-test design. To reduce the enormous between group variability at pretest which is typically associated with the use of small samples, we resorted to matching on the basis of pretest scores.

The tests we developed were often comprised of less than ten items. We chose to avoid items requiring a verbal response, unless, of course the objective implied verbalization as in labelling letters, numbers or geometric forms. Multiple choice formats with symbolic or pictorial choices worked well with children this age.

When structured interviews were used, memory was often a problem. Pictures depicting the character or event could be presented with the question to reduce forgetting. These pictures were often taken off the TV screen using a simple polaroid camera. Pictures were important for another reason. They were often the most direct test of learning we could develop. For example, if a film segment was designed to teach labelling of the letter, "P", a picture of the "P" from the film could provide a more direct test of learning than a printed "P".

Most of the research on film segments has little applicability beyond this specific project. A review of these studies, however, may clarify the nature of the problems to which we addressed ourselves.

1. Number of Repetitions.

In two studies using the J commercial, number of exposures was varied with separate groups of children receiving either one, four or ten exposures. Progressively better performance on post tests was obtained as the number of exposures increased.

2. Comparability of Similar Material.

Two groups of children were matched on pretest scores from a D-test. The experimental group was then presented with 10 exposures to the "D commercial". The procedure was identical as in the 10 exposure group from the above study. The control group did not view the "D commercial". The experimental group surpassed the control on the post-test, but the pre to post-test gain on the "D commercial" was not as substantial as the gain on the "J Commercial".

3. Massing of Exposures.

Two groups of children both received four exposures to the J commercial: Group A saw the commercial four times within an hour's programming, and Group B saw the commercial once a day on four consecutive days. Superior

performance on post-tests was obtained for children viewing four commercials within a single, continuous hour's programming.

4. Length of Material.

The J commercial was cut to form a much shorter (but still meaningful) spot. One group of children received ten exposures to the original J and another group received ten exposures to the "cut" version. On post-test items dealing with labelling or recognition there were no differences between the groups. This indicated that the instructional value, at least for these two criteria, rested in one small portion of the commercial. However, the group viewing the original commercial was superior in choosing a picture of an object that started with J. This was thought to be related to the greater number and variety of words starting with J which appeared in the uncut version.

5. Retention.

The groups used in the study on "length of material" were retested after four weeks. Both groups were able to retain their knowledge equally, showing little decrease in performance over time. The only difference in retention was in choosing a picture of an object that started with J. Not only did children shown the longer version show greater gains on this item, they also showed greater retention.

6. Discriminating Similar Material.

Two studies were done here. The question explored was whether presentation of other letter material would interfere with the learning of a single letter. In the first study ten letter commercials, embedded in a series of one hour programs, were shown to one group of children and not to another. The groups were matched on the basis of pretest scores. The viewers received ten exposures to each letter commercial over a period of four days. They showed negligible gains and often losses in performance from

pre-to post-testing. There was a good deal of confusion among the letters.

In the Second study the "J Commercial" was shown 10 times over a period of four days (As in the Number of Repetition study.) The children were also presented 10 exposures to the "F" commercial and to the "A" commercial. Performance on test items related to "J" was better than in the ten commercial study, but markedly poorer than in the study where the children had viewed only the "J" commercial.

As a result of these studies, we decided to introduce three new letters per week in the "Sesame Street" series (coupled with a systematic of brief reinforcement of previously shown letters). We felt that this would be an appropriate rate for introducing letters without creating undue confusion among regular viewers.

RESEARCH ON FIVE TEST SHOWS

The final phase of prebroadcast research was the evaluation of five hour-long pilot programs. The production and evaluation of these test shows was an effortful, time-consuming and expensive undertaking. The decision to do so was not made lightly. It was based on a thorough understanding of the many useful purposes such an investigation would serve.

The five shows afforded the producers an opportunity for a "dry run." Research on appeal had underscored the importance of variety in programming for preschoolers. The producers felt that the adoption of a magazine format was the best way to build-in variety. This format provided an additional advantage in that unsuccessful segments could be dropped and new material added without changing the "look" of the program. Now script writers would have their first stab at piecing the individual films into a cohesive program. A tentative cast had been selected and would be performing for the first time as a group. The test shows represented a prototype of "Sesame Street," giving the producers a chance to make last minute changes before the program went on the air.

The summative research team was also to derive important information from this evaluation. Many of the measures designed by ETS for the summative evaluation were near the final stages of development. The test shows furnished an opportunity to gather the following useful information on the technical performance of these measures: (1) the ease of administration, (2) average testing time, (3) performance levels, (4) response ambiguities and (5) reliabilities. On the basis of these data last minute changes could be made in the measures prior to the pretesting of

the summative sample.

The formative research team would derive three major benefits from the evaluation: (1) We would have our first opportunity to evaluate a complete program. The experience gained from this undertaking would result in a radically different approach to formative research during the broadcast period. (2) For the first time it would be possible to work with children viewing in their own homes under normal conditions. (3) And, finally, it would provide a check on earlier recommendations that had been made to producers. The results from studies on appeal and educational effectiveness had influenced many production decisions and were reflected in the test shows. Although the evaluation would not constitute a replication of these studies, it would furnish a valuable check on our earlier findings.

The Evaluation

The evaluation of the five test shows was accomplished through the execution of four independent studies. These were carried out during the last week in July and the first week of August, 1969. Two studies were conducted in Philadelphia where the shows were aired over Channel 35, a local ETV station. Two were conducted in New York City day care centers.

Three response measures provided the basic data for the evaluation: (1) Observed reactions of small viewing groups, (2) Distractor observations, and (3) Test Results. The tests included five pilot measures from the proposed ETS battery (Body Parts, Numbers, Letters, Forms and Classification), together with a test made up of items specific to the five test shows.

The Studies

The four studies which comprised the evaluation are presented in Figure 2. (See page 30) Each is described briefly below.

1. Philadelphia Disadvantaged Study - Forty black four-year-old children, selected from disadvantaged neighborhoods in North Philadelphia served as subjects in this study. Each child received the entire ETS battery along with the Program-Specific Test. Two groups were formed, matched on the basis of performance on selected program-specific items. One group was assigned to the experimental condition. Parents of children in this group were asked to have their child watch "Sesame Street" for each of the five days that the program was on the air. The five pilot programs were aired on Channel 35 in Philadelphia from 10:00 A.M. to 11:00 A.M. on July 21 - 25. On the first day of broadcasting each experimental home was visited to insure that the set was on, and tuned into the proper channel. The other group was assigned to the control condition. Parents of children in this group were asked to encourage their children to watch regularly scheduled programs on Channel 10 during the time "Sesame Street" was aired on 35.

At the end of the week, both groups were tested on ETS and program specific items.

2. Philadelphia Middle-Class Sample - During the same period that the disadvantaged study was conducted, a similar study was carried out in a white middle-class neighborhood with 20 four-year old white children serving as subjects. This study was planned and conducted by ETS, mainly for the purpose of gathering additional normative data on the measures

Study	N	Pre-test	treatment	Post-test
Philadelphia Disadvantaged				
Experimental	20	YES	5 shows - Sesame St.	YES
Control	20	YES	5 shows - Regular programming	YES
	40			
Philadelphia Middle Class	20	YES	5 shows - Sesame St.	YES
New York Day Care				
Experimental	12	YES	5 shows - Sesame St.	YES
Control	12	YES	Nothing	YES
	24			
New York Day Care				
Distractor	10	NO	Sesame St. shows 1 & 4	NO

FIGURE 2. Summary of the design for four studies designed to evaluate the five test shows of "Sesame Street."

they had constructed. Each of these children were pretested on the ETS and program specific tests. Following pretest, every child watched "Sesame Street" on Channel 35 during the five-day period in which it was aired in Philadelphia. This group was also post-tested immediately following viewing of the five test programs.

3. New York Day Care Sample This study was carried out for three reasons: First, it was a back-up study. We were concerned about our ability to maintain experimental conditions in the difficult-to-control home-viewing context. The day care context could be better controlled. Secondly, we wanted an opportunity to make small group observations that would provide valuable data on appeal. Finally, we would be able to compare performance and gain in day care versus home-viewing groups.

Twenty-four four-year-olds were pretested on a shortened version of the ETS battery and on the Program Specific items. Half of these children were randomly assigned to the experimental group, the other half to the control group. Children in the experimental group viewed the five "Sesame Street" test shows in groups of various sizes. Following the viewing of the program, both experimental and control subjects were post-tested.

4. New York Distractor Study - Ten four-year-old children from a day care center in New York viewed two of the test shows, (Shows 1 and 4) under the standard distractor procedures, as described earlier in this report.

Problems in Interpretation

A review of the problems that arose in the Philadelphia Disadvantaged Study point up some of the difficulties a researcher is faced with when conducting a study in a natural setting.

Important problems arose during the pretest. Temperatures were high, above 90° in Philadelphia at this time. Many of the mothers had drawn

the shades and kept the lights off to retain the coolness of the evening. The children were often restless and inattentive.

The tests themselves brought new problems. One of the purposes of the Philadelphia testing was to provide information on the tests so that they could be made better. These tests in many instances proved to be too long and too difficult for the children. Often the instructions weren't clear. These studies resulted in significant revisions of the ETS test and testing procedures prior to the summative evaluation.

The treatments were poorly established. On the first day of the experimental airing Apollo 11 landed on the moon. Some children preferred the astronauts to "Sesame Street" and missed Show 1. Some mothers failed to have the children watch even though a visitor in the home checked to see that the TV was on and properly tuned on the first of the viewing days. One television was stolen and one reclaimed both from experimental homes. On the other hand, control children weren't supposed to be watching "Sesame Street". When their mothers turned on channel 10 and saw "I Love Lucy", several felt that a mistake had been made, and some found the experimental shows. In addition, there was a good deal of talking about the study in the neighborhood which encouraged further contamination of the control group. Other problems also arose. On the last day of the test shows, the examiners went to the homes while the program was still on. Many cases of poor reception were reported. Most often, there were other children in the room. Numerous distractions were constantly present. Instead of the relatively clean treatments we had hoped for, we found an experimental group who, if they had viewed the program at all, often viewed under the poorest conditions. We also found a control group who sometimes had viewed the program.

For all these problems, we were still able to distinguish viewers

from non-viewers in terms of relatively higher achievement gains for the former. More importantly, we noted that gains in certain very specific goal areas were greater than in others this allowed us to make inferences about the relative effectiveness of different production approaches employed in the various goal areas.

The Philadelphia Middle-Class Study was conducted mainly for the purpose of providing information on the tests. Conditions in this neighborhood were not the same as in the disadvantaged sample. The homes were cooler, there were less distractions present during testing and the children were more familiar with books and pictures, the materials used in testing. All children in this sample were reported by their mothers to have watched all five shows.

Interpreting the Results of the Studies

The massive amount of data accumulated in the four studies was organized in relation to the program goals. Within each major goal area, all information pertinent to a specific goal was integrated to provide the most comprehensive evaluation possible. This was accomplished in the following manner.

First Pretest scores on individual test items were examined in relation to specific goals. Comparisons of home viewers and day care samples were possible, together with comparisons of middle-class and disadvantaged samples. These data provided information on the current level of functioning of our target population, information especially useful to the producers and writers.

Next we listed all film segments pertinent to a specific goal. Gain scores on items designed to reflect achievement were available from three studies. These data were examined to determine what headway had been made in each goal area. To help explain these results we reviewed

the distractor and small group observations for the relevant film segments. These observations provided useful insights as to why a film was or was not working effectively.

Our overall strategy, then, was to provide producers with a comprehensive evaluation which took attentional data into account in the interpretation of achievement gains (or lack of gains). We feel this approach was especially fruitful and we adopted it for use in other contexts involving not only broadcast but non-broadcast instructional materials as well.

Finally, on the basis of the test scores and observational data, we made recommendations for improving the test shows. The recommendations were directed toward specific goals as well as major goal areas and toward individual film segments as well as the program as a whole.

In addition to these specific recommendations, the following general findings were reported:

1. Four-year-old children who viewed the five hour-long test shows made positive gains on tests over various CTW goals. These gains appeared to be positively related to (a) the amount of emphasis on the specific goal in the programming, (b) the manner in which the goal-related subject matter was presented, and (c) the extent to which the children exhibited relevant overt responses to the given program segment.

2. Background characteristics of the children were related to the average level at which they were already functioning in virtually all goal areas. On pretests, children from middle-class neighborhoods performed at a higher average level than children in day care centers, and the latter, in turn, out-performed disadvantaged children who had had no previous classroom experience. Positive gains were found in all three groups.

3. The visual attention of the four-year-olds was as high for the test shows as for any other children's programs previously tested, including both commercial and non-commercial, cartoon and live-action. A comparison of visual attention levels over successive quarters of the test shows demonstrated the feasability of sustaining the visual attention of four-year-old children over an hour-long program.

4. Repeated exposures, varied treatment, and visual simplicity (freedom from irrelevant elements) were generally the most effective treatments from the standpoint of instructional effectiveness. Careful manipulation of such factors can lead to significantly increased instructional effectiveness.

5. The tests designed by Educational Testing Service and administered as part of the study were found by ETS to be acceptable in terms of important technical characteristics, and were revised as a result of this study.

6. Careful monitoring is necessary to sustain the experimental conditions of "viewing" and "non-viewing" in the case of children studied in their own homes.

APPENDIX A: GOALS DOCUMENT

MEMORANDUM

From: Research Department of Children's Television Workshop

To: -Production Department of Children's Television Workshop
-Sam Ball, Educational Testing Service, Princeton, New Jersey
-Advisors to Children's Television Workshop

Subject: Statement of the Instructional Goals for Children's Television Workshop

Date: December 31, 1968

BACKGROUND

As the initial step toward the establishment of its goals, Children's Television Workshop (CTW) organized a series of five three-day seminars during the summer of 1968, dealing with the following topics: (1) Social, Moral and Affective Development; (2) Language and Reading; (3) Mathematical and Numerical Skills; (4) Reasoning and Problem Solving; and (5) Perception. Representatives from a variety of fields attended these seminars, including psychologists, teachers, sociologists, filmmakers, writers of children's books, and creative advertising people, along with the key staff of CTW. Comprehensive reports on the proceedings, along with various other materials, served as the basis for a special meeting on setting priorities among goals, held September 23 and 24, 1968. Results were summarized in an earlier report entitled "Appendix I. Goals Meeting, Children's Television Workshop." The present statement of goals incorporates, extends, and supersedes that earlier report.

PURPOSES

This report is intended to serve various related purposes. First, it attempts to reflect with reasonable accuracy the suggestions of the many consultants to the project. Secondly, it attempts to provide a framework within which to organize the project's goals. Briefly, these now fall into the three large categories of (1) Symbolic Representation, (2) Problem Solving and Reasoning, and (3) Familiarity with the Physical and Social Environments. Thirdly, it proposes a limited set of priority objectives, toward which the CTW experiment, and therefore its production resources, should be especially directed. Fourthly, in addition to general statements of goals and goal categories, it provides a number of specific operational examples, which will hopefully provide further clarification for the members of the production staff. Fifthly, it will serve as a common reference for the production and the summative evaluation phases of the project, reflecting the necessity for maintaining a coordinated relationship between the two. Finally, the report should be useful in communicating with our sponsors, our advisors and consultants, and the general public.

INTERPRETIVE GUIDELINES

The following observations may clarify the attached statement of goals:

I. Experimental Nature of the Project

Children's Television Workshop is an experiment in the instruction of preschool children through the medium of broadcast television. Accordingly, we have not attempted to restrict our goals to those which may be achieved with certainty. In general, the objective is to learn whether (or to what extent) the priority goals defined here may be within the capability of broadcast television to achieve.

II. Overlapping of Goal Categories

Presenting a listing of goals may imply that each goal is considered (1) singly, in isolation from the others, and (2) as belonging to one goal category alone. We do not intend that the list be regarded in these ways. Rather, the goal categories clearly are overlapping, and there are many cases in which a specific goal has been placed under one heading when it could have been placed under another. For instance, certain goals under "Numbers," "Letters," or "Classification" could well have been placed under "Perceptual Discrimination."

III. Goal Priorities

The goals fall into two major sets in terms of priorities. The first set consists of those objectives presently seen as the primary instructional goals of CTW. Each of these is marked by an asterisk. Those goals not preceded by an asterisk may be dealt with somewhere in the program, but it is not anticipated that they necessarily will be the subjects of concentrated production efforts. The follow-up, or summative evaluation, will focus predominantly upon the higher-priority goals, and will include the measurement of the remaining goals only to the extent that the programs as produced appear to be capable of achieving them.

IV. Measurement Plans

Two main forms of follow-up evaluation will measure the extent to which the instructional objectives of CTW have been met:

(1) Exposing the children to limited program segments prior to and perhaps during the broadcast period under highly controlled or "optimal" viewing conditions, and measuring the immediate, short-term, program-specific achievements which may result.

(2) A nation-wide evaluation of the program's effectiveness to be carried out by Educational Testing Service of Princeton, New Jersey, following a design yet to be determined, but one which will probably emphasize "typical" conditions of broadcast viewing, the evaluation of long-term gains, and the use of standardized instruments.

The Instructional Goals of Children's Television Workshop

I. SYMBOLIC REPRESENTATION

The child can recognize such basic symbols as letters, numbers, and geometric forms, and can perform rudimentary operations with these symbols.

A. Letters

(Note: For most of the following goals, the training will focus only upon a limited number of letters. The entire alphabet will be involved only in connection with recitation.)

* 1. Given a set of symbols, either all letters or all numbers, the child knows whether those symbols are used in reading or in counting.

* 2. Given a printed letter the child can select the identical letter from a set of printed letters.

* 3. Given a printed letter the child can select its other case version from a set of printed letters.

* 4. Given a verbal label for certain letters the child can select the appropriate letter from a set of printed letters.

* 5. Given a printed letter the child can provide the verbal label.

6. Given a series of words presented orally, all beginning with the same letter, the child can make up another word or pick another word starting with the same letter.

7. Given a spoken letter the child can select a set of pictures or objects beginning with that letter.

8. The child can recite the alphabet.

B. Numbers

* 1. Given a printed numeral the child can select the identical printed numeral from a set.

* 2. Given a spoken numeral between 1 and 10 the child can select the appropriate numeral from a set of printed numerals.

* 3. Given a printed numeral between 1 and 10 the child can provide the verbal label.

* 4. Given two unequal sets of objects each containing up to five members the child can select a set that contains the number requested by the examiner.
Ex. Where are there two pennies?

* 5. Given a set of objects the child can define a subset containing up to 10.
Ex. Here are some pennies. Give me two.

* 6. Given an ordered set of up to four objects, the child can select one by its ordinal position.
Ex. Where is the third book?

* 7. The child can count to 10.

8. The child can count to 20.

9. The child understands that the number system extends beyond those he has learned, and that larger numbers are used to count larger numbers of objects.

C. Geometric Forms

1. Given a drawing or a cut-out of a circle, square or triangle, the child can select a matching drawing, cut-out, or object from a set.

2. Given the verbal label, "circle", "square", or "triangle, the child can select the appropriate drawing, cut-out or object from a set.

II. Cognitive Processes

The child can deal with objects and events in terms of certain concepts of order, classification and relationship; he can apply certain basic reasoning skills; and he possesses certain attitudes conducive to effective inquiry and problem solving.

A. Perceptual Discrimination

* 1. Body Percepts
The child can identify and label such body parts as elbow, knee, lips and tongue.

2. Visual Discrimination

a. The child can match a given object or picture to one of a varied set of objects or pictures which is similar in form, size or position.

b. Given a form the child can find its counterpart embedded in a picture or drawing.
Ex. Given a circle the child can find the same shape in the wheels of a car. (This could be done with letters and numbers as well).

c. The child can structure parts into a meaningful whole.
Ex. 1. Using modelling clay and beans the child can fashion a head.

Ex. 2. Given two triangles and a model the child can construct a square.
Ex. 3. Looking at a picture of children with presents and a cake with candles the child can describe the picture as a birthday party.

* 3. Auditory Discrimination

a. Initial Sounds
The child can match words on the basis of common initial sounds. (see I. A., numbers 6 and 7, above)

b. Rhymes
The child can match words on the basis of rhyming.
Ex. Given two or more words that rhyme, the child can pick or supply a third.

c. Sound Identification.
The child can associate given sounds with familiar objects or animals.
Ex. Car horn, wood saw, moo of a cow

d. Copying rhythms
The child can copy a rhythmic pattern.

B. Relational Concepts

* 1. Size Relationships
Ex. Big, bigger, biggest; short, tall; skinny, little, etc.

* 2. Positional Relationships
Ex. Under, over, on top of, below, above, beneath, etc.

* 3. Distance Relationships
Ex. Near, far away, close to, next to, etc.

* 4. Amount or number Relationships
Ex. All, none, some; same, more, less; etc.

5. Temporal Relationships
Ex. Yesterday, today, and tomorrow; early, late; fast, slow; first, last

6. Auditory Relationships
Ex. Loud, louder, loudest; soft, softer, softest; noisy, quiet; high, low, etc.

C. Classification

* 1. Given at least two objects that define the basis of grouping, the child can select an additional object that "goes with them" on the basis of:

- Size: Height, length
- Form: Circular, square, triangular

2. Given 4 objects, 3 of which have an attribute in common, the child can sort out the inappropriate object on the basis of:

- Size: Height, length
- Form: Circular, square, triangular
- Function: To ride in, to eat, etc.
- Class: Vehicles, animals

3. The child can verbalize the basis for grouping and sorting.

D. Ordering

1. Given the largest and smallest of five objects which are graduated in size, the child can insert the three intermediate objects in their proper order.

2. Given pictures of the earliest and latest of five events in a logically ordered temporal sequence, the child can insert pictures of the intermediate events in their proper order.

E. Reasoning and Problem Solving

1. Inferences and Causality

* a. Given a situation the child can infer probable antecedent events.
Ex. Given an apple with a bite missing the child can indicate that someone was eating it.

* b. Given a situation the child can infer probable consequent events.
Ex. Given a man stepping off a ladder, and a bucket of paint beneath his foot, the child recognizes that the man is going to step into the paint.

c. Ordering on the basis of causality
Given two or more events which are causally related, the child can place them in their appropriate causal order.

2. Generating and Evaluating Explanations and Solutions

* a. The child can suggest multiple solutions to simple problems.

* b. Given a set of suggested solutions to a simple problem, the child can select the most relevant, complete, or efficient.

3. Attitudes toward Inquiry and Problem Solving.

a. Persistence
The child persists in his efforts to solve problems and understand events despite early failures.

b. Reactions to lack of knowledge

The child exhibits no undue frustration or embarassment when he must admit to a reasonable lack of knowledge or when he must ask questions.

c. Impulse control

The child understands that reflection and planning may pay off where premature problem attack will not.

III. The Physical Environment

The child's conception of the physical world should include general information about natural phenomena, both near and distant; about certain processes which occur in nature; about certain interdependencies which relate various natural phenomena; and about the ways in which man explores and exploits the natural world.

A. The Child and the Physical World Around Him

1. The Natural Environment

a. Land, Sky, and Water

The child should realize that the earth is made of land and water, and that the earth's surface differs in various places.

Ex. The child can identify puddles, rivers, lakes and oceans when shown pictures of them, can tell that all of them are water, and can tell how they are similar and different in terms of size and depth.

The child can identify mountains and rocks although they differ in size and shape.

The child can identify and give salient facts about objects seen in the sky.

Ex. The sun provides heat and light during the day; the moon and stars provide light at night; airplanes carry people; rockets explore space.

b. City and Country

The child can distinguish the environment and natural life of the city from those of the country.

c. Plants and Animals

The child can classify a group of objects as plants although they differ in size, shape and appearance.

The child can tell that plants are living things, and and that they require sun and water to grow and live.

The child can name some plants that are grown and eaten by man.

The child can classify a group of objects as animals although they vary in size, shape, and appearance.

The child can tell that animals are living things, and that they need food and water to grow and live.

The child can associate certain animals with their homes.

Ex. The child can associate birds with nests; fish

d. Natural Processes and Cycles

(1) Reproduction, Growth and Development

Given pictures of various kinds of young, the child can tell what they will be when they grow up.
Ex. Calves and colts become cows or horses; tadpoles, frogs; caterpillars, butterflies; boys, men; girls, women.

The child can identify such seeds as corn, acorn, bean, and knows that after one of these has been planted a new plant will grow.

The child can identify birth, growth, aging, and death as stages in the life process of individual plants and animals.

(2) Weather and Seasons

The child can describe the weather and activities which are associated with summer and winter.
Ex. In summer the weather is hot and sunny, the trees all have their leaves, people wear light-weight clothing and may go swimming; in winter the weather is cold and snowy, many trees have lost their leaves; people wear heavy-weight clothing, and may go sledding or ice-skating.

2. The Man-Made Environment

a. Machines

The child can identify automobiles, trucks, buses, airplanes, and boats, and can tell where and how each is used.

The child can identify such common tools as a hammer and saw, and can tell how each is used.

The child can identify basic appliances such as refrigerator, record player, and stove, and can tell how each is used.

b. Buildings and other Structures

The child can identify some of the different types of buildings which serve as family homes, schools and stores.

The child can identify some of the materials used in building, such as bricks, wood, and concrete.

The child can identify as man-made such structures as bridges, dams, streets, and roads.

IV. The Social Environment

The child can identify himself and other familiar individuals in terms of role-defining characteristics. He is familiar with forms and functions of institutions which he may encounter. He comes to see situations from more than one point of view, begins to see the necessity for certain social rules, particularly those insuring justice and fair play.

A. Social Units

1. Self

a. The child knows his own name

b. The child can specify whether he or she will grow up to be a mother or a father.

2. Roles

Given the name of certain roles from the family, neighborhood, city or town, the child can enumerate appropriate responsibilities.
Ex. The child can name one or more principal functions of the father and mother, mayor, policeman, baker, mailman, farmer, fireman, soldier, doctor, dentist, baker, schoolboy or schoolgirl.

3. Social Groups and Institutions of Concern to Children

a. The family and the home

The child views such activities as reading, playing of games, and excursions as normal family activities.

The child recognizes that various types of structures all serve as homes.

b. The neighborhood

The child distinguishes between neighborhood areas that are safe and unsafe for play.

c. The city or town

The child recognizes various structures, spaces, and points of interest which make up the city or town.
Ex. The child is familiar with the concepts of a zoo, park or playground, airport and parade, and with stores where various types of common items may be purchased.

The child understands that there are many different cities, that they have finite boundaries, that various goods or products must be transported in and out, and that various modes of transportation are employed.

The child identifies the respective functions of such institutions as the school, post office, and hospital.
Ex. The child knows that people go to school to learn how to read and write; to the hospital if ill or having a baby.

B. Social Interactions

1. Differences in Perspectives

The child recognizes that a single event may be seen and interpreted differently by different individuals.
Ex. Given a picture showing one boy in a bathing suit and another boy in a snow suit, the child can express the feelings of both boys in the event of snow.

* 2. Cooperation

The child recognizes that in certain situations it is beneficial for two or more individuals to work together toward a common goal.
Ex. Two girls want to bring chairs to the table, but can only lift and carry them by working together.

3. Rules which Insure Justice and Fair Play

a. Behaving by Rules

The child is able to behave according to the constraints of simple rules presented either verbally or by models.

b. Recognizing Fairness or Unfairness

The child can distinguish simple situations representing fairness from those representing unfairness.
Ex. The child can say whether a particular form of praise or punishment is or is not appropriate in a particular situation.

c. Evaluating Rules

Given a rule, the child can tell whether it is good or bad, and why.

d. Generating Rules

Given a situation involving interpersonal conflict, the child can furnish an appropriate rule for resolving it.
Ex. Told that two boys both wish to play with the same toy, the child must formulate a rule that is equitable (neither may have it; they can take turns; etc.).

APPENDIX B: Testing for Competence

Section I: Performance of Day Care Children on a Test of Letters.

Section II: Performance of Day Care Children on a Test of Numbers.

Section III: A Comparison of Performances of Day Care and Family Day Care Children.

Section I: Performance of Day Care Children on a Test of Letters.

MEMORANDUM

To: Production
From: Barbara Frengel
Re: Letters

February 27, 1969

A general test dealing with letters was given to 68 four-year-olds from our day-care centers. The results are summarized below.

1. Reciting the Alphabet

The results are presented graphically on the next page. The major findings indicate that very few children in our target population can accomplish this task.

- Only 36 of the 68 children could even begin to recite the alphabet.

- Only 21 children could go beyond ABC

Looking at the graph it seems that certain letters are learned in sets. These sets include:

A B C
J K L M
R S T U
W X Y Z

There also appear to be several stumbling blocks where the children get confused. These are:

C D, D E, E F, I J, and N O P

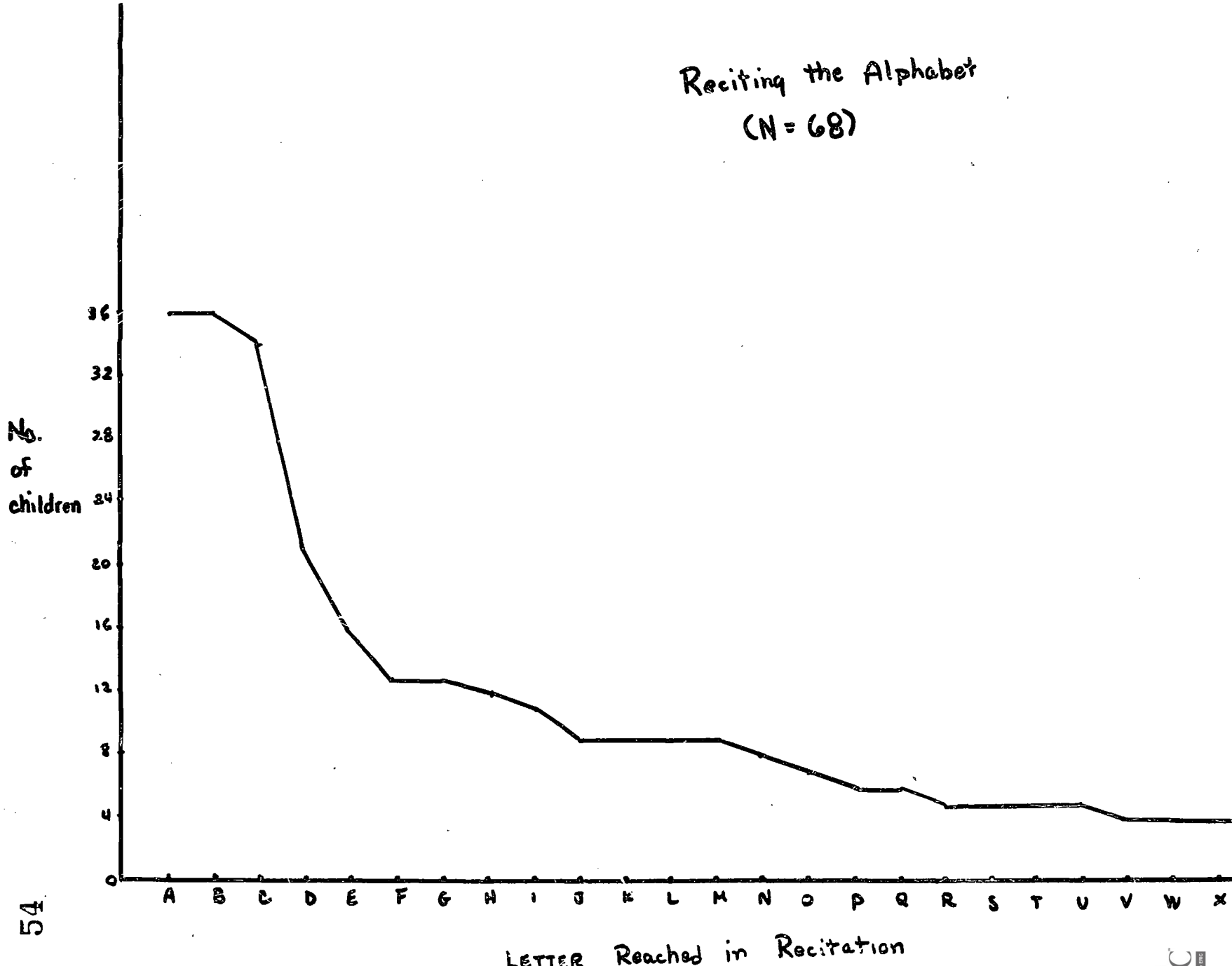
2. Labelling letters of the alphabet.

a. The entire alphabet was presented and the children were asked to pick out and name the letters they knew. The results are presented below:

Letter	% Labelling Correctly
A	23.5%
B	20.6%
C	11.8%
D	10.3%
E	16.3%
F-Z	Less than 10%

b. Letters of the child's name

(1) Labelling letters of their name
The child was asked to label the first letter of his first name (Capital letter).


Reciting the Alphabet
(N = 68)
No. of children
36
32
28
24
20
16
12
8
4
0
A B C D E F G H I J K L M N O P Q R S T U V W X
LETTER Reached in Recitation

Eleven of the children or 16.3% could label this letter correctly.

(2) Recognizing letters of their name

If the child could not label the first letter of his name a card with the alphabet was presented and he was asked to find the first letter of his first name (Debby would be asked to find "D").

Twenty children, or 29.3% could recognize the first letter of their first name.

(3) Writing their names

Forty children wrote letters or reasonable facsimiles.

Twelve children wrote their first names. Seven did this perfectly and five with minor errors.

Twenty-nine children were able to write at least the first letter of their name.

The major finding here is that children seem to learn the letters of their own names first. Using letters in names should be a good idea, like "M is for Martha". In the J-Commercial, several children who were not able to label the J did call it a "Joe" or a "Julio".

First letters are learned first. Using words that start with the letter we are teaching is supported here.

3. Matching Letters

A card with the letters of the alphabet was presented. The child was given eight individual letters and asked to "put them were they go". The results are presented below:

Letter	% Matching Correctly
A	92.6
B	89.7
D	89.7
J	86.8
K	83.8
S	82.4
M	77.9
T	75.0

Except for the "T", this is the exact same ordering of difficulty achieved on the labelling task.

SUMMARY

1. Children are not nearly as familiar with letters as with numbers.

2. Very few children can recite the alphabet.

3. First letters in names are among the first letters children learn.

4. Children are much more familiar with the first part than the latter part of the alphabet.

5. There are some natural groupings that occur in learning to recite the alphabet (ABC, JKLM, RSTU). It might be good to present these together sometimes.

6. Some transition points are difficult. These should probably be stressed.

Section II: Performance of Day Care Children on a Test of Numbers.

MEMORANDUM

February 26, 1969

To: Production
From: Barbara Frengel
Re: The ability of four-year-olds from our Day-Care population to deal with NUMBER

Children in our three major Day-Care Centers (Union, Open Door and Grant) were given a general abilities test dealing with number. A copy of the test is attached.

The results will be discussed question by question.

1. Counting

This question provides information on counting. The child is encouraged to count as far as he can. Fifty-one percent of the children tested could count to six or over.

	% by School			% by Sex		% of Total
	Union (N=19)	Grant (N=28)	OpenDoor (N=19)	Male (N=34)	Female (N=32)	(N=66)
Not at all	10	21	10	20	9	15
1-5	32	28	42	35	31	33
6-10	16	36	32	20	38	29
11-20	26	14	16	20	16	18
21+	16	0	0	3	6	04

2. Labelling Numerals (1 to 5)

The numerals, one to five were presented in a random order and the child was required to name each numeral as it was presented. The numeral, 1, is fairly well known, with 62% of the children able to name this numeral. About 40% of the children could also name the remaining numerals, 2, 3, 4 and 5.

	% by School			% by Sex		% of Total
	Union (N=19)	Grant (N=28)	OpenDoor (N=19)	Male (N=34)	Female (N=32)	(N=66)
1	58	71	53	62	62	62
2	47	36	42	41	41	41
3	53	39	37	38	47	42
4	47	43	42	41	47	44
5	42	36	32	38	34	36

3. Recognizing Numerals (1-5)

Four numerals were presented and the child was required to choose the appropriate one. The results parallel those of the labelling task, but show about a 10% improvement. Again the numeral, 1, is well known and the remaining numerals (2,3,4, and 5) are identified correctly by about 50% of the children.

	% by School			% by Sex		% of Total
	Union (N=19)	Grant (N=28)	OpenDoor (N=19)	Male (N=34)	Female (N=32)	(N=66)
1	74	64	63	62	72	67
2	53	36	58	41	53	47
3	63	32	63	50	50	50
4	63	46	63	50	62	56
5	58	43	47	44	53	48

4. Matching Numerals

Here a card with five numerals is presented. The child is given the numerals 1-5 individually and required to match them with the appropriate numeral on the card. This is a very easy task for the child. It requires no knowledge of number but is a simple perceptual discrimination. The numeral, 5, was most difficult for the children to discriminate. When they erred, they most often confused it with 2 or 3.

	% by School			% by Sex		% of Total
	Union (N=19)	Grant (N=28)	OpenDoor (N=19)	Male (N=34)	Female (N=32)	(N=66)
1	100	100	100	100	100	100
2	100	86	95	94	91	92
3	95	93	100	94	97	95
4	95	100	95	94	100	97
5	89	75	100	85	88	86

5. Demonstrating an understanding of Number

Here children were presented with a pile of ten checkers and required to perform various tasks to demonstrate their understanding of numerosity. Ninety percent of the children know how many objects "one" represents. They also know "all". Only about thirty-five percent can count out three, four or five objects from a pile.

	% by School			% by Sex		% of Total
	Union (N=19)	Grant (N=28)	OpenDoor (N=19)	Male (N=34)	Female (N=32)	(N=66)
1	95	86	95	91	91	91
3	58	36	10	26	44	35
4	47	39	21	29	44	36
5	32	25	5	15	28	21
All	100	68	68	79	75	77

6. Recognizing an instance of number

These were multiple-choice items. Here children were asked to choose a clown with one balloon (from four clowns with varying number of balloons); an envelope with three stamps and an Indian with five feathers.

(The result on threeness is questionable because the stamps were not spread but bunched in the right-hand corner of the envelopes).

Again, "one" is very familiar to the children. Three and five were not so well known.

	% by School			% by Sex		% of Total
	Union (N=19)	Grant (N=28)	OpenDoor (N=19)	Male (N=34)	Female (N=32)	(N=66)
1	89	75	79	73	88	80
3	47	54	42	44	53	48
5	79	57	58	56	72	64

Summary

1. About half of the four-year-olds in day-care centers can already count above six. We will not get very outstanding differences in the summative findings if we gear our major effort in counting to 1-10. We should teach counting to 20.

2. Less than 50% of the children can label numerals 1-5 so this seems a legitimate goal. More know "one" so this should receive the least emphasis.

3. From the results of this test it seems that our major target should be teaching numerosity. This is where the children seem to need the most help. Counting out things in a forward progression might be a good way to do this.

Section III: A Comparison of Performances of Day Care and Family Day Care Children.

RESEARCH MEMORANDUM

To: Production
From: Research
Re: A summary report of the performance of four-year-olds on five general ability measures.
Date: June 11, 1969

Following is a report on our testing efforts with day care and Family Day Care children. After having tested day care children on several of our general abilities measures, we became concerned that the information we had gathered may not have truly reflected the abilities of children at home -- children who had not been exposed to a day care experience.

Testing a group of children in their own homes was considered, but this was not feasible for many reasons in addition to inefficiency.

We were fortunate enough to gain entrance into Family Day Care homes. These homes are described in more detail later. The important factor is that we feel fairly confident in generalizing from the Family Day Care sample to our target population.

TABLE OF CONTENTS

THE FAMILY DAY CARE HOME

The CTW research staff recently visited approximately 45 homes in the five boroughs of New York. The purpose of the visits was to test "hard to reach," disadvantaged four-year-olds in their own homes to determine their present level performance in the specific achievement areas represented in CTW's goals. We mainly wanted to know if the performance of such children is similar or markedly different from the performance of children enrolled in the regular established day care centers in which we have been doing research.

The 50 children tested were all four-year-olds. Each of these young children attends a day care program in an apartment near his home. Mothers conduct these all-day programs for a maximum of ten children in each home. The purpose is to provide care for children of mothers who could not otherwise take jobs.

The Home Setting

Every home visited had more than one child in it. Most homes had at least four children. Every home had at least one television set; many homes had two sets; some homes had three sets. A few homes had color television sets.

Our home visits were all planned. We entered no homes unannounced.

TV Utilization in the Homes

The television sets were on in about half the homes. No television set was tuned to Channel 13 when we arrived. Occasionally, a mother said she looked at Channel 13, but no mother indicated that Channel 13 was a part of her regular viewing pattern. Virtually every home we visited could receive Channel 13's signal.

The Educational Programs in the Homes

The quality of the educational work being done with the children in the homes varied greatly. Two homes visited were conducting a vigorous educational program with the mother in charge drilling the children in counting, learning letters of the alphabet, the pledge of allegiance, etc. However, the majority of the homes were conducting educational programs rated by us as "moderate to weak". In several homes there was no evidence at all of educational materials. There appeared to be no attempt on the part of the mother to formally instruct the children. We rated the educational program in these homes as "non-existent".

Comparison of Home Day Care Sites with Established Day Care Centers

The home day care centers conduct a much weaker educational program than the regular day care centers. It appeared to us that no home center or related agency maintained records as to the ages of the children under their jurisdiction. Some sent us to homes where there were no children of the age we were interested in testing.

This same lack of organization appeared in the homes themselves. Some of the day care mothers did not know the ages of the children in their homes, for example.

This leads us to conclude that, for the CTW utilization staff, the job of getting families from the neighborhoods we visited to watch our show will be every bit as difficult as we imagined. The TV viewers we saw are not in the habit of looking at Channel 13. In the homes we visited where TV was on, the programs being watched were quizzes and soap operas.

The children we tested varied, as might be expected, in their ability to answer the questions correctly. Some of the children, however, were not only unable to answer the test questions correctly, but they were unable to understand the questions we were asking.

The following tests were included in the testing battery: Body Parts, Matching Familiar Figures, Numbers, Grouping and Sorting, Letters. The results from these tests will be discussed separately.

ERIC

TESTING PROCEDURES

and

RESULTS

GROUPING & SORTING

The interest here was what classes the child has available to him, and along what dimensions he can make appropriate decisions as to whether an object should be included or excluded from a set of objects.

Grouping: Two objects were placed on a piece of paper and the four choice objects were placed along side the paper on the table. The child was asked to choose the one choice object that belonged on the paper with the other two objects. A variety of phrasings was used to be sure that the child understood the task (ex. "Which one is the same as..." "Which one is like..." "Which one belongs with.." etc.)

Sorting: Four objects were placed on the paper. Three of these objects were identical in regard to the dimension in question (Form: round, Color: red, Class: vehicles, etc.) The third object varied in that dimension. Grouping and Sorting tasks were only administered to the Family Day Care sample. The results are presented below:

The Ability to Group & Sort Objects Varying in the Dimension of Similarity

Basis of Grouping	Grouping		Sorting	
	Number (N=50)	%	Number (N=50)	%
Color (Red)	25	50	30	60
Size (Large)	21	42	12	24
Form (Round)	13	26	11	22
Class (Animals)	35	70	6	12
Amount (Two)	12	24	15	30
Function (Vehicles)	22	44	10	20

MATCHING FAMILIAR FIGURES TEST

This measure provides information on the degree to which the child can match pictures of similar objects. In order to accomplish the match he must be able to notice the parts within a whole. The child is given one picture and must find the same picture from a set of four. These four pictures vary in different ways (a hat may have a slightly different shape, a different band, a different feather, etc.)

The test also is designed to be used as a measure of reflectivity. (How much time does the child take before he makes a decision?)

The data on the matching of familiar figures is presented below. In this case the day care sample is younger (3.6 to 4.6 years) than the family day care sample (4.0 to 5.0 years).

Copies of the test are available for anyone interested in seeing the pictures used.

MATCHING FAMILIAR FIGURES TEST

Number of Correct First Choices Per Problem

Day Care Center (N=27)

Problem	1	2	3	4	5	6	7	8	9	10
N_c	11	11	8	9	20	8	1	15	3	8
%	.41	.41	.30	.33	.74	.30	.04	.55	.11	.30

Age range 3.6 to 4.6

Family Day Care (N=50)

Problem	1	2	3	4	5	6	7	8	9	10
N_c	23	25	40	21	33	22	12	33	15	19
%	.46	.50	.80	.42	.66	.44	.24	.66	.30	.38

Age range 4.0 to 5.0

Composite (N=77)

Problem	1	2	3	4	5	6	7	8	9	10
N_c	34	36	48	30	53	30	13	48	18	27
%	.44	.47	.62	.39	.69	.39	.17	.62	.23	.35

BODY PARTS

The examiner pointed to the part of interest on his own body and said, YOU KNOW WHAT THIS IS. WHAT'S IT CALLED?, or simply, WHAT'S THIS? If the child was able to label the part correctly he asked, WHAT DO WE DO WITH OUR (EYES)? If the child was not able to label the part the function was not asked. After all the parts had been covered the examiner went back to those the child could not label earlier and said, SHOW ME YOUR (ELBOW). WHERE'S YOUR ELBOW? If the child could correctly identify the part the examiner questioned him as to the function of that body part.

A more comprehensive listing of body parts was included with the Family Day Care sample. The results are presented below:

Labelling & Identification of Body Parts

Body Part	Day Care (N=60)		Family Day Care (N=50)		Total (N=110)	
	%Labelling	%Identifying	%Labelling	%Identifying	%Labelling	% Identifying
1. Eye	85	98	82	94	84	96
2. Ear	95	100	82	92	89	96
3. Nose	100	100	92	98	96	99
4. Tongue	80	92	88	94	85	93
5. Teeth	100	100	96	100	98	100
6. Hand	90	100	82	100	88	100
7. Thumb	51	68	60	78	59	73
8. Elbow	42	75	18	48	32	63
9. Knee	58	86	58	92	59	89
10. Finger			58	92		
11. Arm			66	84		
12. Leg			70	92		

IDENTIFYING FUNCTION OF BODY PARTS

	Family Day Care (N = 50)	Day Care (N = 60)
EYE		
Look, see, etc.	30 %	38 %
Blink, wink, etc.	8	20
Nothing or wrong	62	42
EAR		
Hear, listen, etc.	20	22
Clean, dig in, wear earrings, etc.	16	7
Nothing or wrong	64	71
NOSE		
Breath, smell, etc.	18	22
Pick, blow, sneeze, etc.	8	27
Nothing or wrong	74	51
TEETH		
Chew, bite, talk, etc.	46	40
Brush, fall out, etc.	2	18
Nothing or wrong	52	42
HAND		
Hold things, take things, etc.	18	25
Wear rings, wave, shake, etc.	14	37
Nothing or wrong	68	38
THUMB		
Hold things, pick up things, etc.	6	5
Count, suck, etc.	8	20
Nothing or wrong	86	75

	Family Day Care (N = 50)	Day Care (N = 60)
ELBOW		
Move your arm, bend, etc.	16 %	3 %
Lean on, put on table, etc.	2	7
Nothing or wrong	82	90
KNEE		
Walk, bend, crawl, etc.	34	23
Bump into people, scratch, etc.	2	3
Nothing or wrong	64	74
FINGER		
Touch things, pick up things, etc.	20	
Wear ring, scratch, etc.	8	
Nothing or wrong	72	
ARM		
Reach, move your hand, etc.	4	
For muscles, leaning, holding up, etc.	2	
Nothing or wrong	94	
LEG		
Walk, move, stand, etc.	34	
Put pants on, get in bathtub, etc.	4	
Nothing or wrong	62	
HEAD		
Think, look around, nod, etc.	12	
Comb hair, put food into, bump, etc.	30	
Nothing or wrong	58	
FOOT		
Walk, kick, etc.	36	
Put shoes on, socks, etc.	8	
Nothing or wrong	56	

	Family Day Care (N = 50)	Day Care (N = 60)
NECK		
To move head, to swallow, etc.	12 %	
Wear necklace, shirt	4	
Nothing or wrong	84	
TONGUE		
Eat, talk, lick, etc.	50 %	32 %
Bite, stick in the mouth, etc.	2	5
Nothing or wrong	48	63

###

KNOWLEDGE OF NUMBER

1. Counting

This question provides information on counting. The child is encouraged to count as far as he can.

	DAY CARE (N=66)		FAMILY DAY CARE (N=50)		TOTAL (N=116)	
	Number	%	Number	%	Number	%
Not at all	10	15	5	10	15	13
1 - 5	22	33	17	34	39	34
6 - 10	19	29	14	28	33	28
11- 20	12	18	11	22	23	20
21 +	3	4	3	6	6	5

2. Labelling Numerals (1 - 5)

The numerals, one to five were presented in a random order and the child was required to name each numeral as it was presented. Numeral 1 is fairly well known. About 40% of the children could also name the remaining numerals, 2, 3, 4 and 5.

	DAY CARE (N=66)		FAMILY DAY CARE (N=50)		TOTAL (N=116)	
	Number	%	Number	%	Number	%
1	41	62	25	50	66	56
2	27	41	16	32	43	37
3	28	42	19	38	47	40
4	29	44	21	42	50	43
5	24	36	17	34	41	35

3. Recognizing Numerals (1 - 5)

Four numerals were presented and the child was required to choose the appropriate one. Again the numeral 1 is well known and the remaining numerals (2,3,4, and 5) are identified correctly by about 50% of the children.

	DAY CARE (N=66)		FAMILY DAY CARE (N=50)		TOTAL (N=116)	
	Number	%	Number	%	Number	%
1	44	67	35	70	79	68
2	31	47	33	66	64	55
3	33	50	33	66	66	57
4	37	56	26	52	63	54
5	32	48	29	58	61	52

4. Matching Numerals

Here a card with five numerals is presented. The child is given the numerals 1 - 5 individually and required to match them with the appropriate numeral on the card. This is a very easy task for the child. It requires no knowledge of number, but is a simple perceptual discrimination.

	DAY CARE (N=66)		FAMILY DAY CARE (N=50)		TOTAL (N=116)	
	Number	%	Number	%	Number	%
1	66	100	48	96	114	98
2	61	92	43	86	104	90
3	63	95	47	94	110	95
4	64	97	47	94	111	96
5	57	86	47	94	104	90

5. Enumerating Objects

Here children were presented with a pile of ten checkers and required to perform various tasks to demonstrate their understanding of numerosity. Over ninety per cent of the children know how many objects "one" represents. They also know "all".

	DAY CARE (N=66)		FAMILY DAY CARE (N=50)		TOTAL (N=116)	
	Number	%	Number	%	Number	%
1	60	91	48	96	108	93
3	23	35	19	38	42	36
4	24	36	19	38	43	37
5	14	21	11	22	25	22
All	51	77	48	96	99	85

6. Recognizing an Instance of Number

These were multiple-choice items. Here children were asked to choose a clown with one balloon (from four clowns with varying numbers of balloons); an envelope with three stamps and an Indian with five feathers.

Again, "one" is very familiar to the children. Three and five were not so well known.

	DAY CARE (N=66)		FAMILY DAY CARE (N=50)		TOTAL (N=116)	
	Number	%	Number	%	Number	%
1	53	80	46	92	99	85
3	32	48	23	46	55	47
5	42	64	29	58	71	60

KNOWLEDGE OF LETTERS

1. Reciting the Alphabet

Children were told... YOU KNOW THE ABC'S. SAY THEM FOR ME. If they didn't understand they were told... LISTEN. A - B - C YOU FINISH IT.

The results are presented on page 17. Nearly 50% of the children could not even begin to recite the alphabet. Only 31% could go as far as "D" and less than 25% could go beyond "D".

2. Labelling Letters

For the day care children the letters were presented in alphabetical order on two sheets, one with capital letters and one with lower case letters. The children were asked to find the ones they knew and then were asked, "What is that?" The results are presented below:

LABELLING BY DAY CARE CHILDREN (N=68)

Letter	% Labelling Correctly
A	23.5%
B	20.6%
C	11.8%
D	10.3%
E	16.3%
F-Z	Less than 10%

Presenting the letters this way seemed to overwhelm the children. For the Family Day Care sample the letters were presented individually on cards with the capital and lower case both in the card. The results are presented below:

LABELLING BY FAMILY DAY CARE SAMPLE (N=50)

Letter	% Labelling Correctly	Letter	% Labelling Correctly
A	48%	N	8%
B	28%	O	26%
C	16%	P	12%
D	12%	Q	12%
E	16%	R	18%
F	14%	S	18%
G	10%	T	14%
H	10%	U	8%
I	8%	V	10%
J	8%	W	14%
K	16%	X	18%
L	12%	Y	12%
M	8%	Z	8%

3. Matching Letters

A card with the letters of the alphabet was presented. Eight of these letters were then presented individually and the child was asked to "Put this where it goes." The results are presented below:

PERCENTAGE OF CHILDREN MATCHING LETTERS CORRECTLY

Letter	Day Care (N=68)	Family Day Care (N=50)	Total (N=118)
A	64	56	78
B	91	56	76
D	91	56	76
J	88	50	72
K	72	54	65
S	96	52	78
M	79	40	63
T	78	46	65

DISCUSSION OF RESULTS

GROUPING & SORTING

Only Family Day Care children were tested for classification abilities. The most surprising result was the differences obtained between grouping and sorting on any given dimension. When the basis was color, comparable results were obtained with 50% being able to group on the basis of color, and 60% being able to sort on that basis (See page 4). Looking at the "class" dimension, however, 70% of the children given two animals and asked to find something that went with them could choose another animal from a set of objects. When these same three animals were presented along with a quarter and the children were asked to take something away that didn't belong, only 12% removed the quarter. In general, the percentage of children able to group on the basis of function, class, size, and color shows that this ability is one that can be achieved by the four-year-old (Chance = 25%).

Only on the color dimension did children sort objects above a chance performance.

The most appropriate way to teach these classificatory skills would seem to be by starting with a dimension where the child can "see" what is meant and then carrying out the same operations on a dimension to which he is less attentive.

MATCHING FAMILIAR FIGURES

The interest here was in the child's ability to pick out discriminable cues in order to find a duplicate among four pictures. Results are presented on Page 5. Items 1 and 9 were abstract designs, the remaining items were pictures of familiar objects. Item 7 was a face. Here the choice items were highly similar because several shading cues were lost in the Xerox process. Chance performance is again 25%. Item 9 was an extremely difficult discrimination.

In general, the results indicate that children this age were able to make these kinds of perceptual discriminations, even when they were fairly subtle.

It seems that this skill could be exploited. By using the abilities to match identical objects a basis for classification could be developed by moving from exact duplicates to highly similar objects (ex. all chianti bottles to all basketed bottles).

BODY PARTS

The results for Family Day Care and day care samples are very similar with Family Day Care performing on a slightly lower level. The children were highly skilled at labelling most of the body parts tested. They show little knowledge, however, of how these parts function. (See pages 5-8)

Wizard of Oz-type characters might be a good way to stress the importance of various parts (a rusted tin soldier can't move until the joints are oiled, a girl whose hair covers her eyes can't see until she cuts her bangs, etc.)

NUMBER

In general, there was little difference between day care and Family Day Care samples in their ability to deal with numbers. (Results are presented on pages 9-10.)

a. Counting: Looking at the graph on page 9 we see that most of the children know something about counting and they can usually count to a number somewhere between 1 and 10. This supports the earlier recommendation that we extend the counting goal to 20.

b. Labelling, Identification and Matching of Numbers: The children are fairly familiar with the look of the numerals 1-5 and over 50% of the children could identify a numeral when its label was provided although they were not as adept at providing the label themselves. Again, nearly all the children could match a given numeral with another numeral that appeared in a set of four numbers.

c. Numerosity: Although over 50% of the children tested could count beyond 5, their ability to enumerate has not extended this far. Perhaps what will be most helpful in the development of this skill are films like "Egg and Cookie" where their ability to count is made instrumental to them by being applied to objects (Sort of showing them how counting is used). When the children weren't required to count out objects themselves but were provided with stimuli depicting different amounts, (Recognition of an instance of number) the performance was markedly better. Some of this may reflect the multiple-choice item used here, however, where chance performance was 25% correct.

In summary, it seems that the children at the age tested had already begun to develop some number skills. Over half the sample could already count to ten and could recognize numerals 1 through 5 when provided with the label. They seem to need instruction in enumeration and labelling of the numerals.

LETTERS

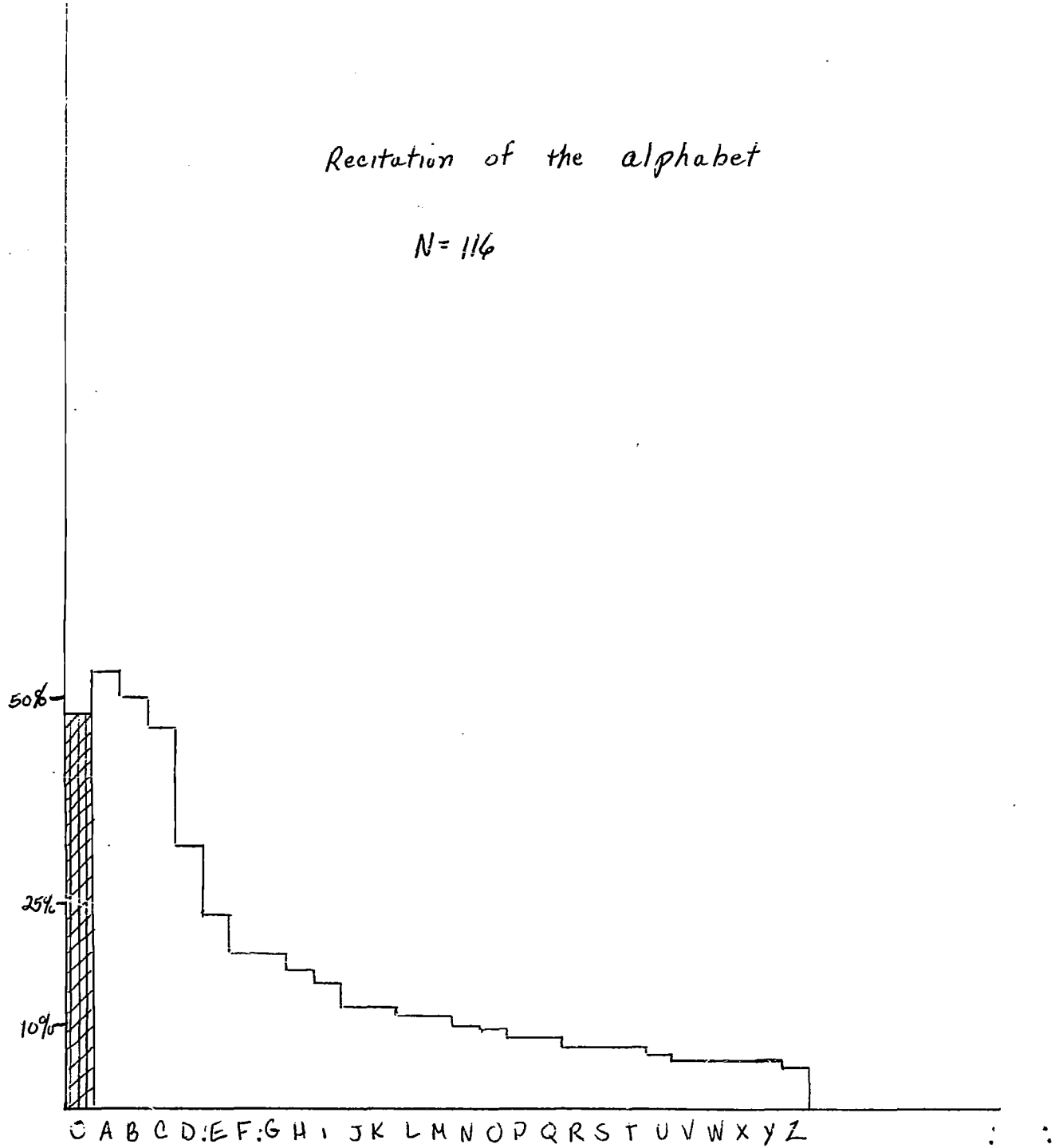
Reciting the Alphabet: The data on recitation of the alphabet is presented graphically on page 17. A good portion of children could not even begin to recite (just under 50%). Of those who knew what was meant and could begin to say the alphabet, few could go beyond D in their recitation and less than 10% could recite the alphabet in its entirety. Often what happens is a confusion or omission of letters. It would seem that several spots where the alphabet is presented distinctly would be most helpful to the children.

Labelling and Recognition of Letters: Results are presented on page 11. In the Family Day Care sample, a substantial percentage of the children knew "A". There was some knowledge of "B" and "O", but little familiarity with any other letters.
Only 26% of the children could provide the label for the first letter of their own name. When asked to find the first letter of their name on a page of letters (Mary would be asked to find "M") only 36% were able to do this.

Matching Letters: Here we find the most outstanding difference between day care and Family Day Care samples (See page 12). Given a letter and asked to match it with an identical letter in a set of eight letters only about half of the children responded correctly. This same kind of task was presented with numbers and this difference between samples was not obtained. Neither was there a sample difference in the Matching Familiar Figures test discussed earlier. It seems that what would account for this difference is a lack of exposure to letters.

Recitation of the alphabet

N = 116



APPENDIX C: SEX DIFFERENCES IN ATTENTION TO "WHAT AM I?"

To: CTW Staff

From: Richard M. Polsky

Date: March 5, 1969

Re: Sex Differences in Attention to "What Am I?"

The research concerning this material was done in January and February, 1969 at Grant Day Care Center, 1299 Amsterdam, New York City. The graph represents the results of testing six children, three boys and three girls, using the one inch videotape and the distractor. The show was tested on the total group of six children. The viewing interest results were graphed according to sex.

In What Am I? the interest level of the boys is almost constantly lower than that of the girls. The points at which the boys are most interested in the program occur during observations 27, 28, 29, and 30. This is the segment of the program in which shots of a pigeon walking and a girl immitating his walk occur. But even during this segment, the high point of the boys' interest (IL 7 at observation 28) is still quite lower than that of the girls at the same point (IL 9 at observation 28).

Near the end of the program the camera gives a close up of a jet plane flying overhead (observations 38 and 39). As might be expected, this was an area of the show that caused the boys to become more interested. It did have that effect. The boys (during observations 39 and 40) had their interest level go from an IL of 2 in observation 38 to an IL of 4 in observations 39 and 40. The girls also showed a slight interest increase at this same point from an IL of 4 at observation point 38 to an interest level of 4 and 5 for observation points 39 and 40. While neither jump is

too large, the boys' increase is roughly twice that of the girls.

Based on this limited data, it is worth considering that the four year old boy may have somewhat different viewing habits and preferences than does the four year old girl.

ERIC

Television content at each observation point in the film "What Am I?"

1. kids running (slow motion)
2. " " " "
3. " " " "
4. girl jumping rope
5. swaying palm tree (S.M.)
6. terns flying rapidly -- wings beating
7. lone gliding bird
8. bird taking bath -- power shovel
9. power shovel
10. CU of steam shovel scoop
11. TS of lawn sprinkler
12. porposes jumping in air
13. TS porposes under water
14. kangaroos jumping, horse (S.M.)
15. horse trotting (girl rider)
16. CU of merry-go-round moving
17. kids imitating merry-go-round
18. oil well pump moving slowly, kids imitating movement
19. kids imitating well,
20. " "
21. " "
22. penguins wadeling, kids imitating penguins
23. CU of two boys imitating penguins
24. kids imitating penguins
25. three penguins wadeling
26. pigeon walking on narrow fence
27. CU of girl's legs and feet imitating pigeon walk
28. pigeon walking, girl imitating
29. pigeon walking, inch worm inching
30. one boy being an inch worm in class
31. ocean waves gently breaking
32. " "
33. kids imitating waves
34. waves actively breaking
35. CU of kids' fingers imitating waves' movement
36. kids being waves, waves breaking
37. more waves
38. birds gliding, jet flying low overhead
39. CU of jet
40. waves breaking on beach
41. waves breaking on beach, monkey in tree
42. female ballet dancer, boy on pogo stick
43. credits, boys running (S.M.)

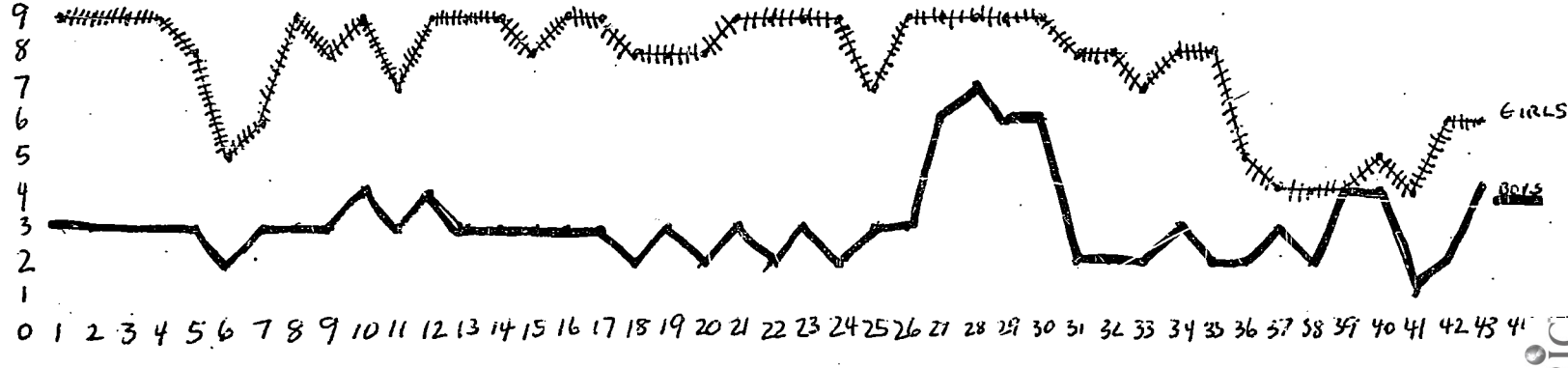
What Am I? Polsky Feb. 5, 1969

Boys interest level: .48

Girls interest level: .88

Boys: [redacted]

Girls: ////////



CHAPTER II:

FORMATIVE RESEARCH DURING

THE BROADCAST PERIOD: THE PROGRESS TESTING

BY: BARBARA FRENGEL REEVES

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APPENDIX

CHAPTER II: FORMATIVE RESEARCH DURING THE PREBROADCAST SEASON

Research during the broadcast period can be distinguished from that of prebroadcast time both by the type of problems investigated and by the approach taken to fulfill the formative functions.

As evidenced in the preceeding chapter, prebroadcast research was largely directed toward specific film segments, instructional goals or programming variables. The multitude of questions raised during this time had been approached with a volley of more or less independent studies.

With the premier of "Sesame Street" the emphasis shifted to the program as a whole. Instead of asking, "How effective is the J Commercial relative to the D Commercial?"we were asking "How effective is Sesame Street relative to No Sesame Street?"

Our approach to this problem took the form of a single, in-depth investigation which would be supplemented by additional smaller studies. This study was based on a repeated measures design which utilized the full battery of achievement tests designed expressly for "Sesame Street" by Educational Testing Service. It was designed to provide periodic information about the show's progress in its various goal areas through successive testing of day-care children.

Concentrating the Formative Effort Into a Single Study

The objective of every research effort is the making of judgments. The unique judgments required of any one effort are instrumental in determining the methods the researcher will adopt. Early in the project we realized that it was impossible, simultaneously, to maximize both the rigor of our research and the range of production relevant problems to which it was addressed. Clearly we had to

strike a balance. During the prebroadcast season, the emphasis was on the range of problems confronting us. At that time we chose to expand our efforts to many problems in the hopes of shedding some light on the many production decisions that would shape the program.

Now the program was a reality and it was time to sit back and take a closer look at the decisions that had been made. There was a major difference between the "Sesame Street Experiment" and traditional educational investigations. The producers tended to look at the program goals as a commitment they had made to the viewing public. They wanted to do everything in their power to fulfill this commitment. The research emphasis was now on providing valid feedback on progress in the major goal areas. The feedback would be the basis for making changes in the programs yet to be produced. A short lead time between the taping and airing of shows was built in so that field studies undertaken throughout most of the broadcast season could still affect the yet untaped programs.

Representatives from the project's funding agencies had also expressed a need for interim data on achievement. In order for new "Sesame Street" experiments to continue beyond the initial 130 hours of programming, the program would have to be refunded. The funding decisions would be made before the report from the summative evaluation was available. The formative research would serve as a major source of information for those who participated in these decisions.

In addition to our own staff and our funders, the general public wanted to know how "Sesame Street" was faring. As a result of the widespread publicity the program had been given we were swamped with requests for information on its progress.

To meet these obligations the formative staff had undertaken a major investigation that would tie up most of the formative resources for the duration of the broadcast period.

THE EXPERIMENTAL DESIGN

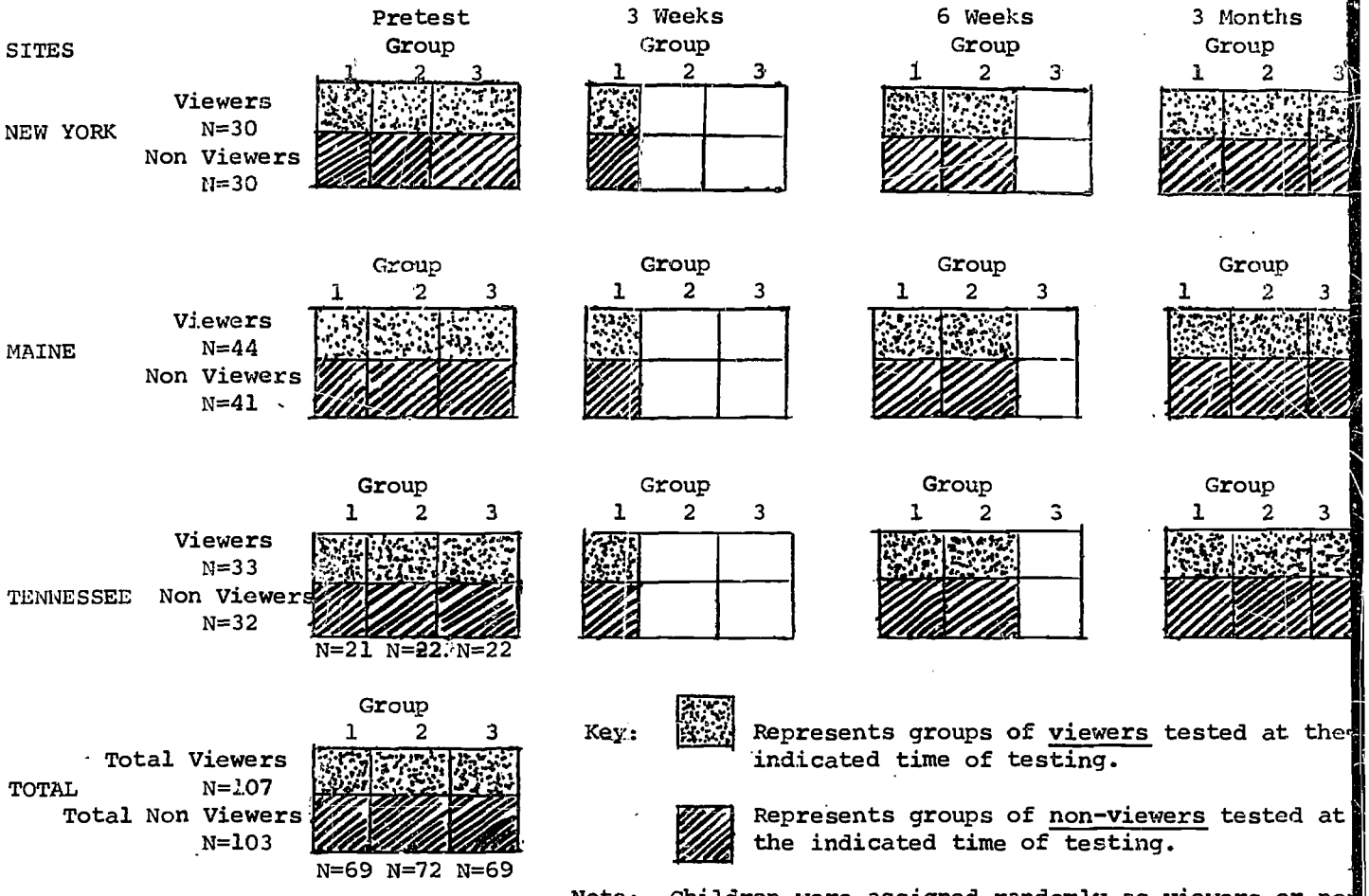
A program of progress testing was instituted during the 1969-1970 broadcast season which involved periodic testing of about 100 viewers and 100 nonviewers of "Sesame Street". The design for this study is presented figuratively on Page 4.

The primary purpose of this effort was to provide rapid feedback on achievement in the major goal areas that would influence production decisions during the course of the programming. Several factors influenced the design adopted to accomplish this. It may be helpful to review them here.

The Decision to Use Repeated Measures

Information on the course of learning is invaluable in the development of any training program. Levels of skills were defined in amny of the "Sesame Street" goal areas. The producers needed to know what programming techniques were most effective in bringing the viewer to a given level of performance, and how rapidly he was advancing toward this level. Growth data, in the form of gain scores over a specified time period, could provide this information. In addition, a "spurt" in learning could be directly related to the programming that had occurred since the last performance measures had been taken. In this way, successful programming approaches could be pinpointed and emulated. Similarly, if little improvement was obtained within a specified time period, the programming elements directed toward the goal in question could be modified or supplemented.

TIME OF TESTING FROM START OF BROADCAST



Note: Children were assigned randomly as viewers or non viewers within each site. As a result each classroom includes some viewers and some non viewers.

FIGURE 1. PROGRESS TESTING: THE EXPERIMENTAL DESIGN

The Advantages of Working in Day Care Centers

Many lessons had been learned previously from the testing of the five pilot programs in Philadelphia (see Formative Research During the Prebroadcast Period, Pages 27-35). The problems involved in monitoring the experimental conditions in the home setting were monumental. We could avoid many of these problems and thereby insure reasonably rigorous conditions of viewing and nonviewing by carrying out the investigation in day care centers rather than private homes. Teachers could monitor viewing groups and keep daily records of absenteeism.

By selecting our samples from day care centers we would also gain efficiency. When testing in individual homes a good deal of time was lost in travelling and setting up equipment. Testing corners could be set up in day care centers and the children brought in individually, in rapid succession, for assessment.

Finally, by choosing centers over homes we were able to make viewing and testing conditions as comparable as possible for each child. Televisions could be checked and repaired if they were not functioning appropriately. Teachers realize the importance of not interrupting a child and examiner while a test is being administered while many mothers insisted on coaching their child during testing. Finally, most distractions such as radios, TVs, and other siblings could be eliminated during testing.

Procedures

The Sample. More than 200 day care children from centers in

Maine, New York and Tennessee served as subjects in this study.

Establishing the Test Sites. Three criteria were used in the selection of testing areas: (1) The program would be aired over a VHF rather than a UHF channel. (2) The program would be aired either at 9 A.M. or 10 A.M. (3) The program would not be repeated later in the day at a time when the children might view it in their homes.

The Philadelphia testing had alerted us to problems that arise when a program is aired over a channel that has a relatively weak signal. The sampling was therefore limited to areas where the program would be received over VHF channels which generally possess stronger broadcasting signals. In addition, whereas UHF channels are often difficult to tune in, VHF stations are easily found on the television dial.

We were also concerned about the time of viewing. Teachers and parents had argued that the children were more alert in the morning. We wished to generalize to morning viewing conditions, since mid-morning airing was the most common airing time among the two hundred or more stations carrying the show. To eliminate time of viewing as a source of variance, the sampling was further restricted to areas where the program would be aired at 9 or 10 in the morning.

Treatment Conditions

Within each test site a child was randomly assigned to a viewer (E) or nonviewer (C) condition for the entire broadcast season. Viewers watched "Sesame Street" each day in groups of 8-12 children, while nonviewers continued in their normal classroom activities.

The random assignment of pupils to experimental and control conditions resulted in about half the children in each classroom viewing the program. This helped avoid the possible confounding of effects due to teacher differences.

As a partial control for the problems created by absenteeism, a decision was made to drop any child from the study who was absent on one-third or more of the class days since the last testing period.

The viewing and nonviewing groups were further randomly subdivided into three subgroups (E_1, E_2, E_3; C_1, C_2, C_3). These subgroups denoted when the children would be tested (See Table 1).

TABLE 1. Testing Patterns for Viewing(E) and Nonviewing(C) Groups*

	Test Administrations				
Group	Pretest	3-Weeks	6-Weeks	3-Months	Total Testings
E_1	X	X	X	X	4
C_1	X	X	X	X	4
E_2	X		X	X	3
C_2	X		X	X	3
E_3	X			X	2
C_3	X			X	2

* This table presented through the courtesy of Jack Miller and Rom Skvarcius, George Peabody College, Nashville, Tennessee

As illustrated in this table, all children were pretested in the week preceeding the premiere of the program. A randomly selected third of the viewers (E_1) and nonviewers (C_1) were retested after three weeks; the same third plus an additional randomly selected third (E_1, E_2; C_1, C_2) were retested after six weeks; and the total sample was retested after three months. Comparisons of E_1C_1, E_2 C_2, and E_3C_3 subgroups would allow us to estimate the effects of testing and control this source of variance in performance.

The Measures

The Peabody Picture Vocabulary Test (PPVT) was administered to each child at pretest. This measure provided a verbal IQ that was used to check the comparability of experimental and control samples prior to the onset of treatment.

Also at pretest, the ETS battery, expressly designed to measure achievement in the major goal areas, was available from the summative research group. This battery would ultimately serve as the yardstick for determining the success of the program in the nation-wide summative evaluation. By using the same battery to gather formative information, it was possible to attempt to evolve the measured effectiveness even as the program was still under production. The following measures were included in the ETS battery and were administered, individually, to each child at pretest:

Numbers	Classification
Letters	Sorting
Body Parts	Relations
Forms	Puzzles

A description of these measures and the subtests that comprise them are presented in the Appendix (See: A: Results of Six Week Testing and Their Implications for Production).

These same measures were employed for the sub-samples retested after three weeks and six weeks. An additional measure, the Character Familiarity Index, was included in the Six Week and Twelve Week Testing. This was a pictorial test designed to assess the child's familiarity with the "Sesame Street" characters. It was included as a check on the experimental viewing conditions. For example, "non-viewers" should not be familiar with the "Sesame Street" characters. After Twelve Weeks, all measures were administered with the addition of two new tests which ETS wished to pilot on our samples. These were the Hidden Triangle Test, designed to measure the child's ability to locate embedded figures; and the What Came First Test which was designed to measure logical sequencing.

Processing the Data

For the data from the progress testing to be of maximum use to production, it was essential that they be summarized in an interpretable form as soon after each testing period as possible. Dr. Jack Miller and Rom Skvarcius at George Peabody College assumed the responsibility for the data processing. Dr. Miller was directing the Nashville test site and valuable time was saved by recording data from that sample onto IBM cards while awaiting the arrival of scored tests from Maine and New York.

Progress was monitored at four levels of specificity. Item-level data provided detailed information on individual operationally defined goals. This information was directly related to programming elements aimed at each specific objective. Subtest scores provided information in general skill areas such as labeling, matching and reciting letters. These data were used to evaluate the approaches taken to develop the skills involved. For example, if substantial gains were made in the subtest, Labeling Letters, but very small gains were made in labeling "D" the interpretaion would be that the general approach was working successfully but the specific material selected for "D" was not satisfactory. Similarly, total test scores reflected achievement in the major goal categories and the composite score for the battery reflected the success of the program as a whole. (See Table 2.)

TABLE 2. Relating production decisions to performance measured at four levels of specificity.

Level	Data Base	Related Production Material
I	Item 25: Letters Test	D Commercial
II	Naming Capitals: Letters Test	All Letter Commercials
III	Total Score: Letters Test	All approaches to teaching of Pre-reading Skills
IV	Composite Scores :	"Sesame Street"

The frequency of correct responding, percentage passing and percentage gain from pretest to the given test point were computed for each test item together with the mean number of correct responses and the mean gain for subtest and total test scores. These computations were carried out for each of the following subsamples: site, sex, experimental treatment and group (Denoting number of times tested. See Table 1, Page 7.)

RESULTS

The "Sesame Street" experiment provided for the production of 130 hourlong programs. These programs were aired over a six month period, with one new program being broadcast each weekday. Educational Testing Service was responsible for the summative evaluation of this experiment.

The Progress Testing, presented in this chapter, was designed and conducted for formative research purposes. Although the subjects in this study were retested at the end of the "Sesame Street" experiment, the major emphasis of the research was on the first three months of programming. This report is limited to that three month period. The six month testing was largely conducted to allow comparisons of the formative and summative results.

The purpose of the Progress Testing was to provide rapid feedback to production. Data obtained at each testing point were put to use as soon as they became available. Results from each testing point were presented discriptively and their implications for production were discussed at four levels of specificity (See Table 2, Page 10). A set of recommendations to production based on the observed results were prepared at each testing point.

Tests of Significance

As stated earlier, the "Sesame Street" experiment was a six month experiment. No changes were predicted in performance over a 3 week, 6 week or three month period. The Progress Testing was designed to provide feedback that could alter the programs yet to be produced. For this reason, it would not be appropriate to run statistical tests on results obtained within a three month period.

An equally compelling argument against subjecting the data to a statistical analysis is that the data obtained from an earlier part of the broadcast season were used to improve the programs that were aired later.

The results obtained at each testing point were reported in terms of means and standard deviations for each test and subtest of the ETS battery and the percentage of subjects passing each item of each test. These are presented in Table 3 of this report (See Pages 12 - 71.) It would be impossible to include the detailed discussions of these results here, but the major findings at each testing point are reviewed below.

TABLE 3: RESULTS OF THE PROGRESS TESTING

TABLE 3a. Sample sizes at each testing point in the Progress Testing.

Group	Pretest		3 Week		6 Week		3 Month	
	E	C	E	C	E	C	E	C
1	36	32	33	31	33	32	32	30
2	39	34			31	34	32	34
3	35	35					33	31

TABLE 3b1. Means and standard deviations for experimental subjects on the Body Parts Test.

Subtest	Group	Pretest		3 Week		6 Week		3 Month	
		$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Pointing (5)	1	8.861	0.225	9.393	0.156	9.181	0.176	9.500	0.141
	2	9.102	0.197			9.516	0.138	9.656	0.106
	3	8.885	0.219					9.393	0.137
Labeling (15)	1	15.527	0.548	15.636	0.466	16.848	0.328	17.500	0.314
	2	16.205	0.427			16.709	0.388	17.187	0.322
	3	15.971	0.432					17.121	0.451
Function (pictures) (8)	1	7.000	0.245	7.333	0.172	7.393	0.179	7.437	0.126
	2	6.692	0.252			7.322	0.175	7.906	0.052
	3	6.885	0.289					7.424	0.199
Function (no (pictures) (4)	1	3.222	0.195	3.303	0.193	3.575	0.157	3.750	0.134
	2	3.384	0.154			3.612	0.194	3.718	0.102
	3	3.228	0.221					3.484	0.151
Total Test (32)	1	34.611	0.985	35.666	0.628	37.000	0.599	38.187	0.438
	2	35.384	0.847			37.161	0.723	38.468	0.453
	3	34.971	1.025					37.424	0.813

TABLE 3b2. Means and standard deviations for control group on the Body Parts Test.

Subtest	Group	Pretest		3 Week		6 Week		3 Month	
		$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Pointing (5)	1	9.093	0.175	8.903	0.305	9.343	0.244	9.433	0.170
	2	9.088	0.220			9.205	0.172	9.411	0.202
	3	8.771	0.232					9.322	0.169
Labeling (15)	1	16.093	0.414	15.870	0.598	16.687	0.492	17.233	0.456
	2	15.676	0.580			16.176	0.509	16.941	0.460
	3	15.142	0.451					17.161	0.388
Function (pictures) (8)	1	6.500	0.381	6.516	0.330	7.125	0.264	7.466	0.201
	2	6.705	0.346			7.000	0.350	7.470	0.194
	3	6.514	0.269					7.133	0.247
Function (no pictures) (4)	1	3.156	0.238	3.161	0.250	3.468	0.183	3.666	0.146
	2	3.352	0.178			3.382	0.223	3.617	0.184
	3	3.085	0.214					3.548	0.201
Total Test (32)	1	34.843	1.022	34.451	1.258	36.625	1.010	37.800	0.850
	2	34.823	1.171			35.764	1.082	37.441	0.866
	3	33.514	0.962					37.225	0.763

TABLE 3b3. Percentage of experimental and control subjects passing each item of the Body Parts Test.

Test: Body Parts Subtest: Pointing Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
1. Leg	Pre	100	100	97	97	94	100	97	99
	3 Wk.	100	100					100	100
	6 Wk.	100	100	100	97			100	98
	3 Mo.	100	97	100	100	100	100	100	99
2. Knee	Pre	83	84	95	88	91	86	90	86
	3 Wk.	91	84					91	84
	6 Wk.	97	94	94	91			95	92
	3 Mo.	97	97	97	91	97	94	97	94
3. Arm	Pre	97	100	100	97	97	100	98	99
	3 Wk.	100	100					100	100
	6 Wk.	100	97	100	100			100	98
	3 Mo.	100	100	100	100	100	100	100	100
4. Neck	Pre	100	100	97	97	100	97	99	98
	3 Wk.	97	97					97	97
	6 Wk.	100	97	100	97			100	97
	3 Mo.	97	97	100	97	97	97	98	97
5. Elbow	Pre	75	81	82	85	80	77	79	81
	3 Wk.	97	81					97	81
	6 Wk.	88	94	94	82			91	88
	3 Mo.	94	90	100	97	91	84	95	90

TABLE 3b3, con't.

Test: Body Parts Subtest: Pointing Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
6.	Pre	94	91	85	85	91	89	90	88
Thumb	3 Wk.	97	84					97	84
	6 Wk.	91	94	100	85			95	89
	3 Mo.	97	94	100	85	97	97	98	92
7.	Pre	92	100	90	94	94	91	92	95
Lip	3 Wk.	97	87					97	87
	6 Wk.	97	97	97	100			97	98
	3 Mo.	97	100	91	94	100	100	96	98
8.	Pre	100	100	100	100	100	100	100	100
Head	3 Wk.	100	97					100	97
	6 Wk.	97	97	100	100			98	98
	3 Mo.	100	100	100	100	100	100	100	100
9.	Pre	94	100	97	97	97	97	96	98
Stomach	3 Wk.	100	97					100	97
	6 Wk.	100	97	100	97			100	97
	3 Mo.	100	100	100	94	100	100	100	98
10.	Pre	50	53	67	68	43	40	54	53
Heel	3 Wk.	61	65					61	65
	6 Wk.	48	69	66	71			57	70

TABLE 3b3, con't.

Test: Body Parts Subtest: Labeling Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
11.	Pre	97	100	100	100	100	97	99	99
Nose	3 Wk.	97	97					97	97
	6 Wk.	100	100	100	100			100	100
	3 Mo.	100	97	100	100	97	100	99	99
12.	Pre	97	100	100	97	97	97	98	98
Hair	3 Wk.	97	100					97	100
	6 Wk.	100	100	100	97			100	98
	3 Mo.	100	100	100	100	100	100	100	100
13.	Pre	92	100	100	100	100	100	97	100
Teeth	3 Wk.	97	100					97	100
	6 Wk.	100	100	100	100			100	100
	3 Mo.	100	100	100	100	100	100	100	100
14.	Pre	97	97	97	91	94	89	96	92
Hand	3 Wk.	88	94					88	94
	6 Wk.	100	100	97	100			98	100
	3 Mo.	97	90	100	94	94	97	97	94
15.	Pre	97	100	100	97	100	100	99	99
Ear	3 Wk.	97	97					97	97
	6 Wk.	100	100	100	100			100	100
	3 Mo.	100	100	100	100	100	100	100	100

TABLE 3b3, con't.

Test: Body Parts Subtest: Labeling Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
16.	Pre	94	100	95	97	100	100	96	99
Eye	3 Wk.	97	97					97	97
	6 Wk.	100	100	94	100			97	100
	3 Mo.	97	100	100	100	97	100	98	100
17.	Pre	92	100	97	94	97	97	95	97
Tongue	3 Wk.	91	94					91	94
	6 Wk.	97	94	100	94			98	94
	3 Mo.	97	100	97	97	97	100	97	99
18.	Pre	86	91	87	85	91	74	88	83
Neck	3 Wk.	88	90					88	90
	6 Wk.	85	94	97	82			91	88
	3 Mo.	100	97	97	88	94	90	97	92
19.	Pre	89	84	85	85	91	80	88	83
Leg	3 Wk.	85	74					85	74
	6 Wk.	82	87	87	82			85	85
	3 Mo.	94	97	97	91	88	90	93	93
20.	Pre	89	91	85	88	89	91	87	90
Finger	3 Wk.	91	94					91	94
	6 Wk.	97	94	97	91			97	92
	3 Mo.	100	97	97	91	91	94	96	94

TABLE 3b3, con't.

Test: Body Parts Subtest: Labeling Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
21.	Pre	83	97	85	85	77	89	82	90
Arm	3 Wk.	91	84					91	84
	6 Wk.	91	81	87	85			89	83
	3 Mo.	97	94	94	97	91	97	94	96
22.	Pre	72	78	85	76	71	71	76	75
Foot	3 Wk.	76	71					76	71
	6 Wk.	91	78	84	79			88	79
	3 Mo.	91	84	94	79	85	87	90	83
23.	Pre	94	91	87	88	91	86	91	88
Thumb	3 Wk.	94	87					94	87
	6 Wk.	100	94	94	88			97	91
	3 Mo.	97	97	100	88	97	97	98	94
24.	Pre	69	69	79	82	86	69	78	73
Knee	3 Wk.	73	81					73	81
	6 Wk.	88	78	81	76			85	77
	3 Mo.	87	87	91	85	85	90	88	87
25.	Pre	75	84	85	85	83	66	81	78
Elbow	3 Wk.	79	87					79	87
	6 Wk.	91	94	87	82			89	88
	3 Mo.	97	87	97	94	100	94	98	92

TABLE 3b3, con't.

Test: Body Parts Subtest: Labeling Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
26.	Pre	58	66	69	62	60	51	63	59
Shoulder	3 Wk.	52	77					52	77
	6 Wk.	55	78	69	76			62	77
	3 Mo.	72	77	67	74	67	74	68	75
27.	Pre	19	12	28	21	37	17	28	17
Forehead	3 Wk.	21	16					21	16
	6 Wk.	21	22	26				22	24
	3 Mo.	34	23	30	29	48	39	38	30
28.	Pre	17	22	18	6	14	17	16	15
Wrist	3 Wk.	24	32					24	32
	6 Wk.	30	28	31	21			31	24
	3 Mo.	34	48	30	38	39	32	35	40
29.	Pre	61	59	69	62	40	57	57	59
Cheek	3 Wk.	64	52					64	52
	6 Wk.	88	69	81	68			85	68
	3 Mo.	69	74	67	71	64	61	66	69
30.	Pre	72	69	69	65	77	66	73	66
Chin	3 Wk.	64	65					64	65
	6 Wk.	70	78	69	68			69	73
	3 Mo.	87	77	70	76	79	74	79	76

TABLE 3b3, con't.

Test: Body Parts Subtest: Function Pictures Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
31.	Pre	86	81	79	82	86	80	84	81
To Pet	3 Wk.	85	84					85	84
	6 Wk.	100	94	97	91			98	92
	3 Mo.	94	90	100	97	91	94	95	94
32.	Pre	75	72	67	71	80	74	74	72
To Smile	3 Wk.	82	55					82	55
	6 Wk.	73	72	72	76			72	74
	3 Mo.	72	84	94	85	82	84	83	84
33.	Pre	94	87	90	91	94	91	93	90
To Kick	3 Wk.	91	84					91	84
	6 Wk.	97	87	91	94			94	91
	3 Mo.	100	94	100	94	97	97	99	95
34.	Pre	89	78	87	79	91	91	89	83
To Look	3 Wk.	97	94					97	94
	6 Wk.	97	94	97	88			97	91
	3 Mo.	97	100	97	97	97	90	97	96
35.	Pre	78	62	69	76	77	63	75	67
To Smell	3 Wk.	85	68					85	68
	6 Wk.	85	81	94	85			89	83
	3 Mo.	91	94	100	88	91	77	94	86

TABLE 3b3, con't.

Test: Body Parts Subtest: Function Pictures Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
36.	Pre	92	84	87	88	89	71	89	81
To Hear	3 Wk.	97	87					97	87
	6 Wk.	91	94	91	85			91	89
	3 Mo.	97	94	100	94	91	87	96	92
37.	Pre	97	91	100	91	91	91	96	91
To Walk	3 Wk.	97	97					97	97
	6 Wk.	100	94	94	94			97	94
	3 Mo.	97	97	100	97	97	97	98	97
38.	Pre	89	94	90	91	80	89	86	91
To Chew	3 Wk.	100	84					100	84
	6 Wk.	97	97	100	85			98	91
	3 Mo.	97	97	100	94	97	94	98	95

TABLE 3b3, con't.

Test: Body Parts Subtest: Function No Pictures Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
39.	Pre	89	87	85	91	86	83	86	87
To See With	3 Wk.	88	81					88	81
	6 Wk.	91	94	91	88			91	91
	3 Mo.	97	97	94	91	97	90	96	93
40.	Pre	83	75	92	82	83	89	86	82
To Pick Up Things	3 Wk.	82	74					82	74
	6 Wk.	88	94	94	85			91	89
	3 Mo.	91	90	100	94	88	90	93	92
41.	Pre	75	78	85	82	74	71	78	77
To Lick	3 Wk.	79	84					79	84
	6 Wk.	91	78	91	82			91	80
	3 Mo.	94	90	88	85	76	87	86	87
42.	Pre	75	75	77	79	80	66	77	73
To Listen	3 Wk.	82	77					82	77
	6 Wk.	88	81	87	82			88	82
	3 Mo.	94	90	91	91	88	87	91	90

TABLE 3c1. Means and standard deviations for experimental subjects on the Letters Test.

Subtest	Group	Pretest $\bar{X}$	Pretest SDm	3 Week $\bar{X}$	3 Week SDm	6 Week $\bar{X}$	6 Week SDm	3 Month $\bar{X}$	3 Month SDm
Matching(12)	1	9.722	0.281	11.333	0.241	11.121	0.355	11.656	0.106
	2	10.641	0.202			11.483	0.138	11.562	0.126
	3	10.514	0.257					11.363	0.149
Recognition(8)	1	3.138	0.279	4.454	0.382	4.575	0.226	5.531	0.356
	2	3.948	0.315			4.451	0.355	5.437	0.375
	3	3.423	0.360					5.121	0.366
Naming Capital Letters (16)	1	3.500	0.612	5.757	0.860	6.575	0.951	9.500	1.039
	2	5.179	0.871			6.096	0.918	9.750	0.987
	3	4.971	0.910					9.151	1.096
Naming Lower Case(8)	1	1.000	0.203	1.787	0.330	2.363	0.425	3.343	0.476
	2	1.846	0.337			2.064	0.390	3.531	0.457
	3	1.457	0.338					3.303	0.475
Embed. Letters (8)	1	4.944	0.238	5.606	0.221	5.787	0.256	6.218	0.223
	2	5.589	0.196			5.838	0.241	6.281	0.169
	3	5.428	0.281					6.333	0.207
Initial Sounds (6)	1	1.138	0.120	1.121	0.149	1.575	0.194	1.593	0.184
	2	1.179	0.115			1.322	0.142	1.375	0.183
	3	1.028	0.166					1.787	0.178
Test Total (67)	1	25.056	1.236	30.757	1.744	33.181	1.960	38.781	2.095
	2	29.153	1.805			32.225	1.970	39.250	1.998
	3	27.657	2.001					38.484	2.322

TABLE 3c2. Means and standard deviations for control subjects on the Letters Test.

		Pretest		3 Week		6 Week		3 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Matching(12)	1	11.062	0.215	10.709	0.377	11.468	0.126	11.466	0.141
	2	10.852	0.335			11.235	0.249	11.411	0.112
	3	10.771	0.278					11.645	0.098
Recognition(8)	1	3.812	0.368	3.967	0.389	4.156	0.391	5.300	0.407
	2	3.852	0.368			4.323	0.395	4.735	0.396
	3	2.971	0.334					4.612	0.421
Naming Capital Letters (16)	1	5.125	0.897	5.580	0.941	6.375	0.972	8.533	1.084
	2	5.911	0.912			6.323	1.061	7.676	1.039
	3	3.200	0.830					5.935	0.996
Naming Lower Case(8)	1	1.468	0.301	1.870	0.336	2.093	0.397	3.033	0.494
	2	1.911	0.384			2.176	0.433	2.617	0.501
	3	1.114	0.329					2.612	0.481
Embed. Letters (8)	1	5.562	0.190	5.580	0.261	5.906	0.170	6.433	0.212
	2	5.647	0.249			5.970	0.247	6.205	0.197
	3	5.114	0.258					6.096	0.219
Initial Sound (6)	1	1.218	0.160	1.419	0.144	1.437	0.179	1.266	0.158
	2	1.147	0.164			1.441	0.189	1.794	0.178
	3	1.257	0.149					1.064	0.166
Total Test (67)	1	29.156	1.735	30.000	1.975	32.468	1.969	37.233	2.204
	2	30.352	2.133			32.323	2.214	35.852	2.264
	3	25.085	1.819					33.161	2.094

TABLE 3c3. Percentage of experimental and control subjects passing each item of the Letters Test.

Test: Letters Subtest: Matching Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
1. Cone	Pre	94	100	95	94	97	100	95	98
	3 Wk.	100	97					100	97
	6 Wk.	97	100	100	100			98	100
	3 Mo.	100	100	100	100	100	100	100	100
2. Tall Rectangle	Pre	94	94	90	94	97	94	94	94
	3 Wk.	97	94					97	94
	6 Wk.	97	100	100	97			98	98
	3 Mo.	100	100	100	100	100	100	100	100
3. Circle	Pre	97	100	95	97	91	94	95	97
	3 Wk.	97	100					97	100
	6 Wk.	97	100	100	100			98	100
	3 Mo.	100	100	100	100	100	100	100	100
4. Right	Pre	89	97	82	91	83	83	85	90
	3 Wk.	97	90					97	90
	6 Wk.	94	100	94	97			94	98
	3 Mo.	97	100	97	97	97	97	97	98
5. Upper R	Pre	97	97	100	97	100	97	99	96
	3 Wk.	97	97					97	97
	6 Wk.	100	100	100	97			100	98
	3 Mo.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 3c3, con't.

Test: Letters Subtest: Matching Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
6.	Pre	97	100	97	94	97	97	97	97
Upper D	3 Wk.	97	94					97	94
	6 Wk.	100	100	100	97			100	98
	3 Mo.	100	100	97	100	100	100	99	100
7.	Pre	86	84	90	97	91	91	89	91
Upper W	3 Wk.	100	90					100	90
	6 Wk.	97	91	94	91			95	91
	3 Mo.	100	90	100	94	91	97	97	94
8.	Pre	75	91	97	88	89	91	87	90
Upper N	3 Wk.	94	81					94	81
	6 Wk.	94	97	100	94			97	95
	3 Mo.	97	97	94	100	88	97	93	98
9.	Pre	94	97	95	97	97	94	95	96
3	3 Wk.	97	97					97	97
	6 Wk.	100	100	100	97			100	98
	3 Mo.	100	100	97	100	100	100	99	100
10.	Pre	100	100	97	94	89	94	95	96
2	3 Wk.	100	94					100	94
	6 Wk.	100	97	100	100			100	98
	3 Mo.	100	100	100	100	100	100	100	100

TABLE 3c3, con't.

Test: Letters Subtest: Matching Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
11. Is	Pre	86	81	77	85	86	83	83	83
	3 Wk.	91	87					91	87
	6 Wk.	94	100	97	91			95	95
	3 Mo.	97	90	91	97	94	97	94	95
12. Who	Pre	56	66	49	59	34	57	46	60
	3 Wk.	67	52					67	52
	6 Wk.	67	62	66	62			66	62
	3 Mo.	75	65	82	53	67	77	74	65
Test: Letters Subtest: Domain Item									
13. Letters	Pre	19	28	21	32	29	29	23	30
	3 Wk.	36	29					36	29
	6 Wk.	42	31	37	29			40	30
	3 Mo.	37	45	45	59	52	45	45	50
14. To Read	Pre	47	53	49	50	49	29	48	44
	3 Wk.	27	48					27	48
	6 Wk.	55	47	41	47			48	47
	3 Mo.	41	58	61	68	61	58	54	61

TABLE 3c3, con't.

Test: Letters Subtest: Recognizing Item	Test Time	Group I E	Group I C	Group II E	Group II C	Group III E	Group III C	Total Sample E	Total Sample C
15.	Pre	69	72	67	59	66	49	67	59
A	3 Wk.	76	77					76	77
	6 Wk.	70	59	75	71			72	65
	3 Mo.	87	81	85	74	82	74	85	76
16.	Pre	53	56	56	53	49	31	53	47
P	3 Wk.	48	68					48	68
	6 Wk.	64	50	59	62			62	56
	3 Mo.	78	74	76	71	82	58	79	68
17.	Pre	44	44	41	59	49	43	45	49
J	3 Wk.	76	45					76	45
	6 Wk.	70	62	78	53			74	58
	3 Mo.	87	77	82	65	88	74	86	72
18.	Pre	39	50	46	47	51	37	45	45
M	3 Wk.	55	48					55	48
	6 Wk.	64	56	44	59			54	58
	3 Mo.	72	74	82	65	58	68	70	69
19.	Pre	29	25	46	35	31	34	35	32
a	3 Wk.	48	35					48	35
	6 Wk.	52	34	53	38			52	36
	3 Mo.	59	58	61	65	64	42	61	55

TABLE 3c3, con't.

Test: Letters Subtest: Recognizing ---------- Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
20.	Pre	31	50	49	59	49	54	43	54
t	3 Wk.	45	48					45	48
	6 Wk.	61	62	69	68			65	65
	3 Mo.	75	74	73	56	64	58	70	62
21.	Pre	28	44	41	26	14	23	28	31
d	3 Wk.	42	26					42	26
	6 Wk.	45	34	31	38			38	36
	3 Mo.	34	35	30	32	39	35	35	34
22.	Pre	22	41	49	47	34	26	35	38
f	3 Wk.	55	48					55	46
	6 Wk.	48	56	41	44			45	50
	3 Mo.	59	48	61	47	36	52	52	49

TABLE 3c3, con't.

Test: Letters Subtest: Naming Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
23.	Pre	53	72	49	59	57	37	53	55
A	3 Wk.	55	55					55	55
	6 Wk.	70	62	62	53			66	58
	3 Mo.	75	74	73	71	70	61	72	69
24.	Pre	14	28	33	32	29	17	25	26
F	3 Wk.	30	39					30	39
	6 Wk.	36	41	28	38			32	39
	3 Mo.	50	42	64	56	55	35	56	45
25.	Pre	22	28	28	38	34	17	28	28
P	3 Wk.	36	45					36	45
	6 Wk.	36	41	47	41			42	41
	3 Mo.	50	65	67	44	61	29	59	46
26.	Pre	25	31	33	29	29	14	29	25
D	3 Wk.	33	35					33	35
	6 Wk.	39	31	41	38			40	35
	3 Mo.	56	58	67	50	55	39	59	49
27.	Pre	11	41	38	41	40	17	30	33
S	3 Wk.	36	45					36	45
	6 Wk.	36	41	31	44			34	42
	3 Mo.	59	52	55	56	52	48	55	52

TABLE 3c3, con't.

Test: Letters Subtest: Naming Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
28.	Pre	22	37	28	53	34	17	28	36
C	3 Wk.	36	35					36	35
	6 Wk.	42	41	37	41			40	41
	3 Mo.	50	48	58	50	52	39	53	46
29.	Pre	17	19	23	32	20	17	20	23
W	3 Wk.	55	16					55	16
	6 Wk.	55	25	44	29			49	27
	3 Mo.	72	42	73	47	64	42	69	44
30.	Pre	22	28	28	44	34	20	28	31
H	3 Wk.	27	26					27	26
	6 Wk.	42	37	25	41			34	39
	3 Mo.	50	45	55	44	55	26	53	39

TABLE 3c3, con't.

Test: Letters Subtest: Letters In Words Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
31.	Pre	94	94	100	94	86	91	94	93
DOG	3 Wk.	97	97					97	97
	6 Wk.	94	100	97	91			95	95
	3 Mo.	100	97	100	100	100	100	100	99
32.	Pre	92	97	90	91	83	80	88	89
dog	3 Wk.	88	87					88	87
	6 Wk.	94	97	97	94			95	95
	3 Mo.	97	100	100	97	97	94	98	97
33.	Pre	89	97	95	97	94	83	93	92
ACT	3 Wk.	94	97					94	97
	6 Wk.	97	97	97	100			97	98
	3 Mo.	91	100	100	100	100	100	97	100
34.	Pre	86	87	95	94	89	89	90	90
kin	3 Wk.	94	97					94	97
	6 Wk.	100	100	100	97			100	98
	3 Mo.	100	100	100	100	100	100	100	100
35.	Pre	42	56	59	62	60	40	54	52
SIP	3 Wk.	52	68					52	68
	6 Wk.	61	72	53	68			57	70
	3 Mo.	74	74	76	82	64	65	70	74

TABLE 3c3, con't.

Test: Letters Subtest: Letters In Words Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
36.	Pre	36	47	54	59	54	46	48	50
NET	3 Wk.	64	48					64	48
	6 Wk.	67	69	62	59			65	64
	3 Mo.	75	71	70	56	76	52	73	59
37.	Pre	25	50	38	32	40	43	35	42
bugs	3 Wk.	48	35					48	35
	6 Wk.	45	31	47	44			46	38
	3 Mo.	41	52	55	56	52	48	49	52
38.	Pre	31	28	28	35	37	40	32	35
cone	3 Wk.	24	29					24	29
	6 Wk.	36	25	31	44			34	35
	3 Mo.	47	48	33	29	45	52	42	43

TABLE 3c3, con't.

Test: Letters Subtest: Naming Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
39.	Pre	14	16	26	18	14	9	18	14
b	3 Wk.	21	19					21	19
	6 Wk.	30	25	28	12			29	18
	3 Mo.	25	19	27	21	30	16	28	19
40.	Pre	6	12	15	18	9	9	10	13
r	3 Wk.	18	6					18	6
	6 Wk.	12	9	22	15			17	17
	3 Mo.	31	29	39	26	30	26	34	27
41.	Pre	33	41	36	41	31	26	34	36
i	3 Wk.	45	58					45	58
	6 Wk.	48	50	34	47			42	48
	3 Mo.	75	55	73	50	61	58	69	54
42.	Pre	8	22	21	15	26	14	18	17
y	3 Wk.	15	19					15	19
	6 Wk.	21	25	22	26			22	26
	3 Mo.	41	32	45	26	45	23	44	27
43.	Pre	14	22	21	86	23	17	19	22
m	3 Wk.	24	32					24	32
	6 Wk.	39	25	31	32			35	29
	3 Mo.	56	48	48	38	52	45	52	44

TABLE 3c3, con't.

Test: Letters Subtest: Naming Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
44.	Pre	8	19	31	35	23	9	21	21
e	3 Wk.	24	23					24	23
	6 Wk.	33	34	25	35			29	35
	3 Mo.	47	48	52	44	48	35	49	43
45.	Pre	17	16	31	32	20	17	23	22
t	3 Wk.	30	26					30	26
	6 Wk.	39	22	37	35			38	29
	3 Mo.	44	48	58	35	55	42	52	42
46.	Pre	0	0	5	6	0	11	2	6
g	3 Wk.	0	3					0	3
	6 Wk.	9	9	9	15			9	12
	3 Mo.	16	13	21	21	9	16	15	17

TABLE 3c3, con't.

Test: Letters Subtest: Initial Sound Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
47.	Pre	17	19	33	24	29	26	26	23
(t) table	3 Wk.	24	19					24	19
	6 Wk.	39	37	31	41			35	39
	3 Mo.	44	23	30	32	42	23	39	26
48.	Pre	19	28	13	26	20	43	17	33
(c) car	3 Wk.	15	32					15	32
	6 Wk.	36	28	19	24			28	26
	3 Mo.	22	34	21	32	27	23	23	29
49.	Pre	44	41	49	38	23	40	39	40
(a) apple	3 Wk.	39	52					39	52
	6 Wk.	55	47	47	44			51	45
	3 Mo.	53	55	48	71	64	35	55	54
50.	Pre	33	34	23	26	31	17	29	26
(p) pencil	3 Wk.	33	39					33	39
	6 Wk.	27	31	34	35			31	33
	3 Mo.	41	20	36	44	45	26	41	30

TABLE 3c3, con't.

Test: Letters Subtest: Naming Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
51.	Pre	42	34	54	44	43	40	46	40
O	3 Wk.	48	52					48	52
	6 Wk.	61	59	78	53			69	56
	3 Mo.	81	74	85	62	76	61	81	66
52.	Pre	25	22	28	24	34	26	29	24
R	3 Wk.	36	35					36	35
	6 Wk.	30	44	34	38			37	41
	3 Mo.	53	48	55	38	52	35	53	41
53.	Pre	39	37	44	53	40	26	41	39
B	3 Wk.	55	45					55	45
	6 Wk.	52	50	50	56			51	53
	3 Mo.	69	58	73	53	64	42	68	51
54.	Pre	14	28	28	47	26	17	23	31
E	3 Wk.	42	35					42	35
	6 Wk.	39	41	44	50			42	45
	3 Mo.	75	55	67	53	55	32	65	47
55.	Pre	17	31	23	29	20	14	20	25
I	3 Wk.	21	29					21	29
	6 Wk.	21	31	31	29			26	30
	3 Mo.	62	52	48	41	45	23	52	39

TABLE 3c3, con't.

Test: Letters Subtest: Naming Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
56.	Pre	11	28	31	26	17	14	20	23
G	3 Wk.	24	23					24	23
	6 Wk.	30	28	25	29			28	29
	3 Mo.	50	42	45	38	55	26	50	35
57.	Pre	8	25	28	18	20	14	19	19
Y	3 Wk.	18	23					18	23
	6 Wk.	27	34	28	26			28	30
	3 Mo.	47	35	52	29	58	26	52	30
58.	Pre	8	22	21	21	20	11	16	18
U	3 Wk.	21	19					21	19
	6 Wk.	27	31	16	24			22	27
	3 Mo.	50	45	58	35	52	29	53	36
Test: Letters Subtest: Words Item									
59.	Pre	0	3	8	6	6	6	5	5
Dog	3 Wk.	6	6					6	6
	6 Wk.	12	9	3	6			8	8
	3 Mo.	9	10	12	6	12	10	11	8

TABLE 3c3, con't.

Test: Letters Subtest: Words Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
60.	Pre	0	6	0	3	0	0	0	3
Dog	3 Wk.	6	6					0	3
	6 Wk.	3	3	6	0			5	2
	3 Mo.	0	3	3	0	6	3	3	2
61.	Pre	0	0	0	3	0	3	0	2
egg	3 Wk.	0	0					0	0
	6 Wk.	0	3	6	0			3	2
	3 Mo.	6	0	12	6	9	3	9	3
62.	Pre	0	0	0	3	0	0	0	1
Street	3 Wk.	0	0					0	0
	6 Wk.	0	3	0	3			0	3
	3 Mo.	0	0	0	3	0	0	0	1
63.	Pre	0	0	0	3	0	0	0	1
judge	3 Wk.	0	0					0	0
	6 Wk.	0	3	0	0			0	2
	3 Mo.	0	0	0	0	0	0	0	0
64.	Pre	0	0	0	3	0	0	0	1
Mail	3 Wk.	0	0					0	0
	6 Wk.	0	3	0	0			0	2
	3 Mo.	0	0	0	0	3	0	10	0

TABLE 3d1. Means and standard deviations for experimental subjects on the Forms Test.

		Pretest		3 Week		6 Week		3 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Recog-	1	2.138	.191	2.393	.194	2.515	.209	2.562	.215
nizing	2	2.333	.173			2.419	.206	2.687	.192
(4)	3	2.257	.184					2.696	.206
Label-	1	1.527	.180	2.454	.209	2.878	.183	2.906	.181
ing	2	2.102	.207			2.806	.187	3.031	.182
(4)	3	1.628	.242					2.878	.229
Total	1	3.666	.298	4.848	.320	5.393	.322	5.468	.314
Test	2	4.435	.306			5.225	.284	5.718	.281
(8)	3	3.885	.377					5.575	.386

TABLE 3d2. Means and standard deviations for control subjects on the Forms Test.

		Pretest		3 Week		6 Week		3 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Recog-	1	2.093	.197	2.290	.232	2.343	.198	2.166	.192
nizing	2	2.205	.167			2.558	.175	2.470	.203
(4)	3	1.600	.179					2.387	.230
Label-	1	2.031	.226	2.129	.239	2.687	.202	2.700	.220
ing	2	2.147	.246			2.235	.246	2.470	.216
(4)	3	1.628	.209					2.548	.216
Total		4.125	.355	4.419	.364	5.031	.302	4.866	.341
Test		4.352	.377			4.794	.365	4.941	.360
(8)		3.228	.338					4.935	.373

TABLE 3d3. Percentage of experimental and control subjects passing item of the Forms Test.

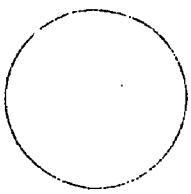
Test: Forms Subtest: Recognizing Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
1. 	Pre	92	94	95	97	97	97	95	96
	3 Wk.	100	94					100	94
	6 Wk.	100	100	100	100			100	100
	3 Mo.	100	100	97	97	97	97	98	98
2. 	Pre	25	28	36	32	31	23	31	28
	3 Wk.	42	42					42	42
	6 Wk.	58	44	53	47			55	45
	3 Mo.	62	32	70	53	64	[illegible]	65	43
3. 	Pre	58	59	56	56	57	23	57	46
	3 Wk.	55	58					55	58
	6 Wk.	64	53	53	62			58	58
	3 Mo.	53	42	55	53	55	58	54	51
4. 	Pre	39	28	46	35	40	17	42	27
	3 Wk.	42	35					42	35
	6 Wk.	45	37	37	47			45	42
	3 Mo.	41	39	45	44	55	42	47	42

TABLE 3d3, con't.

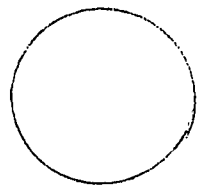
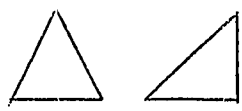
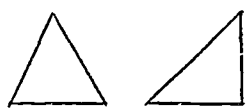
Test: Forms Subtest: Labeling Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
5. 	Pre	47	53	62	65	46	37	52	51
	3 Wk.	79	61					79	61
	6 Wk.	85	75	87	68			86	71
	3 Mo.	91	77	85	79	79	68	85	75
6. 	Pre	3	16	18	21	14	9	12	15
	3 Wk.	36	23					36	23
	6 Wk.	39	37	41	29			40	33
	3 Mo.	47	35	55	29	55	39	52	34
7. 	Pre	64	75	72	65	57	66	65	68
	3 Wk.	73	68					73	68
	6 Wk.	91	78	69	68			80	73
	3 Mo.	69	77	85	71	76	74	77	74
8. 	Pre	49	59	59	65	46	51	48	58
	3 Wk.	58	61					58	61
	6 Wk.	73	78	84	59			78	68
	3 Mo.	84	77	82	68	79	74	82	73

TABLE 3e1. Means and standard deviations for experimental subjects on Numbers Test.

Subtest	Group	Pretest $\bar{X}$	Pretest SDm	3 week $\bar{X}$	3 week SDm	6 week $\bar{X}$	6 week SDm	3 Month $\bar{X}$	3 Month SDm
Domain of Numbers (2)	1	0.972	.250	1.303	.153	1.363	.136	1.343	.131
	2	1.256	.197			1.290	.140	1.562	.118
	3	1.171	.126					1.484	.116
Recognizing Numbers (6)	1	2.972	.622	3.787	.260	4.000	.288	4.281	.324
	2	3.067	.427			4.354	.264	4.562	.287
	3	3.200	.311					4.393	.268
Naming Numerals (15)	1	4.305	.267	3.909	.762	6.939	.785	7.781	.853
	2	4.973	.369			7.064	.728	8.343	.808
	3	5.085	.870					8.212	.970
Relative Cardinality (8)	1	5.055	.225	5.454	.298	5.939	.281	5.812	.299
	2	5.435	.252			5.935	.240	6.093	.192
	3	5.371	.272					5.848	.238
Total Test (57)	1	25.472	.079	29.666	1.887	32.787	1.655	34.343	1.698
	2	28.282	1.782			33.677	1.783	36.000	1.582
	3	28.085	1.953					35.151	1.924

TABLE 3e2. Means and standard deviations for experimental subjects on Numbers Test.

		Pretest		3 Week		6 Week		3 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Domain of Numbers (2)	1	1.312	.122	1.322	.142	1.468	.134	1.566	.114
	2	1.147	.127			1.441	.127	1.558	.120
	3	1.057	.147					1.387	.119
Recognizing Numbers (6)	1	4.000	.269	3.870	.320	4.031	.343	4.200	.358
	2	4.029	.255			4.264	.305	4.294	.268
	3	3.057	.319					3.935	.321
Naming Numerals (15)	1	5.625	.810	6.322	.832	6.781	.827	7.800	.884
	2	6.470	.804			6.784	.817	7.794	.857
	3	4.085	.801					7.258	.948
Relative Cardinality (8)	1	5.531	.241	5.677	.247	5.968	.282	6.000	.234
	2	5.705	.294			5.911	.268	6.000	.242
	3	5.200	.297					5.387	.306
Total Test (57)	1	31.562	1.737	31.612	1.976	33.500	1.947	35.730	1.916
	2	31.588	1.773			33.529	1.981	35.294	1.870
	3	26.400	2.058					32.774	2.085

TABLE 3e3. Percentage of experimental and control subjects passing each item on the Numbers Test.

Test: Numbers Subtest: Domain	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
1. Name	Pre	36	47	49	41	51	43	45	44
	3 Wk.	64	58					64	58
	6 Wk	61	62	53	65			57	64
	3 Mo.	53	71	76	74	67	55	65	67
2. Count	Pre	61	84	77	74	66	63	68	73
	3 Wk.	67	74					67	74
	6 Wk.	79	84	75	79			77	82
	3 Mo.	81	87	82	82	82	84	82	84
Subtest: Recognition									
3. 1	Pre	72	75	67	79	69	69	69	74
	3 Wk.	82	84					82	84
	6 Wk.	88	81	94	88			91	85
	3 Mo.	91	87	94	91	88	81	91	86
4. 4	Pre	61	69	54	71	60	54	58	64
	3 Wk.	79	74					79	74
	6 Wk.	76	75	81	85			78	80
	3 Mo.	78	81	88	82	82	74	83	79
5. 2	Pre	50	72	54	76	57	51	54	66
	3 Wk.	76	74					76	74
	6 Wk.	79	81	84	76			82	79
	3 Mo.	81	71	88	79	79	71	83	74

TABLE 3e3, con't.

Test: Numbers Subtest: Recognition	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
6.	Pre	44	87	59	74	51	49	52	69
	3 Wk.	64	71					64	71
10	6 Wk.	70	69	72	74			71	71
	3 Mo.	72	71	88	79	79	77	80	76
7.	Pre	53	53	33	65	54	54	46	57
	3 Wk.	55	48					55	48
6	6 Wk.	64	56	62	56			63	56
	3 Mo.	66	65	61	62	76	55	67	60
8.	Pre	17	44	41	38	29	29	29	37
	3 Wk.	24	35					24	35
20	6 Wk.	33	41	44	47			38	44
	3 Mo.	41	42	42	35	36	35	40	37
Subtest: Naming	Pre	53	59	51	62	49	46	51	55
9.	3 Wk.	64	68					64	68
4	6 Wk.	76	72	78	68			77	70
	3 Mo.	75	84	82	79	76	71	78	79
10.	Pre	28	31	28	41	29	20	28	31
	3 Wk.	42	42					42	42
7	6 Wk.	48	47	41	47			46	47
	3 Mo.	56	58	64	56	55	52	58	55

TABLE 3e3, con't.

Test: Numbers Subtest:Naming	Test Time	Group I E	Group I C	Group II E	Group II C	Group III E	Group III C	Total Sample E	Total Sample C
11.	Pre	69	75	62	76	66	63	65	71
	3 Wk.	73	77					73	77
1	6 Wk.	79	75	87	82			83	79
	3 Mo.	87	84	82	76	76	68	82	76
12.	Pre	31	31	36	35	29	29	32	32
	3 Wk.	39	35					39	35
8	6 Wk.	55	37	47	47			42	42
	3 Mo.	59	52	67	53	64	52	63	52
13.	Pre	53	59	44	65	60	49	52	57
	3 Wk.	61	68					61	68
3	6 Wk.	70	75	72	68			71	71
	3 Mo.	72	74	87	79	70	74	76	76
14.	Pre	47	56	44	65	51	40	47	53
	3 Wk.	64	71					64	71
5	6 Wk.	64	59	75	74			69	67
	3 Mo.	66	71	82	76	73	68	73	72
15.	Pre	42	75	46	71	40	37	43	60
	3 Wk.	55	68					55	68
2	6 Wk.	67	78	62	68			65	73
	3 Mo.	75	74	82	71	76	68	78	71

TABLE 3e3, con't.

Test: Numbers Subtest:Naming	Test Time	Group I E	Group I C	Group II E	Group II C	Group III E	Group III C	Total Sample E	Total Sample C
16.	Pre	14	31	36	44	31	17	27	31
	3 Wk.	36	39					36	39
10	6 Wk.	55	47	53	44			54	45
	3 Mo.	59	55	61	47	61	52	60	51
17.	Pre	25	34	31	47	26	23	27	35
	3 Wk.	52	42					52	42
6	6 Wk.	52	47	59	44			55	45
	3 Mo.	56	48	61	56	55	52	57	52
18.	Pre	25	22	31	41	31	26	29	30
	3 Wk.	39	35					39	35
0	6 Wk.	33	44	62	47			48	45
	3 Mo.	50	42	58	50	48	55	52	49
19.	Pre	17	25	23	32	31	14	24	24
	3 Wk.	18	35					18	35
9	6 Wk.	45	31	28	32			37	32
	3 Mo.	41	35	39	29	45	29	42	31
20.	Pre	11	25	18	29	31	14	20	23
	3 Wk.	27	26					27	26
11	6 Wk.	27	28	19	24			23	26
	3 Mo.	37	39	30	32	33	26	34	32

TABLE 3e3, con't.

Test: Numbers Subtest: Naming	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
21.	Pre	6	12	10	12	14	9	10	11
	3 Wk.	9	12					9	12
17	6 Wk.	15	16	6	9			11	12
	3 Mo.	16	10	15	18	30	19	20	16
22.	Pre	3	9	18	18	11	11	11	13
	3 Wk.	6	6					6	6
20	6 Wk.	15	12	12	18			14	15
	3 Mo.	19	26	24	26	36	23	27	25
23.	Pre	8	16	15	9	9	11	11	12
	3 Wk.	6	10					6	10
12	6 Wk.	6	9	9	9			8	9
	3 Mo.	9	13	18	29	24	19	17	21
Subtest:Ladybugs	Pre	94	97	90	91	94	86	93	91
24.	3 Wk.	94	100					94	100
	6 Wk.	97	100	100	100			98	100
1	3 Mo.	100	100	97	97	100	97	99	98
25.	Pre	94	97	97	97	94	89	95	94
	3 Wk.	91	100					91	100
More	6 Wk.	97	100	97	97			97	98
	3 Mo.	97	97	91	97	94	100	94	98

TABLE 3e3, cont.

Test:Numbers Subtest: Ladybugs	Test Time	Group I E	Group I C	Group II E	Group II C	Group III E	Group III C	Total Sample E	Total Sample C
26.	Pre	89	94	95	94	94	89	93	92
	3 Wk.	91	90					91	90
2	6 Wk.	100	97	100	100			100	98
	3 Mo.	97	100	100	97	100	94	99	97
27.	Pre	19	16	10	12	20	9	16	12
	3 Wk.	12	16					12	16
Fewer	6 Wk.	12	12	9	12			11	12
	3 Mo.	16	6	6	6	12	6	12	7
28.	Pre	75	81	74	76	80	69	76	75
	3 Wk.	76	77					76	77
5	6 Wk.	79	81	94	79			86	80
	3 Mo.	78	84	97	88	94	71	90	81
29.	Pre	6	12	21	26	14	9	14	16
	3 Wk.	21	13					21	13
Fewest	6 Wk.	12	16	16	12			14	14
	3 Mo.	22	13	9	18	15	6	15	12
30.	Pre	39	47	44	41	40	46	41	45
	3 Wk.	45	48					45	48
Most	6 Wk.	64	62	59	53			62	58
	3 Mo.	44	42	61	50	64	48	56	47

TABLE 3e3, con't.

Test: Numbers Subtest: Ladybugs	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
31.	Pre	42	53	41	53	43	49	42	51
	3 Wk.	42	48					42	48
Same	6 Wk.	64	72	66	65			65	68
	3 Mo.	59	68	82	71	58	48	66	62
Subtest: Checkers									
33.	Pre	33	41	44	44	31	37	36	41
	3 Wk.	39	39					39	39
How many?	6 Wk.	39	50	53	53			46	52
	3 Mo.	47	55	58	56	39	55	48	55
34.	Pre	56	78	74	65	51	63	61	68
	3 Wk.	58	68					58	68
Take four.	6 Wk.	88	81	66	71			77	76
	3 Mo.	72	84	82	76	76	71	77	77
35.	Pre	83	91	90	90	86	94	86	93
	3 Wk.	85	87					85	87
Take two.	6 Wk.	94	91	94	91			94	91
	3 Mo.	94	100	91	91	94	94	93	95
36.	Pre	36	59	49	44	37	51	41	51
	3 Wk.	48	55					48	55
Give me six.	6 Wk.	55	72	62	68			58	70
	3 Mo.	59	68	61	71	52	58	57	66

TABLE 3e3, con't.

Test: Numbers Subtest: Checkers	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
37.	Pre	92	97	97	97	97	94	95	96
	3 Wk.	94	100					94	100
Take them all.	6 Wk.	97	100	97	97			97	98
	3 Mo.	97	100	100	94	100	90	99	95
38.	Pre	83	91	95	91	86	80	88	87
	3 Wk.	94	97					94	97
Give me some.	6 Wk.	88	84	94	91			91	88
	3 Mo.	97	97	94	97	94	94	95	96
39.	Pre	72	75	72	76	74	69	73	73
	3 Wk.	73	81					73	81
Where are there more?	6 Wk.	85	81	87	82			86	82
	3 Mo.	91	90	88	79	79	74	86	81
40.	Pre	58	66	67	76	69	77	65	73
	3 Wk.	73	65					73	65
Where are there more?	6 Wk.	85	69	69	82			77	76
	3 Mo.	59	84	79	85	70	71	69	80
Subtest: Gen. Quest.	Pre	89	94	92	88	86	86	89	89
	3 Wk.	88	90					88	90
41. How many birds?	6 Wk.	97	94	94	88			95	91
	3 Mo.	94	97	94	94	85	90	91	94

TABLE 3e3, con't.

Test: Numbers Subtest: General Questions	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
42.	Pre	39	81	72	65	54	63	55	69
	3 Wk.	61	65					61	65
If one more bird, how many?	6 Wk.	67	72	78	74			72	73
	3 Mo.	69	84	73	85	79	77	73	82
43.	Pre	72	81	77	88	77	80	75	83
	3 Wk.	76	84					76	84
How many cookies?	6 Wk.	91	81	84	82			88	82
	3 Mo.	81	97	88	82	91	90	87	90
44.	Pre	58	75	67	76	60	54	62	68
If we take one cookie away, how many?	3 Wk.	61	77					61	77
	6 Wk.	67	69	81	71	[illegible]	[illegible]	74	70
	3 Mo.	72	81	88	85	83	74	82	80
45.	Pre	69	84	69	71	83	69	74	74
How many hands?	3 Wk.	82	74					82	74
	6 Wk.	91	84	75	88			83	86
	3 Mo.	94	90	85	76	85	87	88	84
46.	Pre	78	100	95	94	91	89	88	94
	3 Wk.	88	97					88	97
How many ears?	6 Wk.	91	94	94	91			92	92
	3 Mo.	91	97	100	94	94	97	95	96

TABLE 3e3, con't.

Test: Numbers Subtest: Gen. Quest.	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
47. How many heads?	Pre	81	87	87	94	89	74	85	85
	3 Wk.	88	94					88	94
	6 Wk.	94	94	94	91			94	92
	3 Mo.	97	97	94	91	94	90	95	93
48. How many fingers?	Pre	22	37	41	47	34	37	33	41
	3 Wk.	36	45					36	45
	6 Wk.	39	44	44	50			42	47
	3 Mo.	66	48	52	38	48	55	55	47
49. How many feet?	Pre	75	94	82	85	83	80	80	86
	3 Wk.	82	84					82	84
	6 Wk.	91	87	97	91			94	89
	3 Mo.	91	97	91	85	94	94	92	92
50. Cut an apple in half, how many pieces?	Pre	53	66	59	79	63	66	58	70
	3 Wk.	64	58					64	58
	6 Wk.	67	75	84	68			75	71
	3 Mo.	72	65	76	88	67	68	71	74
51. 2 + 1	Pre	25	41	15	29	20	23	20	31
	3 Wk.	18	42					18	42
	6 Wk.	33	34	25	38			29	36
	3 Mo.	34	52	21	47	33	19	30	40

TABLE 3e3, con't.

Test: Numbers Subtest: Gen. Quest.	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
52.	Pre	6	9	3	9	0	14	3	11
	3 Wk.	6	16					6	16
5 + 3	6 Wk.	6	9	0	6			3	8
	3 Mo.	3	16	3	12	6	13	4	14
53.	Pre	17	22	13	6	14	6	15	11
	3 Wk.	12	13					12	13
- 1	6 Wk.	9	12	9	15			9	14
	3 Mo.	16	6	15	9	12	6	14	7
54.	Pre	8	19	8	15	20	11	12	15
	3 Wk.	6	19					6	19
2 X 2	6 Wk.	18	25	12	15			15	20
	3 Mo.	9	19	6	15	27	10	14	15

TABLE 3f1. Means and standard deviations for experimental subjects on the Sorting Test.

		Pretest		3 Week		6 Week		3 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Sorting	1	2.527	.219	3.818	.283	4.333	.224	4.937	.190
(6)	2	3.205	.226			4.483	.257	4.937	.210
	3	2.914	.250					4.606	.217
Comp-	1	5.277	.146	5.333	.207	5.727	.117	5.843	.101
letion	2	5.615	.101			5.709	.124	5.906	.052
(6)	3	5.457	.193					5.666	.142
Total	1	7.805	.300	9.151	.419	10.060	.298	10.781	.227
Test	2	8.820	.264			10.193	.309	10.843	.224
(12)	3	8.371	.357					10.272	.311

TABLE 3f2. Means and standard deviations for control subjects on the Sorting Test.

		Pretest		3 Week		6 Week		3 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Sor-	1	3.375	.253	3.870	.195	4.031	.255	4.333	.205
ting	2	3.735	.271			4.029	.244	4.647	.192
(6)	3	3.000	.231					4.064	.231
Comp-	1	5.323	.202	5.645	.143	4.718	.128	5.333	.223
letion	2	5.142	.218			5.441	.159	5.382	.246
(6)	3	5.142	.192					5.741	.103
Total	1	8.687	.371	9.516	.285	9.750	.320	9.866	.324
Test	2	9.058	.370			9.470	.341	10.029	.383
(12)	3	8.142	.335					9.806	.268

TABLE 3f3. Percentage of experimental and control subjects passing each item on the Sorting Test.

Test: Sorting Subtest: Sorting Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
1. Shapes	Pre	67	91	79	85	66	80	71	85
	3 Wk.	88	97						
	6 Wk.	100	84	97	91				
	3 Mo.	100	100	100	91	100	100	100	97
2. Small Spoon	Pre	39	41	41	53	43	49	41	48
	3 Wk.	58	48						
	6 Wk.	58	62	59	65				
	3 Mo.	81	71	73	74	70	71	74	72
3. Two Shoes	Pre	36	47	49	56	43	37	43	47
	3 Wk.	67	58						
	6 Wk.	76	56	84	47				
	3 Mo.	81	55	88	71	76	68	82	65
4. Three Horns	Pre	28	50	56	44	51	43	45	46
	3 Wk.	42	39						
	6 Wk.	55	50	72	62				
	3 Mo.	53	35	61	50	48	42	54	43
5. Hat	Pre	25	50	36	62	34	29	32	47
	3 Wk.	58	61						
	6 Wk.	82	66	69	71				
	3 Mo.	87	84	82	85	73	45	81	72

TABLE 3f3, con't.

Test: Sorting Subtest: Sorting Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
6. Frog	Pre	58	59	59	74	54	63	57	65
	3 Wk.	70	84						
	6 Wk.	79	84	72	79				
	3 Mo.	91	84	94	94	94	81	93	86

Test: Sorting Subtest: Completion Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
7. Wear	Pre	100	97	100	94	97	97	99	96
	3 Wk.	97	100						
	6 Wk.	100	100	100	100				
	3 Mo.	100	97	100	94	100	100	100	97
8. Eat	Pre	100	94	100	94	97	91	99	93
	3 Wk.	94	100						
	6 Wk.	100	100	100	100				
	3 Mo.	100	94	100	88	94	100	98	94
9. Ride	Pre	86	84	97	97	89	83	91	88
	3 Wk.	91	100						
	6 Wk.	100	97	100	100				
	3 Mo.	97	94	100	94	97	100	98	96
10. Round	Pre	69	81	79	71	86	69	78	73
	3 Wk.	76	84						
	6 Wk.	88	84	91	71				

TABLE 3f3, con't.

Test: Sorting Subtest: Completion Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
11.	Pre	86	87	90	94	91	86	89	89
Animal	3 Wk.	91	90						
	6 Wk.	100	94	87	91				
	3 Mo.	100	94	97	91	91	94	96	93
12.	Pre	86	87	95	82	86	89	89	86
2	3 Wk.	85	90						
	6 Wk.	94	97	91	91				
	3 Mo.	91	94	97	91	97	90	95	92

TABLE 3g1. Means and standard deviations for experimental subjects on the Relations Test.

		Pretest		3 Week		6 Week		3 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Total	1	6.861	.338	7.606	.301	8.242	.288	8.187	.343
Test	2	7.589	.302			8.225	.252	8.656	.165
(10)	3	7.914	.288					8.212	.277

TABLE 3g2. Means and standard deviations for experimental subjects on the Relations Test

		Pretest		3 Week		3 Week		6 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
Total	1	8.062	.276	8.225	.277	8.312	.278	8.666	.236
Test	2	7.323	.352			8.411	.301	8.411	.327
(10)	3	7.228	.343					8.322	.305

TABLE 3g3. Percentage of experimental and control subjects passing each item on the Relations test.

Test: Relations Subtest: Labeling Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
1. Biggest	Pre	97	100	100	97	100	94	99	97
	3 Wk.	97	100						
	6 Wk.	100	100	100	97				
	12 Wk.	97	100	100	97	97	100	98	99
2. Smallest	Pre	83	91	85	91	83	89	84	90
	3 Wk.	88	87						
	6 Wk.	91	87	100	91				
	12 Wk.	94	90	100	91	94	97	96	93
3. Over	Pre	58	84	72	65	74	66	68	71
	3 Wk.	76	90						
	6 Wk.	85	97	97	91				
	12 Wk.	87	94	94	88	79	84	87	89
4. Nearest	Pre	58	81	64	65	74	57	65	67
	3 Wk.	58	74						
	6 Wk.	67	69	91	76				
	12 Wk.	78	77	85	62	82	74	82	71

TABLE 3g3, con't.

Test: Relationships Subtest: Matching Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
5. Through	Pre	64	72	74	65	66	63	68	66
	3 Wk.	58	71						
	6 Wk.	64	66	62	76				
	12 Wk.	72	65	76	79	70	77	72	74
6. On	Pre	92	97	95	94	94	89	94	93
	3 Wk.	94	100						
	6 Wk.	97	97	97	94				
	12 Wk.	97	97	97	97	94	97	96	97
7. In	Pre	69	69	74	79	71	71	72	73
	3 Wk.	85	84						
	6 Wk.	79	94	75	79				
	12 Wk.	78	87	91	88	79	84	83	86
8. Under	Pre	67	75	79	65	77	69	75	69
	3 Wk.	70	81						
	6 Wk.	85	84	66	88				
	12 Wk.	78	90	85	79	73	87	79	85

TABLE 3g3, con't.

Test: Relations / Item	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
9. Between	Pre	31	50	54	35	71	49	52	45
	3 Wk.	42	48						
	6 Wk.	64	44	53	62				
	12 Wk.	47	68	52	74	64	52	54	65
10. Around	Pre	67	87	62	76	80	77	69	80
	3 Wk.	94	87						
	6 Wk.	97	94	87	91				
	12 Wk.	91	94	91	85	91	81	91	86

TABLE 3h1. Means and standard deviations for experimental subjects on the Classification Test.

Subtest	Group	Pretest $\bar{X}$	Pretest SDm	3 Week $\bar{X}$	3 Week SDm	6 Week $\bar{X}$	6 Week SDm	3 Month $\bar{X}$	3 Month SDm
Non-Why	1	7.916	.483	9.454	.579	10.757	.366	11.156	.414
Total	2	8.384	.413			10.580	.384	11.500	.301
(13)	3	8.914	.506					10.454	.507

TABLE 3h2. Means and standard deviations for control subjects on the Classification Test.

Subtest	Group	Pretest $\bar{X}$	Pretest SDm	3 Week $\bar{X}$	3 Week SDm	6 Week $\bar{X}$	6 Week SDm	3 Month $\bar{X}$	3 Month SDm
Non-Why	1	8.500	.609	9.645	.545	10.125	.661	10.900	.453
Total	2	8.823	.524			9.294	.571	10.794	.428
(13)	3	8.314	.595					9.967	.400

TABLE 3h3. Percentage of experimental and control subjects passing each item of the Classification Test.

Test: Classification / Item	Test Time	Group I E	Group I C	Group II E	Group II C	Group III E	Group III C	Total Sample E	Total Sample C
1. Fruit	Pre	72	87	74	74	86	87	77	80
	3 Wk.	91	94						
	6 Wk.	97	84	91	82				
	3 Mo.	97	94	100	94	91	94	96	94
2. Shape	Pre	86	81	82	85	83	82	84	82
	3 Wk.	94	87						
	6 Wk.	100	91	97	88				
	3 Mo.	97	100	100	94	97	100	98	98
3. Size	Pre	86	75	85	88	86	82	85	81
	3 Wk.	88	94						
	6 Wk.	100	91	100	88				
	3 Mo.	97	94	100	94	97	100	98	96
4. Small Animal	Pre	56	66	67	68	63	59	62	63
	3 Wk.	73	71						
	6 Wk.	76	78	87	79				
	3 Mo.	87	77	88	82	79	90	85	83
5. Number	Pre	53	56	64	71	86	74	67	66
	3 Wk.	82	81						
	6 Wk.	88	75	84	74				
	3 Mo.	87	87	91	94	91	84	90	89

TABLE 3h3, con't.

Test: Classification / Item	Test Time	Group I E	Group I C	Group II E	Group II C	Group III E	Group III C	Total Sample E	Total Sample C
7.	Pre	44	47	59	47	49	47	51	46
Number	3 Wk.	61	77						
	6 Wk.	73	84	50	47				
	3 Mo.	84	68	79	71	64	42	76	60
9.	Pre	31	31	38	41	34	49	35	41
Number	3 Wk.	45	42						
	6 Wk.	45	47	50	41				
	3 Mo.	53	52	52	44	48	39	51	45
10.	Pre	44	50	56	50	54	51	52	50
Shape	3 Wk.	58	55						
	6 Wk.	70	72	78	56				
	3 Mo.	78	74	85	79	70	58	78	71
12.	Pre	69	69	62	62	71	83	67	71
Shape	3 Wk.	70	74						
	6 Wk.	91	81	87	82				
	3 Mo.	97	94	97	79	88	77	94	83
14.	Pre	53	53	62	59	57	51	57	54
Class (plants)	3 Wk.	67	65						
	6 Wk.	79	78	81	68				
	3 Mo.	78	87	94	76	73	77	82	80

TABLE 3h3, con't.

Test: Classification / Item	Test Time	Group I E	Group I C	Group II E	Group II C	Group III E	Group III C	Total Sample E	Total Sample C
15. Class (vehicles)	Pre	86	97	85	91	86	77	85	88
	3 Wk.	85	94						
	6 Wk.	97	91	97	88				
	3 Mo.	94	94	94	97	94	94	94	95
16. Function (clothing)	Pre	61	81	62	85	77	63	66	75
	3 Wk.	76	84						
	6 Wk.	88	84	84	74				
	3 Mo.	94	87	91	88	82	74	89	83
18. Size and function (small shoe)	Pre	50	56	44	62	60	46	51	54
	3 Wk.	61	48						
	6 Wk.	73	56	78	62				
	3 Mo.	72	74	82	85	73	68	76	76

TABLE 3i1. Means and standard deviations for experimental subjects on the Puzzles Test.

		Pretest		3 Week		6 Week		3 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
	1	2.777	.207	3.484	.265	3.575	.217	3.843	.196
Recogni-	2	2.743	.203			3.258	.201	3.718	.229
tion(5)	3	2.742	.222					3.545	.213
	1	2.694	.224	2.969	.248	3.303	.248	3.875	.204
Label-	2	2.487	.204			2.967	.204	3.843	.215
ing(5)	3	2.342	.208					3.909	.170
	1	5.472	.370	6.454	.435	6.878	.410	7.718	.336
Total	2	5.230	.358			6.225	.333	7.562	.290
Test(10)	3	5.085	.376					7.454	.331

TABLE 3i2. Means and standard deviations for control subjects on the Puzzles Test.

		Pretest		3 Week		6 Week		3 Month	
Subtest	Group	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm	$\bar{X}$	SDm
	1	3.062	.190	3.419	.189	3.312	.281	3.766	.177
Recogni-	2	3.058	.223			3.382	.202	3.558	.194
tion(5)	3	2.628	.256					3.483	.221
	1	2.843	.258	3.064	.270	3.406	.283	3.533	.223
Label-	2	2.911	.254			3.323	.272	3.647	.276
ing(5)	3	2.285	.226					3.580	.211
	1	5.906	.381	6.483	.398	6.718	.510	7.300	.362
Total	2	5.970	.416			6.705	.410	7.205	.406
Test(10)	3	4.914	.394					7.064	.390

TABLE 3i3. Percentage of experimental and control subjects passing each item of the Puzzles Test.

Test: Puzzles Subtest: Recognition Item	Test Time	Group I E	Group I C	Group II E	Group II C	Group III E	Group III C	Total Sample E	Total Sample C
1. Table leg is missing	Pre	50	62	62	65	63	54	58	60
	3 Wk.	67	68						
	6 Wk.	76	75	69	71				
	3 Mo.	91	84	82	76	73	68	82	76
2. Dog is sitting at table	Pre	42	47	51	53	49	31	47	44
	3 Wk.	64	52						
	6 Wk.	64	62	66	59				
	3 Mo.	72	65	76	71	67	71	71	69
3. Car has square wheels	Pre	69	84	64	79	77	71	70	78
	3 Wk.	85	84						
	6 Wk.	88	81	81	82				
	3 Mo.	87	97	88	91	85	81	87	90
4. Chicken has one leg	Pre	39	47	31	35	23	40	31	41
	3 Wk.	58	68						
	6 Wk.	52	47	22	44				
	3 Mo.	56	52	48	41	42	42	49	45
5. TV is triangular	Pre	78	66	67	74	63	66	69	68
	3 Wk.	76	71						
	6 Wk.	79	66	87	82				

TABLE 3i3, con't.

Test:Puzzles Subtest:Labeling	Test Time	Group I		Group II		Group III		Total Sample	
		E	C	E	C	E	C	E	C
6.	Pre	69	59	49	65	60	43	59	55
Ear of cat is	3 Wk.	70	71						
missing.	6 Wk.	85	81	69	82				
	3 Mo.	84	87	88	88	88	71	87	81
7.	Pre	33	44	26	47	14	26	25	39
Telephone cord	3 Wk.	39	39						
is missing.	6 Wk.	36	53	34	53				
	3 Mo.	53	55	52	74	48	58	51	60
8.	Pre	56	56	72	65	66	51	65	57
Pounding nail	3 Wk.	73	68						
with balloon.	6 Wk.	76	72	69	59				
	3 Mo.	78	81	91	81	97	77	89	77
9.	Pre	72	87	82	76	66	83	74	82
Plane running	3 Wk.	70	77						
on train tracks.	6 Wk.	82	78	91	68				
	3 Mo.	94	74	97	77	97	100	96	81
10.	Pre	39	37	21	38	29	26	29	34
House has no	3 Wk.	45	52						
door.	6 Wk.	52	56	34	71				
	3 Mo.	78	55	61	68	61	52	66	58

Pretest

Pretest data provided supplementary information on the competence of our target population. However, since the sample was drawn solely from day care populations we assumed that the scores obtained at pretest would reflect a higher level of achievement than we could expect from children with no preschool experience.

To confirm the equivalence of experimental and control groups at pretest, analyses of variance were run on the pretest scores for each of the measures comprising the ETS battery (See Table 4).

TABLE 4: Pretest F-Ratios for Experimental and Control Groups*

Subscale	Group Means Experimental	Group Means Control	E vs C F-Ratios	
Body Parts	35.03	34.62	.59	
Letters	27.67	28.31	.30	
Forms	3.97	3.93	.17	
Numbers	27.64	29.72	2.72	
Sorting Skills	8.38	8.65	1.03	
Relationships	7.54	7.47	.07	
Classifications	10.01	10.33	.40	
Puzzles	5.35	5.62	1.04	Exp. N=110 Con. N=101
Composite	125.59	128.64	.42	

* This table presented through the courtesy of Jack Miller and Rom Skvarcius, George Peabody College, Nashville, Tennessee

As evidenced by these results, the experimental and control groups were highly comparable at pretest. The IQ data, as measured by the PPVT, support this finding. The mean IQ for the experimental group was 97.38 at pretest, and the mean IQ for the controls was 98.24 with a range of 45 through 155.

Body Parts Test. Scores on this test were high with means of over 34 items correct of a possible 42 items (See Table 3, Pages 13 - 23). Both experimental and control subjects were at ceiling levels of performance in many of the test items, particularly those comprising the identification (Point to your eyes) and labeling subtests (What's this? What's it called?).

The children appeared to be less familiar with the functions of the various body parts, although performance on these items was still generally high.

Remembering that the children comprising the sample for this study were all attending day care centers, we questioned whether children with no preschool experience would perform as well on this measure. Informal reports from testers involved in the nationwide ETS summative evaluation indicated that children who did not attend preschool or day care centers were not evidencing the same consistently high performance on this measure.

Letters Test. The means and standard deviations for the subtests comprising the Letters Test are presented in Table 3 (See Pages 24 -40). Although the children seemed to have no difficulty discriminating one letter from another (See Matching and Embedded Letter subtests),

few were able to identify a letter given its name, to provide the label for a letter (See Recognition and Naming subtests), or to identify an object whose name began with a given initial letter sound.

Forms Test. This test was comprised of only eight items, four constituting the recognizing subtest, and four, the labeling subtest. At pretest, most children could recognize a circle, given its name, and many could label this form. The children showed a very limited knowledge of squares, triangles and rectangles, however. (See Table 3, Pages 41 - 43 .)

Numbers Test. The results for the Numbers Test are presented in Table 3, Pages 44 - 56 . In general, the children seemed more familiar with numbers than with letters. Over half of the children could identify numbers 1 through 5, given their name, and many could even name those numerals themselves. There was less familiarity with the names of numbers larger than 5, and substantially less with numbers larger than 10. In addition, many children were able to count out objects when their amount totaled less than five.

Sorting. The results obtained on the Sorting Test are presented in Table 3, Pages 57 - 60. Although the children showed a good understanding of the task, as evidenced by their performance on item 1, they did not perform as well when the sort was based on size or quantity. The scores on the completion subtest were surprisingly high with means of over five items correct of a possible six items.

Relations Test. The level of performance on pretest was high

with means of about seven items correct out of 10 items (See Table 3, Page 61 - 64.) The children were near the ceiling level of performance on several items comprising the test.

Classification Test. This measure was comprised of items that required the child to select a picture (from a set of four) that belonged with three pictures presented together on a page. Several items were follow-ups where the child was required to verbally justify his choice. Scoring problems arose on these items and they were dropped. The results for the "non-why" questions are presented in Table 3 (See Pages 65 - 68). The high level performance on several items of this measure indicated that the children had a good understanding of the task. The mean numbers of items correct ranged from 7.9 to 8.9 out of 13 items.

Puzzles Test. This measure was comprised of two subtests. In the first the child was required to select a picture (out of four) where something was wrong or funny. The means on this subtest ranged from 2.7 to 3.1 correct out of a possible five items. In the second subtest the child was presented a picture which portrayed something funny or absurd and was required to verbally describe what was wrong. Means on this subtest ranged from 2.3 to 2.9 items correct of a possible five.

The Three Week Testing

The results of the three week testing proved to be of limited value for several reasons. With the Thanksgiving vacation from school, the viewers had only seen about 12 programs. They had

received little or no information in many of the areas tapped by the ETS measures. For example, only seven letters out of 26 had been presented on the program although the children were tested on all 26.

Secondly, the sample size was reduced as only one-third of the viewers and nonviewers were retested after three weeks. In areas where small gains were obtained, these were not interpretable because they were based on a small sample.

Finally, the results were scarcely in when it was time for the formative research team to begin the six week testing.

For all these reasons, only the most pronounced gains were reported to production. These were on items testing the child's ability to label, recognize and match letters and numbers that had actually been presented on the show. This was not surprising because letters and numbers were heavily emphasized in these programs. It was encouraging, however, to see that the production techniques aimed at these goals were affecting a change in performance. Gains were also evident on the Forms Test, mainly attributable to the items testing recognition and labelling of triangles. (See Table 3, Pages 41 - 43)

The Six Week Testing

The results from the six week testing were extremely useful to production. The testing was completed the week before Christmas vacation and the results were reported to the production staff and

representatives of the project's funding organizations in January of 1970.

The mean gains from pretest to six weeks were greater for viewers than nonviewers on each of the eight tests comprising the ETS battery. (See Table 3, Pages 13 - 71).

The format used to report the results of the testing made them readily interpretable to the producers. For each test and subtest, the pretest and six week test means were reported along with the mean gains. For each item of each test the percentage of subjects passing were reported at pretest and six week testing, together with the differences in the percentage passing the item over the six week period.

A summary of the results of the six week testing and the implications drawn from them are presented in the Appendix of this report, together with the recommendations that were made to production. This report is a working example of how formative implications are drawn from a seemingly summative evaluation.

A review of the paper presented in the Appendix will give the reader an idea of the kinds of changes that were effected in the programs that were yet to be taped as a result of the six week testing.

The Three Month Testing

The total sample was retested after twelve weeks of programming. By this time Groups E_1 and C_1 had been tested four times; Groups E_2 and C_2, three times; and Groups E_3 and C_3 had been tested twice

(See Table 1, Page 7). An analysis of the variances based on the number of times the subjects were tested is presented in Table 5. The data indicate that the number of times the subjects were tested had little effect on their overall performance. This made comparisons of the total experimental and control samples from pretest to three months possible.

TABLE 5. Comparisons of groups tested two, three, and four times*

Subscale	Group Means By Times Tested			Testing Factor F-Ratio	Number of Tests/Gains F-Ratio
	Four	Three	Two		
Body Parts	36.38	36.89	35.60	.96	.44
Letters	32.71	32.99	31.57	.29	.62
Forms	4.52	4.92	4.48	1.26	1.21
Numbers	31.81	33.02	31.10	.53	.57
Sorting Skills	9.28	9.78	9.26	2.19	2.24
Relationships	8.04	7.98	7.98	.04	1.27
Classifications	12.02	11.98	11.52	.37	2.47
Puzzles	6.62	6.50	6.24	.65	1.21
Composite	141.62	143.63	138.37	.48	.97

* This table presented through the courtesy of Jack Miller and Rom Skvarcius, George Peabody College, Nashville, Tennessee

Over the three month experimental period, a number of the control subjects viewed "Sesame Street" in their homes, on weekends or when they were absent from school. The Character Familiarity Index which was designed to reflect exposure to "Sesame Street" had showed little contamination of the control condition after six

weeks of programming, but after three months many of the control subjects had been exposed to the show.

Some of the gain on the part of the control subjects is attributable to the exposure to "Sesame Street". As the test results are reviewed below, it is also important to remember that all subjects in the study were attending day care centers. Much of what "Sesame Street" was attempting to teach was consistent with the day care curriculum. Gains were therefore expected for both experimental and control subjects, but greater gains were anticipated for the experimental group.

Body Parts Test. With the high performance on pretest there was little room for gain on any of the subtests in this measure. The experimental mean for the Body Parts Test rose from 35.0 items at pretest to 38.0 items at three months, a mean gain of 3.0 items; while the control mean rose from 34.3 items at pretest to 37.5 items at three months, a gain of 3.2 items.There were 42 items on the Body Parts Test.

Letters Test. This test was designed to measure achievement in areas heavily emphasized in the program. The experimental mean was from 27.3 to 38.8, a gain of 11.5 items while the control mean rose from 28.1 to 35.4, a gain of 6.7 items. The superior gain on the part of the experimentals is largely attributable to their increased ability to recognize and label capital letters. However, the mean gain from pretest to three months was greater for experimental than control subjects on each of the subtests comprising the Letters Test.

Forms Test. Large gains in performance were observed in the experimental group reflecting an increased familiarity with geometric forms. The experimental mean rose from 4.01 at pretest to 5.59 at three months, a gain of 1.58 items on this eight-item test. The control mean rose from 3.89 at pretest to 4.92 at three months, a gain of 1.03 items. The gain on the Forms Test was largely attributable to the four items comprising the labeling subtest. Here the experimental mean rose from 1.76 to 2.93, a gain of 1.17 items while the control mean rose from 1.93 to 2.57, a gain of 0.64 items.

Numbers Test. Numerical skills were also heavily emphasized in "Sesame Street." The mean for the experimental group rose from 26.64 at pretest to 35.16 at three months, a gain of 8.48 items, while the control mean rose from 29.10 at pretest to 34.61 at three months, a gain of 5.51 items. The experimental gain was largely attributable to the increased ability of viewers to label the numerals (See Table 3, Pages 24 - 56).

Sorting Test. This measure was made up of two subtests, sorting and completion. In the completion subtest the children were near the ceiling level of performance at pretest. On this six-item subtest the experimental mean rose from 5.45 to 5.80, a gain of 0.35 items while the control mean rose from 5.26 to 5.55, a gain of 0.29 items. On the sorting subtest, however, where there was room for growth, the gain for the experimentals was greater than for the controls on every item comprising the subtest (See Table 3, Page57).

Relations Test. On this test, children were also near the ceiling level of performance at pretest. The experimental mean

rose from 7.45 at pretest to 8.35, a mean gain of 0.90 items while the control mean rose from 7.52 to 8.46, a gain of 0.94 items.

Classification Test. Both experimental and control groups showed substantial gains on this measure from pretest to the three month testing. In general, however, gains by the viewers were greater than those of the control subjects on items where the basis of classification was guantity (See Table 3, Pages 65-68 .)

Puzzles Test. This test was designed to measure achievement in the problem solving goal area. It was particularly aimed at the absurdities pointed up in the "Buddy and Jim" sketches. The experimental subjects showed a substantial gain on this measure. The mean for this group rose from 5.26 at pretest to 7.58 at three months, a gain of 2.32 items, while the control mean rose from 5.58 to 7.20, a gain of 1.62 items.

Tests of Significance

The reasons for not subjecting the data from this study to seemingly appropriate statistical analysis have been reviewed earlier in this report. Still, tests of significance serve a useful descriptive purpose. Several analyses were carried out by Jack Miller and Rom Skvarcius at George Peabody College for the purpose of exploring some questions raised by members of the project's funding agencies and its Research Advisory Committee. These are reviewed below.

Do Both Black and White Children Learn From "Sesame Street?"

The Progress Testing was not designed to provide a comparison of performance between Black and White children. However, since both groups were well represented in our sample, each could be analyzed separately to see if viewers within each group performed significantly better than nonviewers. The results of analysis of variance in test performance of viewers and nonviewers as reported for both Black and White children are presented in Tables 5 and 6. Again, we would like to emphasize that these Tables are presented purely for descriptive purposes. Black children were drawn largely from New York and Tennessee samples while the White population was heavily drawn from the Maine sample.

TABLE 6 : Pretest-Posttest gains by viewing and nonviewing black children

Subscale	Group Means				Groups By Trials F-Ratio
	Viewers		Nonviewers		
	Pretest	Posttest	Pretest	Posttest	
Body Parts	32.62	37.53	33.37	36.46	2.96
Letters	24.41	38.81	24.68	33.94	6.69*
Forms	3.34	6.00	4.14	5.43	9.18**
Numbers	23.31	32.72	24.43	30.51	5.35*
Sorting Skills	7.22	10.47	8.23	9.43	24.34**
Relationships	6.91	8.34	6.97	8.11	.50
Classifications	9.41	12.81	9.00	11.43	1.23
Puzzles	4.31	6.81	4.74	6.48	2.57
Composite	111.53	153.50	115.57	141.80	16.04**

* Significant at the .05 level.
** Significant at the .01 level.

TABLE 7.: Pretest-Posttest gains by viewing and nonviewing white children

Subscale	Group Means: Viewers Pretest	Viewers Posttest	Nonviewers Pretest	Nonviewers Posttest	Groups By Trials F-Ratio
Body Parts	36.22	38.26	35.35	38.08	1.04
Letters	29.28	38.85	30.42	36.27	6.99**
Forms	4.28	5.38	3.80	4.62	.66
Numbers	29.77	36.37	32.80	37.00	5.10*
Sorting Skills	8.95	10.71	8.90	10.18	2.17
Relationships	7.85	8.35	7.77	8.67	1.97
Classifications	10.31	14.48	11.10	13.90	3.53
Puzzles	5.86	7.95	6.13	7.60	2.59
Composite	132.51	160.35	136.27	156.32	7.37**

* Significant at the .05 level.
** Significant at the .01 level.

These results indicate that both Black and White viewers gained more than nonviewers over this 12 week period in many of the "Sesame Street" goal areas.

Do Both Four-and Five-Year-Olds Gain From Watching "Sesame Street?"

Separate analysis of variance indicated that for both groups, viewers were consistently superior in their performance to nonviewers. The analyses are summarized in Tables 7 and 8.

TABLE 8 : Pretest-Posttest gains by viewing and nonviewing four-year-olds

Subscale	Group Means: Viewers Pretest	Viewers Posttest	Nonviewers Pretest	Nonviewers Posttest	Groups By Trials F-Ratio
Body Parts	33.38	36.97	30.91	35.09	.27
Letters	24.09	33.88	23.84	28.38	8.43**
Forms	3.06	5.20	2.94	4.34	2.33
Numbers	21.12	29.91	22.09	25.97	9.65**
Sorting Skills	7.76	9.97	7.72	8.88	4.15*
Relationships	7.00	8.03	6.56	7.53	.02
Classifications	8.38	12.32	7.03	10.44	.25
Puzzles	4.62	6.62	3.94	5.91	.00
Composite	109.74	143.44	105.03	126.78	8.23**

* Significant at the .05 level.
** Significant at the .01 level.

TABLE 9 : Pretest-Posttest gains by viewing and nonviewing five-year-olds

Subscale	Group Means: Viewers Pretest	Viewers Posttest	Nonviewers Pretest	Nonviewers Posttest	Groups By Trials F-Ratio
Body Parts	36.51	38.94	36.47	38.72	.06
Letters	29.96	41.53	29.74	37.72	5.17*
Forms	4.47	5.91	4.38	5.23	2.41
Numbers	31.00	38.15	33.09	38.43	2.99
Sorting Skills	8.62	10.98	9.15	10.38	10.85**
Relationships	7.94	8.55	7.89	9.04	2.90
Classifications	10.49	14.94	12.06	14.28	9.86**
Puzzles	5.68	8.23	6.45	7.95	8.04**
Composite	134.42	166.85	139.23	161.49	11.77**

* Significant at the .05 level.

SUMMARY

The major effort of the formative research during the broadcast season involved a program of periodic testing of about 100 viewers and nonviewers of "Sesame Street."

Subjects for the study were three ,four ,and five-year-old children from day care centers in Maine, Tennessee and New York. A battery of tests, designed by Educational Testing Service expressly for measuring achievement in the goal areas defined by the Workshop, served as the response measures in this study.

The Progress Testing was designed to provide feedback on achievement in each goal area, that would allow producers to alter the program during the broadcast season to better meet the program objectives.

Although the Progress Testing constituted the major thrust of the formative effort during the broadcast season, additional studies were continually being conducted.

These were largely aimed at new production material or specific program objectives. In addition, distractor studies and small group observations that yielded vital information on appeal were also carried out. (See Formative Research During the Prebroadcast Period for a review of these research methods.) Forty subjects from the Progress Testing site in New York (20 viewers and nonviewers) viewed show 64 under standard distractor procedures. These data indicated that after 64 hours of "Sesame Street," the viewers still found the programming highly appealing.

The study reviewed in this chapter is presented as a working example of formative research, a decision-oriented research. We hope that the reader will conclude, as we have, that formative research has an important place in educational training programs.

ERIC

APPENDIX

THE RESULTS OF THE SIX WEEK TESTING

AND THEIR

IMPLICATIONS FOR PRODUCTION

ERIC

BODY PARTS

The data from the six-week testing indicate that the children in day care centers are well able to identify and label the parts of the body. With the exception of forehead and wrist, over 70% of the children in both experimental and control groups responded correctly on all recognition and labelling items. The results were the same for identifying the parts of the body associated with basic functions such as looking, smelling, etc.

The Body Parts Test is comprised of four subtests: (1) Pointing, (2) Labelling, (3) Locating a body part given its function (multiple choice) and (4) Identifying a body part given its function.

The total test consists of 42 items. The mean for the experimental group for the total test rose from 35.01 at Pretest to 37.12 at Six-Week Testing while the control group mean rose from 34.83 to 36.18. The mean gain for the experimental subjects (2.11 items) was slightly higher that the mean gain for the controls (1.35 items). With the over-all high level of performance, mean gains from Pretest to Six-Week Testing were small. However, positive gains were noted for both groups on each subtest. In each case, the gains were higher for the experimental subjects.

Implications

The high level of performance on this measure implies that the majority of children from three to five years of age are already familiar with the level of knowledge about their bodies that is tapped by this test. This may not be true for children from disadvantaged areas who have had no preschool experience, however.

Recommendations

The gains made on items in the Body Parts Test which were not already

at ceiling level on the Pretest are impressive. This indicates that for a child who is not already familiar with the body parts being tested, the methods used in the program were successful in raising his level of performance.

It is recommended then, that the show continue to deal with the body parts goals as it has done in the past. Since the children are familiar with body parts, these could be used to teach other goals. For example, the child can be shown that his nose is between his ears, emphasizing the relational concept. Finger plays can also be used which stress relations and number concepts.

The similarities and differences between parts of the child's body can be compared to animals' bodies when they appear on the show. For example, the child has hair on his head while the animal may have fur over its body. They may both have two eyes; the animal may walk on all fours while the child walks upright on two legs, etc.

The child could be taught more about his body. For example, he can be shown how the skin, fingernails and eyelashes act to protect him. This can also be compared with animals who have fur to keep them warm, feathers that repel water, etc.

LETTERS

The data from the Six-Week Testing indicate that although much headway is being made in the children's knowledge of letters, there is still a great deal of room for growth. Because of the emphasis that is placed on goals dealing with letters, the eight subtests are discussed individually below. (Sixteen letters were taught during the first six weeks - A,B,C,E,E,G,H,J,M, O,R,S,T,W,X, and Z).

On each of the eight subtests, the mean gain for the experimental group from Pretest to Six-Week Testing surpassed that of the control group. The experimental mean rose from 27.18 at Pretest to 33.01 at Six-Week Testing, a mean gain of 5.83 items. The control mean rose from 30.37 to 32.38, a mean gain of 2.01 items.

Matching

On this subtest the child was shown a card on which a shape, letter, number or form was printed. He was then required to find the identical stimulus from a set of four. Performance on this task was exceptionally high, over 90% correct at Six-Week Testing, on all items with the exception of the word "WHO."

Implications

These data imply that the children have a good understanding of this task and possess the skills necessary to perform successfully when a single stimulus is involved. Errors occur when the child is asked to match a stimulus that is made up of several elements, such as WHO which is comprised of the three elements of W,H, and O.

Recommendations

Since both experimental and control children were able to match successfully when the match involved a unitary stimulus, it is suggested that less emphasis be placed on this skill. Rather the skills necessary to perform correctly on more complex matching problems should be stressed.

On the WHO item, the problem seems to lie in the strategy that the child uses to complete the task. He should be taught that a systematic approach is possible to solving such a problem. He is most probably concentrating his attention on only one element of the stimulus. In WHO, for example, he may only attend to the letter W. This could result in the child's matching WHO with WAR. In both words W is the first letter.

To correct this the child can be taught to make a systematic check of each letter. This skill can also be emphasized in the Sorting Game. The word that doesn't belong could have a different last letter such as:

WHO	WHO
WHY	WHO

Another method that could be used to teach children the strategy for matching would be to superimpose or matte the letters of the word to be matched over each of the possible choices. If this is done, the matte should proceed from left to right and each letter should be confirmed. This would result in a match-miss-match test. The important thing is for the child to realize that all of the letters must match that of the standard before he can conclude that they are the same.

Defining the Domain of Letters

Children were asked two questions to determine their understanding of the domain of letters and their function. They were shown a page with eight printed letters and asked: (1) What are these called? The percentage of children in the experimental group answering this question correctly rose from 29% on Pretest to 52% after Six Weeks of viewing, while the percentage of control subjects answering correctly stayed relatively stable at about 40% correct. (2) Are they used to read or are they used to count? There was virtually no change in performance from Pretest to Six Week Testing for either experimental or control children on this item.

Implications

These results indicate that although the children are becoming fairly familiar with the individual letters such as "W" or "J" they do not understand what they are or how they are used. They do not realize that "W" is a letter and that it is used to make words.

Recommendations

When the alphabet, in its entirety, or individual characters from the alphabet are presented, the point should be made that these are letters , that they are all letters, and that letters are used to make words.

Letters we have received from parents indicate that after viewing the program, children begin pointing out the letter they have learned in magazines and in books. This could be used to define the role of letters for the child. The letter could be pointed out in books. The point could then be made that we read books.

We read words in books by sounding out the letters. Letters are for reading.

The domain of letters and numbers should be brought into contact and their respective functions should be distinguished. A game could be played where a pile of letters and numbers gets sorted into two piles: letters and numbers. As the sort is carried out the child could be shown that 2, 5, 7, etc., are numbers and that they are put in the same pile because all are used in counting. O,R,W, etc., are all letters and they are used in reading.

Recognizing Letters

There were impressive gains in the number of children who were able to recognize specific letters after watching "Sesame Street". In the task the child was shown four letters and asked to "Find the W." The gains were generally higher for capital letters than for lower case letters. Although the gains are impressive there is still room for growth. After Six Weeks of programming the highest performance was on the letter J with 74% of the children identifying this letter correctly.

Some children when shown a set of four letters and asked to find the W are unable to do so, even though they can successfully label it when it is presented alone.

Implications

Although the children are becoming more familiar with the individual letters taught on the program, they may not possess the strategies necessary to solve this task correctly.

Recommendations

In this problem type, the child must sustain an image of the letter in question while he checks a succession of given letters to see which one matches his "standard."

(Our experimental children seem to have problems when they encounter this format on a test, whether with letters, numbers, forms or whatever.) For example, given the following ... A S P C A ... and asked to find the letter S, the children often need to be taught to know the following:

-only one of the letters is an S
-all of the rest of the letters are not the S.
(for the young child, this does not necessarily follow from the above statement. Each should be mentioned separately.)

Certain procedural strategies follow from the above. Since only one of the letters is the letter S, the child can be taught to make a systematic left-to-right check, proceeding letter to letter to test each against his "standard." For each letter he should make a "yes" or "no" decision relative to this "standard."

Since all of the other letters are not an S, the child can be taught to use the process of elimination. If he knows that the first letter is an "A" then this letter is definitely not the "S" and the number of choices is narrowed.

One way to make this clear to the child is to develop games that will teach him to use these strategies. For example, the standard he uses could be a real one. A cardboard S could be shown to the child and then placed in a box. The child could then be shown the set of cardboard letters, A S P C A. When a tentative decision has been reached about the correct letter, the standard could be taken out of the box and compared, systematically to each of the letters in the set.

Naming Letters

Substantial gains were made in the ability to name letters by the experimental group. The children were tested on 16 capital and eight lower case letters. Performance, in general, was better on capital letters.

For capital letters, the experimental mean rose from 4.37 on Pretest to 6.34 at Six Weeks, a mean gain of 1.97 items. The control mean rose from 5.52 to 6.34, a mean gain of 0.82 items. Only 11 of the 16 letters tested were presented on the Show in the first Six Weeks of programming. Most of the gain was concentrated on these letters. For lower case letters, the mean gain for experimental was 0.78 items, and 0.44 for controls.

Implications

The gains made in naming letters suggests that the methods currently being used to teach this skill are working effectively. There still seems to be some confusion between letters and numbers and between letters and other letters.

The poorer performance on the lower case letters could be the result of several factors: (1) They are not stressed as heavily on the show. Although there are cartoons for lower case as well as capital letters, many of the additional scenes dealing with letters involve capitals. These segments seem to be important. More recent data (after three months of viewing) show impressive gains on the letter "i". This seems largely due to a segment on the show in which while Big Bird was guarding the letter "i", the dot ran away and was lost. (2) The children are shown two things, a capital and a lower case letter and given the same name for them. This may be confusing for the child. He may think he made a mistake calling the capital letter by that name when he sees a small letter and is told that this is the "r".

Recommendations

The confusion between letters and numbers seems to occur for two reasons: (1) The child doesn't recognize that two domains exist and are separate. This could be clarified for him. (See the suggestions for teaching this distinction which appear on page 5 : Defining the Domain of Letters.) (2) The child knows more names for numbers than he does for letters. He may not know that 3 is a "three" but the label three is available to him. When he is frustrated or confused he may try to name a letter with this label. He has seen both letters and numbers

confusion could be cleared up if the child had a definite stimulus to attach this label to. For example, if he knew for certain that 3 was "three" he would be less likely to call a K a "three".

The confusion that exists between letters seems to be related to how they look. The mistakes that the children make are in naming a letter with a label for a letter that resembles it quite strongly such as B and P, and M and W.

The Workshop advisors suggest teaching the children to discriminate between letters having a similar shape, but not between letters which are reversals of one another such as M and W or b and d. Some of the letters that could be taught in pairs so that their differences could be stressed are shown below:

Capitals	Lower Case
F - E	a - d
A - H	n - h
O - C, Q, G	n - m
P - R	i - j
V - U	k - x
X - K	g - y
M - N	c - e
W - V	

There are several methods that can be used to teach children to discriminate one letter from other letters. The child could be shown one letter at a time and told to say or do something each time he sees the "f." In this situation a variety of letters could be presented but the child must only respond to the "f."

A second way children could be taught to discriminate among letters is by pairing letters where confusion may occur. When this is done the discrimination could be taught two ways. Taking the letter B, the letter could be paired with P. Each time the letters are presented the child must find the B. This could also be done by having the child name both letters when they are presented together.

The Sorting Game could also be used with the confusing letter pairs. The child could be asked to find the letter (B) which is not like the others (Ps). The child could also be asked to sort Bs and Ps into separate piles.

Initial Letter Sounds

There was virtually no gain in the ability of children in the experimental group to discriminate initial letter sounds as measured by the ETS Letters Test. The children were shown four pictures and asked to find the one that started with T, C, A, or P.

Implications

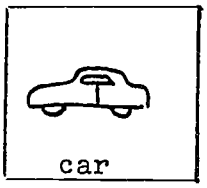
If the child does not understand what we are asking in a problem like this then the problem most probably extends to the situation where we say that Wanda is a W-word. We are using this technique to teach the letters S, T and X. There is reason to question whether the children have any understanding of what we are saying to them when we

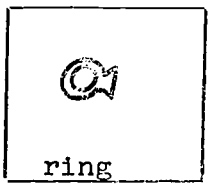
talk about T-Words, etc.

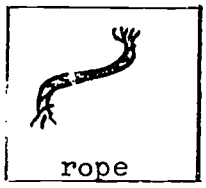
Recommendations

The children should be taught that letters have a name and a sound. When we read we say the sound of the letters. The segment on Kermit teaching the sound of B was very well done. Perhaps after this segment is shown the children could play a game where they must choose the picture that starts with B. Have simple pictures the children will be very familiar with such as Television, Bird, Cow and Monkey. Take each word and check it against the B-sound. Some other methods for teaching initial letter sounds are described below:

- Present words with the same initial sound simultaneously instead of always sequentially.
- Talk quite directly to the point that each of several different words can have the same letter. For example, present the following pictures...

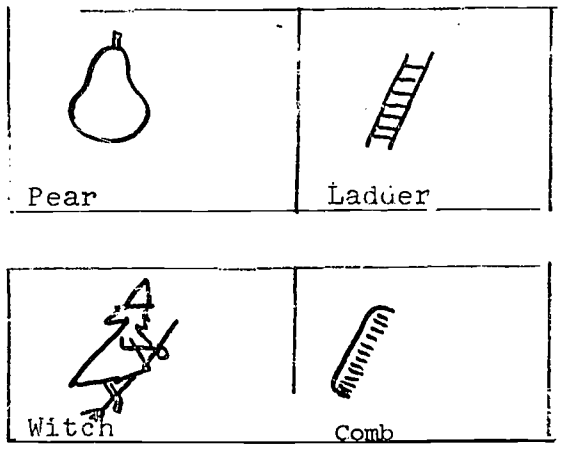






... then move a cut-out letter "r" from one word to the next. Point out that the words ring, rope and ribbon start with "r" and the word car ends with "r."

- Make a game of picking which of two pictures shows something starting with a given letter. For example show the following pairs...



...and ask which picture shows something that starts with a "P" or "L" or "W" or "C". Guide the child step by step in going from the name of the object -- to the discovery of its initial letter sound -- to the identification of the printed letter form which represents that sound.

- Do the process in reverse. Start with a letter, identify the sound it represents and then locate objects or pictures starting with that sound.

Recitation of the Alphabet

Although there were substantial gains in the ability to recite the alphabet, at the end of six weeks of programming still less

than 25% of the children could recite it in its entirety without making a mistake. There seem to be plateaus of learning, EFG, for example, seem to be learned as a unit. There is a definite drop in the percentage of children who continue to H.

Implications

The children seem to learn the alphabet in "runs." Errors seem to occur most frequently following certain specific runs. These runs should be linked together for the child. Often the runs are spoken as though they are a single word. Perhaps the child has not realized that the letters he is learning are the same things that make up the alphabet.

Recommendations

Have the child watch someone put together a disorganized set of letters to form the alphabet. Have one cast member start of saying the alphabet, A-B-C (each time finding the letter and arranging them in order). Have this person stop at D, not remembering what comes after C. Let him find someone who can help with the next sequence... DEFG... again finding the letter each time. Continue until the entire alphabet is stretched out, in order, on the floor or street. It might be possible to take the letter that is being taught on a given day and have that letter be the one on which the cast member is stuck.

Be sure to point out that the alphabet is made up of these letters. Point out, too, that the alphabet is the complete set of letters, that there aren't any more. Maybe someone could sing the alphabet song to show that all the letters are there.

The use of the alphabet song to find what letter comes next should be demonstrated to the child. When Oscar couldn't remember "z" it would have been nice to have someone suggest that he sing the song and that might have helped him remember the "z".

FORMS

The Forms Test was comprised of two subtests: (1) Recognizing Forms and (2) Labelling Forms. This was a very short test, the entire measure consisting of only eight items.

On the first set of items, the children were shown another set of four forms. They were asked in turn to name the square, rectangle, the circle and triangle. Gains of over 30% were made by the experimental group in labelling the square, rectangle, and triangle. There was a 13% gain in the ability to label the circle.

In the second subtest, the child was shown a page on which forms were printed. He was asked in turn to point to the circle, the rectangle, a triangle and another triangle. Performance was high for triangle and circle. One hundred per cent of the children successfully identified the circle. There was a substantial gain in the number of children identifying rectangle correctly, but at six weeks, there were still only 55% of the children who responded correctly on this item.

The experimental mean rose from 4.07 on Pretest to 5.37 at Six Weeks, a mean gain of 1.30 items. The control mean rose from 4.24 to 4.94, a gain of 0.66 items.

Implications

The methods that are presently being used to teach the names of these shapes are working effectively. Although gains have been

obtained in the knowledge of rectangle, this form remains the least familiar.

Recommendations

The children were able to identify three of the four forms correctly on the recognition subtest (over 80% correct performance on square, and triangles). Still, with only the rectangle remaining unfamiliar to them they did not realize that this one shape that was left had to be the rectangle. If the children could use the process of elimination that was mentioned earlier in regard to items of this type, they would have successfully identified the rectangle. (See Page 6, Recognizing Letters).

Of the shapes tested, circle was the most familiar at Pretest. The children should be most "ready" to learn this name if they do not have this label available to them. Still there is a proportionately small gain on this item in the labelling subtest. Perhaps we have stressed the concept "round things" while neglecting to teach the label "circle."

Rectangularity should be more heavily stressed. This should especially be done in identifying rectangular objects. Perhaps the "hidden figures" game could be used with the child required to find rectangles.

NUMBERS

In the area of numbers, like that of letters, substantial gains were made by the children viewing the program. In general, when the results of the Letters Test were compared with the results of the Numbers Test, scores tended to be higher in numbers.

In the first Numbers subtest, (Recognizing the Domain of Numbers), equivalent gains were obtained in experimental and control groups. In each of the remaining subtests, the mean gain for experimental group exceeded the mean gain for controls.

The total Numbers Test consisted of 54 items. The experimental mean rose from 26.32 to 32.91, a mean gain of 6.59 items. The control mean rose from 30.85 to 32.71, a mean gain of 1.86 items. The 12.4% increment in performance by the experimental group compared to the 3.5 increment for control subjects indicates that substantial gains were made in the area of numbers.

Because of the central role numbers play in the program, the individual subtests are discussed below.

Defining the Domain of Numbers

As in the Letters Test, a page with eight printed numbers was presented and the children were asked two questions: (1) What are these called? There was no difference in the amount of gain made by viewers and nonviewers on this question. Both groups registered gains of about 20% with the number of children successfully answering the question of about 70%. (2) Are they used to count or to read? Over 80% of the children in both experimental and control conditions answered correctly.

Implications

Children are much more familiar with the domain of numbers than that of letters. Since there was little difference in performance of experimental and control children it is impossible to determine

if the methods being used to teach this concept are working. Gain was made by the experimentals, but also by the controls.

Recommendations

Tell the children quite directly that 1, 2, etc., are not cabbages, fruit or automobiles, but that they are numbers. (In explaining why certain other things are not numbers, we can impart a great deal of information about what numbers are.) Explain that numbers are used to count and that we count to find out how many things we have. (Strictly speaking, the written symbol is the numeral, or it can be called "the way we write numbers", but it should not be called a number, because teachers in school now tend to insist on the distinction.)

Distinguish between letters and numbers. This has been suggested earlier (See Page 3, Defining the Domain of Letters).

Recognizing Numerals

In this subtest, four numerals were presented on a page and the child was required to find the 1, 4, 10, 2, 6, and 20, each from a set of four numbers. With the exception of 20, which was not treated in Jazz Numbers or the Henson Number Films, gains of around 20% were made by the children in the viewing group. Again in this subtest, the children had a high degree of familiarity with the three numerals that were not 20, but did not know how to use the process of elimination to determine that the one numeral they did not know was, in fact, the 20.

Implications

The methods presently being used to teach the recognition of numerals are extremely effective. The children are now showing a high degree of familiarity with the numerals 1 through 10. The data indicate that it is possible to go further in the area of numbers, stressing the numerals 11 through 20.

Recommendations

The numerals 6 through 10 should receive more emphasis than 1 through 5. With the exception of the numeral 10, itself, there is a drop in the percentage of children successfully identifying numerals larger than five. There is an even greater drop in performance on numerals larger than 10. For the children who have successfully mastered the earlier numbers, it would be beneficial to begin introducing material that is more advanced, particularly recognition of the numerals 11 through 20. (We still recommend introducing the concepts of enumeration and numerosity primarily through the use of the first ten numbers.)

Naming Numerals

The data on naming numerals directly reflects the findings from Recognition of Numerals. The drop in performance after 5, and the even greater drop after 10 is reflected in the following data taken from the Six-Week Testing of the experimental group:

Numeral	% Labelling Correctly
1	84
2	68
3	72
4	81
5	73
6	58
7	49
8	55

Numeral	% Labelling Correctly
11	24
12	9
17	12
20	15

Implications

The results from the Six-Weeks Testing indicate that there have been substantial gains in performance of children viewing the program. The numerals 1 through 5 are now quite familiar. There is good reason to continue teaching 6 through 10 as about 50% of the children who were tested are still unable to label these numerals correctly. There is, however, good reason to go beyond the numeral 10, for half the children are already able to perform correctly on 1 through 10 and they are ready to learn more.

Recommendations

A heavier emphasis should be placed on the numerals 6 through 10, and an effort could be made to introduce the numerals 11 through 20. It doesn't seem that the same films would work as well for these higher numerals. In both the Jazz Numbers and the Henson Number Films, numerosity is stressed. It is difficult for the child to visualize more than about five objects at once. It is suggested that straight labelling of numerals 6 through 20 could be taught if we choose to so extend our goals, much as it is done with letters. The children should see that this funny thing is a "six" or an "eight" as well as knowing that there are six things or eight things on the screen. The figure-eight in ice skating may be one way to introduce this. A football player with a numeral 12 on his shirt may be another.

Counting the Number of Objects (Enumeration)

The children were quite skilled at counting out up to five objects. Beyond five there was a substantial drop in performance.

Implications and Recommendations

As in the recognition and labelling of numerals the children appear to have mastered the numbers one through five and are ready to go on to more advanced numbers. The problem, and the objective, is to prompt the children to add one more object each time they add one more number in the number sequence. They often count faster or slower than they add new objects.

Recognizing Relative Amount

Children were tested for their understanding of concepts like fewer, most, same and more. This was done in a multiple-choice format. The child was shown several pictures depicting varying numbers or amounts, and were asked to point to the picture that had the "fewest ladybugs," etc. The concepts of "more" and "all" were fairly familiar to the children. Slightly over 60% were able to identify pictures with "same number" and "most" correctly. The concepts of "fewer" and "fewest," on the other hand were very difficult with less than 20% of the children responding correctly on these items.

Implications

The children are not as familiar with relative amounts as they are with specific number of objects when that number is one through fice. The familiarity that the children have shown with the concept

of "more" indicates that they may be ready for conservation problems. (See below.)

Recommendations

There should be a greater emphasis on concepts dealing with relational quantities. Comparatives and superlatives, especially, should be stressed.

It may be possible to begin teaching conservation of mass. This simply means that although a given object may change shape the amount of material that comprises it will remain constant. This is usually demonstrated with clay which can be rolled into different shapes such as ball or sausage-like shapes. The child can be shown that two balls are the same, then one is changed in shape and the two balls still have the same amount of clay in them. We should check with our advisors before introducing this sort of problem, but the data suggest that the children are ready for conservation.

Counting (Rote Recitation)

The data show that even prior to "Sesame Street" most of the day-care children which comprise our particular sample could already count to 10.

Implications

Since the children are already able to count to 10, they are ready to learn more. The counting itself could be extended or the counting could be used as a tool for teaching the children other things.

Recommendations

Counting could be extended to twenty. The progression from 11 to 20 probably will be more difficult for the children. These numbers are less familiar to them and they are "larger" words to learn. Perhaps these could be taught with a rhythm as with jumping rope.

The counting process can be used to help impart the concept that each successive number is one more than the previous one. This could be done in the following manner:

(1) Begin with one object. Count it and call it one.

(2) Add one object. Count again. Stop with two.

(3) Proceed up to about seven, recounting the entire set each time one more object is added.

(4) Let one of the characters have an "Aha!" experience to the effect that you don't have to count each time to know how many are there when you are adding one. It's simply the next higher number in counting.

(5) Show this is true by predicting that the next number will be eight by counting. Then add the next object and count the objects giving eight.

This approach should help simultaneously the processes of rote counting, enumeration, addition by one and the iterative principle of number sequence.

Relations

In the relations test, there were ten items testing the following concepts: (1) Biggest, (2) Smallest, (3) Over, (4) Nearest, (5) On, (6) In, (7) Under, (8) Through, (9) Between and (10) Around. The

relations Biggest, Smallest and On were familiar to the children at Pretest and performance was near the ceiling on these items. There were gains of 25% or more on Over and Around. Performance was poor on the item testing for knowledge of "in." On other measures of children's familiarity with concepts, this is usually one of the earliest learned. This suggests that it was not the concept but the particular item in the test that caused the low performance.

The experimental mean rose from 7.24. on Pretest to 8.28 at Six Weeks, a gain of 1.04 items. The control mean rose from 7.68 to 8.39, a gain of 0.71 items.

Implications

The improvement on the relations "over" and "around" suggest that the film "Over, Under and Through" is having a positive effect in improving the children's familiarity with these concepts. It is puzzling that "through" does not show this same gain, especially since it receives the additional emphasis from the film of Alice Braithwaite Goodieshoes. Perhaps it is the item on the test which is causing this result. In any case, the data seems to imply that the following relations need a stronger emphasis in the future programs: Nearest, Through, Under and Between.

Recommendations

Some of the films and present methods of making these relational terms salient include the Alice Braithwaite Goodieshoes films, the muppet who is found next to, under and on top of the box, and the "Over, Under and Through" film. More material of these types would be highly

desirable.

A different approach would be to make the familiarity with these relations have some "pay of value" for the viewer. Games could be played with the viewing audience where they would be right if they picked the picture showing the man that is between or under the tree. The child could also be given riddles like "what is on your face and between your eyes?" "What is on your forehead and over your eyes? You have two of them." "What do we put on our foot that goes between our foot and our shoe?" "What do we wear on our hand that we stick our finger through?" "What do we wear around our wrist that we put our hand through to put on?"

Using this type of an approach, some of the less familiar body parts would be emphasized together with the relational concepts.

It would probably be helpful in defining the relations to show what they do not mean. This could be accomplished by having someone make an error. When asked to put his hand through a hoop Ernie might put his hands around it instead and be corrected by Bert.

Another approach might be to show a series of instances of a single relationship in quick succession. For example, consider the following questions asked in quick succession:

1. A place setting is shown without a plate.
   Ask: What goes between the fork and the knife?

2. Show a car with no wheels floating above a road.
   Ask: What goes between the car and the road?

3. Show two pieces of bread with a space between them.
   Ask: What goes between the slices of bread to make a sandwich?

4. Show the letters A and C.
   Ask: What goes between them?

SORTING

Two subtests comprise the test of Sorting. (1) Sorting and (2) Completion. In the Sorting subtest, the children were shown four objects and asked to find one that was different from the others or did not belong. Impressive gains were made on this subtest with the experimental group showing a 25.8% increment in performance whereas the control group showed an increment of 8.8%.

In the Completion subtest, the children were asked questions of the following type: "You eat bread; you eat chicken; what else do you eat?" Performance was very high on this subtest with the children in both groups reaching the ceiling on several items.

Implications

The gains in sorting skills among "Sesame Street" viewers were quite striking. They are perhaps the best evidence that the program is capable of teaching higher-level cognitive processes. The form used in testing for sorting skills is essentially the same as the format has proven to be very successful.

Recommendations

With the evidence that we have obtained showing substantial improvements in sorting following viewing of the "One of these things is not like the others" segments, it seems highly desirable to begin extending this skill to other contexts.

One way to help the children generalize their newly acquired skill in sorting is to use one or more of the promient elements from the present teaching format in connection with new forms or applications. For instance, the sorting song could be used in the following

kinds of situations:

(1) Alter the form of the display in various ways

a. Set the four objects in a row, occasionally rather than always displaying them in the four-fold table.

b. Find examples in everyday situations.

- three whole eggs in their shells and one cracked egg in a frying pan.
- three baby animals and one mother.
- three good tires and one flat tire on a car.
- eleven eggs and one cookie in an egg carton.

(2) Alter the basic structure of the problem

a. Show four balloons, three of which are inflated with lighter-than-air gas, and one which is inflated with plain air. You must release the strings to see which one is not like the others.

b. Show four people about to do a dance. When they start, one does it differently.

c. Show a large number of objects, two of which are different from the others. Adjust the song accordingly.

d. Show four strings of beads, where the beads on one string are arranged in a different pattern than the others.

(3) Occasionally show some important consequence of things being different from other things.

a. Show someone receiving an assemble-it-yourself toy with one wheel or one leg different than the

others.

b. Show three yoyos one of which has no string.

c. Show four cupcakes, one of which has a finger-full of icing scooped out. Show four kids, one with icing on his finger.

d. Show a child being rewarded for being different in a situation, or a group of children picking the runt of a litter for a pet.

(4) Teach other goals using the same format.

a. Show four body parts, three of which are found on the face and one which isn't.

b. Show four body parts, three of which are found on the fact and one which isn't.

c. Show four children eating soup, one who is drinking it from a bowl.

d. Show four children with a toy, three of whom share their toy and one who does not.

Note that while it seems important to vary the format in order to teach the children to generalize their sorting skill, it probably is desirable to continue using our basic sorting format very frequently in order to help insure that the children possess basic sorting skill which is to be generalized through introduction of the various new formats.

CLASSIFICATION

The Classification Test was made up of 18 items. On this test the child was shown a set of three objects that had something in common. He was then required to choose another object (from a set of four) that belonged with the first three objects.

Children in the experimental group showed a 19% increment in performance compared with a 10% increment by non-viewers. The experimental mean rose from 8.16 on Pretest to 10.71 at Six Week Testing, a mean gain of 2.55 items. The control mean rose from 8.68 to 9.71, a mean gain of 1.03 items.

Implications

The gains made by viewers on this measure again reflect the success with which "Sesame Street" is improving higher-level cognitive skills of its viewers. The high level of performance on items on this type suggests that more classification skills could be attempted in the program.

Recommendations

Multiple classifications could be approached in the following manner. The child could be shown three large red balls and then asked to find something that goes with them. First, have the child choose the fourth object from a set of three blocks and one ball. Then have the child choose the fourth object from a set of three small balls and one large ball. Finally, have him choose the fourth object from a set of two blocks, one small ball and one large ball. Using this sort of technique one can stress first that the child must look for a ball, not a block. Secondly, one stresses the fact that the child is looking for a large ball. In the third stage these concepts are put together. Working in this way one can progress to even more difficult double classifications.

Another way to approach multiple classification is by showing a group of objects or people and finding how many ways they are the

same. For example, a set of vehicles may be the same because you can ride in them, but they also may have wheels, windows, doors, etc. A group of people may be the same in many ways, there may be several girls, some of the girls may have blond hair, the boys may all have sneakers or trousers, etc.

Bert and Ernie may have an argument about which two things go together in the following set of objects: a red ball, a red and white striped ball and a peppermint stick. Both are right. They can begin naming how many ways the things are alike (round, have red on them, etc.), and find that the balls have more things in common than the striped ball and the pepermint stick.

PUZZLES

The puzzles test was made up of two kinds of items. In the first, the children were shown a picture with something wrong and were asked what was funny about it. In the second set, the children were shown a picture and asked to find what was missing. There were problems associated with some of the items on this test and it is currently being revised. Even on items that appear to be clear, however, such as a house with a door missing, performance was not very high. The mean for the experimental group rose from 5.34 to 6.55, a mean gain of 1.21 items. For the control group the mean rose from 5.94 to 6.71, a mean gain of 0.71 items. The Puzzles test was made up of ten items.

Implications

There is a good deal of room for growth in this area. Basically, the child is being asked to define a problem. He looks at a picture where something is wrong or missing. He is asked to discover what it is that is wrong.

Recommendations

Very simple examples should be used to help the child discover what is wrong in a set of situations. For example, the child can be shown a glove with a finger missing, a car with three wheels or a man with one leg. He can be asked to find what's missing. These should be done one at a time. If the child cannot see what is wrong with a glove that has a finger missing, he may see it when the glove is put on by someone. Show clearly the finger sticking out of the hole where the glove should be. Then have the person pretend to go outside and get a very cold finger. This should make it very clear to the child what is wrong with the glove and why it is wrong. The same thing can be done with the car. Have someone try to push a car with three wheels. Have someone try to walk on one leg, etc.