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ABSTRACT

In the spring of 1971, an initial version of a program to teach selected prereading skills was tried out in three kindergartens. The three visual skills to be taught by the program were attending to letter order, letter orientation, and word detail. The sound skills to be taught were sound matching and sound blending. The program materials for children consisted of whole group, small group, and individual games and activities designed to teach the selected skills. The teacher was provided with a manual describing the games and the suggested scheduling, grouping, and assessment procedures. This working paper summarizes the conditions of the tryout; describes and evaluates the program components in detail, and suggests revisions for the 1971-72 full-year testing of the program. (Author/DB)

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THE PREREADING SKILLS PROGRAM:

EVALUATION OF THE FIRST TRYOUT

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Report from the Basic Prereading Skills:
Identification and Improvement Element of the Project
on Reading and Related Language Arts

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PS 005891

Wisconsin Research and Development
Center for Cognitive Learning
The University of Wisconsin
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STATEMENT OF FOCUS

The Wisconsin Research and Development Center for Cognitive Learning focuses on contributing to a better understanding of cognitive learning by children and youth and to the improvement of related educational practices. The strategy for research and development is comprehensive. It includes basic research to generate new knowledge about the conditions and processes of learning and about the processes of instruction, and the subsequent development of research-based instructional materials, many of which are designed for use by teachers and others for use by students. These materials are tested and refined in school settings. Throughout these operations behavioral scientists, curriculum experts, academic scholars, and school people interact, insuring that the results of Center activities are based soundly on knowledge of subject matter and cognitive learning and that they are applied to the improvement of educational practice.

This Technical Report is from the Basic Prereading Skills: Identification and Improvement element of the Reading and Related Language Arts Project, in Program 2, Processes and Programs of Instruction. The objectives of Program 2 are to develop curriculum materials for elementary and preschool children, to develop related instructional procedures, and to test and refine the instructional programs incorporating the curriculum materials and instructional procedures. Contributing to these objectives, this project has two general objectives: (1) to develop kindergarten level tests for diagnosing deficits in skills which relate to reading, and (2) to develop a kindergarten-level program for teaching these skills. Tests and instructional programs will be developed for: visual and acoustic skills, including letter and letter string matching with attention to order, orientation and detail; auditory matching and blending; and for relating sounds to symbols.

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ABSTRACT

From February through May of 1971, an initial version of a program to teach selected prereading skills was tried out in three Madison kindergartens. The three visual skills to be taught by the program were attending to letter order (ab vs. ba), letter orientation (b vs. d), and word detail (cfg vs. ctg). The sound skills to be taught were sound matching (which word has the sh sound: ship or cat?) and sound blending (what word do these sounds make: sh - i - p?) To facilitate the teaching of the two sound skills, children were taught to associate the individual sounds with pictures (for instance, the sound /sh/ with the picture of a girl with her finger to her lips).

The program materials for children consisted of whole group, small group, and individual games and activities designed to teach the selected skills. The teacher was provided with a manual describing the games and the suggested scheduling, grouping, and assessment procedures. The program was used in classes for 30 to 45 minutes a day, two to five days a week. A project staff member was present at each session both as aide and as observer.

This working paper summarizes the conditions of the Spring 1971 tryout, describes and evaluates the program components in detail, and suggests revisions for the 1971-72 full-year testing of the program.

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1. Background

1.1 Introduction

The Prereading Skills Program, here for convenience labeled PSP, is being developed at the Wisconsin Research and Development Center for Cognitive Learning as part of an on-going study of reading and prereading skills. Research on a variety of reading-related subjects was begun in 1966, including studies of letter-sound learning, speech development, prediction of reading success, and visual scanning. Primary emphasis during this phase of our work was placed on learning which skills were required for learning to read and on how to detect and correct deficiencies in these skills at the kindergarten and preschool level.[1] As a result of the progress made in detecting deficits in prereading skills and in relating these deficits to reading failure, a decision was made in the Fall of 1970 to begin design of an instructional program for teaching prereading skills at the kindergarten level.

A needs and specifications paper was drafted in September of 1970 (Venezky and Chapman, in press) and simultaneously a series of mini-experiments was designed for testing instructional procedures[2] and

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[1] Reports on this work can be found in Calfee, Chapman and Venezky (1970), and Venezky, Calfee and Chapman (1969).

[2] An unpublished summary of these studies was circulated to a number of researchers working in related areas. This report is no longer available.

for revising the Basic Skills Test, a diagnostic test developed for basic prereading skills. In October (1970) the new Basic Skills Test (now renamed the Basic Prereading Skills Test--BPST) was piloted on 162 kindergarten children in Madison, Wisconsin;[3] on the basis of these test results, further experimenting was done, leading to an extensive revision of the test. A pilot test of the revised BPST was carried out on 138 kindergarten children in Madison in February, 1971[4] and a large-scale field test is planned for the 1971-72 school year.

Parallel to the development of the BPST was the development of the Prereading Skills Program (PSP), which by December, 1970 was sufficiently advanced to allow a tryout of major components in the Spring of 1971 in three Madison kindergartens. The teachers for these classes had been co-operating with the project staff during the Fall on experiments for both the test and program and hence were familiar with the goals of the project and with many of the instructional activities which were eventually incorporated into the program. (Each teacher taught a morning and an afternoon class. At the beginning of the school year the BPST was given to all six classes; then three were selected for experimenting in the Fall and the remaining three reserved for a tryout in the Spring.)[5]

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[3] See Robin S. Chapman, 1971, in press. (a)

[4] See Robin S. Chapman, in press.

[5] To prepare all of the program exercises, design and produce materials, prepare a teacher's handbook, and at the same time be revising and administering the BPST was an enormous strain on not only the project personnel, from the director to the secretary, but also on a significant portion of the R & D Center staff. Needless to say, without the Herculean efforts which these persons exerted and without the work, trust, and cooperation of the three kindergarten teachers, we would have made much less progress.

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This report is a summary of the program as it was carried out in Spring, 19/1, and of its evaluation. The objectives of the Spring tryout were:

1. to test the general format of the program, which included whole class, small group and individual activities, under the management of the kindergarten teacher and an aide

2. to assess the usability by teachers and children of the various instructional activities and materials

3. to assess the effectiveness of activities for teaching each designated skill

4. to test the management procedure by which a teacher evaluated and recorded the progress of each child on program skills.

Although we cannot deny that sensational gains by the tryout group in prereading skills were an unstated hope of this tryout, such gains, even if they had occurrred (and they did not) could not with any honesty be attributed to the instructional components of the program. Aside from whatever halo effect may have emanated from our efforts, there was a continual change in activities, instructions, grouping, and pacing. Techniques developed in one classroom were often--but not always--tried in the other two, and some materials and exercises, because of the abbreviated tryout period, were not tried in all classes. (It should be kept in mind, also, that this program is intended for a full school year, although the tryout covered less than one-half of this time.) In short, our goal this year was to launch the ship and make it seaworthy. A small-scale field test, scheduled for the 1971-72 school year in approximately 14 kindergartens, will be the maiden voyage.

1.2 Summary of the Instructional Program

The PSP centered on two sets of skills, here called visual skills and sound skills.[6] Visual skills included:

1. Attention to letter orientation (e.g., does not confuse b and d)

2. Attention to letter order (e.g., does not confuse saw and was)

3. Attention to word string detail (e.g., does not confuse caning and canning)

Sound skills included:

1. Learning single sound responses for picture stimuli[7]

2. Detecting whether or not a word contained a particular sound (e.g., telling whether /tren/ contains the sound /n/).

3. Blending sounds, to make words (e.g., producing /tren/ from /t/, /r/, /e/, /n/.)

Three additional skills were included in the program, one as an introduction for group activities and for attending to sounds (noise matching), one for combining visual and sound skills (letter-sound correspondence learning), and one for reasons which tend to change with the weather (letter naming).[8]

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[6] The rationale behind the selection of these skills is presented in Venezky & Chapman, in press.

[7] Picture-sound learning is not considered a skill in the same sense as sound matching and sound blending, but is used as a carrier for the other sound skills. (The picture-sound pairs, once learned, are utilized in the teaching of sound matching and sound blending.)

[8] Letter names per se are not needed for learning to read, nor are they effective mnemonics or mediators for letter sounds (see Venezky, in press). However, letter names are an essential ingredient in the popular concept of reading instruction and have become convenient labels for referring to sounds. Many children know a few letter names when they arrive in kindergarten and many parents expect their children to know all of the names by the time they leave. Thus, while our program has no use for letter names, we are forced to pay some attention to them, lest they interfere with program activities.

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Instruction in these skills included: whole class instruction by the teacher; whole class activities; small group activities; and individual activities, either for assessment or for extra practice. Groups were selected initially on the basis of BPST scores; thereafter progress and social interaction were used for regrouping.

The program began with administration and grading of the BPST. This was administered individually to each child and included sub-tests for each program skill.[9] For each child a mastery or non-mastery score was recorded on each subtest; then two sets of groups (four to six children/group) were created, one for visual skills and one for sound skills, by placing children with similar abilities together. Instruction began with the introduction of one set of four picture-sound pairs to the entire class. The four pairs were introduced in a story and then reinforced with a song, sung to the tune of "Twinkle, Twinkle, Little Star,"[10] and a game of charades in which children attempted to act out the various pictures. Later, each child was tested individually on the picture-sound pairs and given the picture cards for each pair he learned.

After approximately one week of picture-sound learning, in which three sets (of four pairs each) were learned, the children were taught the first small-group games. Gradually, additional games were taught so that in a class of 30 as many as five different activities could be occurring at the same time. A typical instructional period might

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[9]Since a separate report has been prepared on the BPST (Chapman, in press),no evaluation of the reliability or validity of the test will be included here.

[10]With due apologies to the composer.

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include the following:[11]

1. Review one or two verses of the sound song.

2. Introduction of a new level of Letter Lotto.

3. Division of class into small groups, with one or two groups playing a sound-matching game and the remaining groups playing the new version of Letter Lotto.

4. Informal assessment by the teacher or aide of several children on visual skills.

Assessments of each child's progress in each skill area were obtained by both formal and informal procedures. Picture-sound learning was assessed by individual testing of each child on each set of four pairs; visual skills were assessed through single page exercises. Informal observation was the only assessment procedure used for sound matching and sound blending. Each teacher recorded assessments on charts. Since the entire management and assessment procedures, including the teacher's handbook, are now undergoing extensive revision, no detailed discussion of them is included in this report. General comments on each, however, are included in Chapter 3.

1.3 Tryout and Evaluation Procedures

The Spring tryout began in February in three kindergarten classes

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[11] Several daily schedules from the teacher's handbook are shown in Appendix A, followed by samples of activity pages. For one class the sequence of activities for the entire tryout period is shown in Appendix B, along with the total number of class periods spent on each activity.

and continued to the end of May. (The school year ended on June 4.)
Total number of class days spent on the program are summarized in
the table below, each day representing from 20 to 45 minutes of in-
struction and games.

Tryout Class	Number of Children	Average Time/Day	Days/ Week	Total Days
M	29	30-45 min.	5	51
L	20	20-30 min.	3	25
S	9	30-45 min.	2	21

The children in Class M were from a middle to lower middle-
class area; those in classes L and S, a lower middle-class area.
Class S children, in addition, were eligible for Title I aid and
were attending kindergarten all day, twice a week. Children were
included in this group on the basis of learning, behavioral, or
language problems.

For almost all tryout periods a member of the project staff
was available as a teacher's aide. Instruction and management, how-
ever, were carried out by the teacher. The aide assisted groups in
playing games, tested new small-group and individual activities, and
met with the teacher before or after class to demonstrate new
materials and to discuss problems with the program and suggestions
for improvement.

Informal assessments of program components, made by project
staff or teachers, were entered on 3" x 5" cards, filed in the pro-
ject office, and reviewed periodically. In addition, the project
staff and teachers met for an entire afternoon in early June to

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evaluate all program activities and materials and to discuss suggestions for improving particular items. Formal assessment was done through the BPST, which was administered to all six kindergartens just before the program began and to a random sample from two tryout and two control classes at the end of May.

In the following chapter summaries and evaluations of the instructional activities and management systems are presented; a general evaluation of the program and the formal evaluation based on BPST scores is presented in Chapter 3.

2. Description and Evaluation of Activities

2.1 Visual Skill Activities

Each game constructed to teach visual skills had two basic versions: one requiring attention to letter order, and another requiring attention to letter orientation. A letter order version of a game, for instance, might require that the child match fn with another fn instead of nf. A letter orientation version of the same game might require him to match p with another p instead of q.

More complex versions of a game were made by lengthening the letter sequences to be compared; for instance, eps with eqs. These longer versions were intended to teach attention to word detail as well as order or orientation. No materials designed to teach word detail exclusively, however, were constructed for the Spring tryout.

A variety of games and activities were developed for the Spring tryout: card games, board games, lotto games, punch boxes, and workbook pages. These games are described and reviewed in the following sections.

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2.11 Card Games

There were two card games that we felt the children would be able to play together before the end of kindergarten: Battle and Patience.

The rules for Battle are (1) Players are designated as Same and Different, (2) shuffle and deal out all cards face down, (3) each player places a card face up on the table and then decides if the two cards are the same or different in value, (4) if the cards are the same, the player designated Same takes the pair, if different the other player takes the cards, (5) the player with the most pairs after all the cards have been played wins.

The rules for Patience are (1) shuffle and deal out each card face down,(2) each player is allowed to turn over two cards and decide if they are the same or different,(3) if the cards are the same, he is allowed to pick up the pair; if they are different, they are turned face down in their original position, (4) the player with the most pairs after all the cards are matched wins the game.

For the Spring tryout, card decks were constructed for four variations of Battle and Patience. The individual cards used to construct these decks are given below. Each deck consisted of

Letter Content for Card Game

	Battle	Patience
Orientation 1	p q	p q b d
Orientation 2	pe qe	pe qe be de
Order 1	nf fn	nf fn tz zt
Order 2	mks msk	mks msk skm smk ksm kms

24 cards; the Battle and Patience decks were color coded so that they could be distinguished easily.

The Battle and Patience games were scheduled for introduction only after other materials to teach the same skills had been introduced. A clerical error in not clearly labeling each deck as to its possible use added to teacher confusion. (The same decks were used for Lotto and Patience.) The result seemed to be that materials for these games were not given to children by the teacher as often as other game materials. In fact, only project personnel played Patience with the children.

The children seemed to enjoy playing both Battle and Patience and only minor revisions seem necessary. The Patience deck was of a light color and the letter often showed through the card. This is easily corrected by using a more opaque material for the cards. More complicated forms of orientation and order materials should be developed.

2.12 Matching Board Game

This game consists of a cardboard playing surface with a matrix of card-size squares printed on it (each square having a letter or letter sequence exactly like our card materials), a set of cards, a spinner board with interchangeable overlay, and a scoreboard for playing tokens. Versions were designed for each of the letter subsets used in our Patience games. The playing surface and the cards were the same color for the other three sets of materials. This change enabled the child to see better which squares had not

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yet been filled on the board.

There are several ways to use these materials. One game requires (1) the cards to be shuffled and six cards dealt out to each player, (2) each child takes turns spinning the spinner and if he has a card in his hand which is the same as the value on the spinner, he is to place it on the appropriate square on the playing surface and advance his playing token. Another version requires the child only to draw a card and try to place it correctly on the playing board and then advance his token.

The matching board was a success primarily with the children who had already developed the skill. It appeared to be too big and formidable to interest the non-mastery children. Also, the rules involving all the material were too complicated: e.g., the children would often fail to remember to advance their tokens. New variations using similar material but simpler formats are needed.

For future use, the card deck, spinner and scoreboard could be used without the large playing board. The spinner and cards can be used in a game requiring the child to discard when the spinner points to a card which he has in his hand. The first child to discard all of his cards wins the game. Another variation uses the scoreboard. Deal out three cards to each player so that no child has all card types. Spin the spinner. If the spinner points to a letter sequence which the child has in his hand he may advance his token on the scoreboard. Many other variations of the game are possible using these materials. Primarily for this reason, the spinner and scoreboard should be retained in the package of game

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materials.

2.13 Letter Lotto

Letter Lotto is a game requiring a child to match a letter or letter sequence occurring on a playing card with the same sequence on an individual playing board. Four variations of the game were developed, corresponding to Patience items in Table 1. Original plans to develop the materials for two to six players with six different Lotto boards and a deck of 54 cards per game were changed after the introduction of Orientation I in one kindergarten. Maximum workable group size was no more than four players, and two or three was a more effective group size in holding the child's attention and interest in the game. Thus, for all practical purposes, children played Lotto games in maximum groups of four with a deck of 36 cards.

Lotto rules are quite simple and easy for a child to understand. Each Lotto board has spaces for nine cards. The cards (deck of 36) are shuffled and placed face down. Players take turns drawing a card and seeing if it matches a square on their lotto boards. The first child to complete his board is the winner.

Several variations of the Lotto game were played. Teachers wanting to check the skill involved sometimes asked a child to fill out a Lotto board with the correct cards, thus enabling her to check the child's performance "on his own." Another variation of the game has nine or fewer cards dealt out to each child. The child who places the most cards on his Lotto board wins the game. This variation lets the child play the game without worrying about when he is to take a turn.

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For future production of the Lotto cards, some means of
naturally indicating the correct orientation of the card is desirable.
A thumbprint on the bottom of the card was suggested by one of the
teachers using the program as a possible means of showing correct
orientation.

2.14   Punch Box Game

This particular game offered the possibility of having a game
in which the child could be given feedback without supervision.   A
metal card file for 3" x 5" cards had two holes punched horizontally
near the bottom of the front of the stand.   The cards in the file
contained a standard at the top middle and two response alternatives
printed on the card above the two holes in the box.   Corresponding
holes were punched in the cards; that for the correct hole on the
card was notched so that when a pointer was inserted through the
cards at that position, the card could be withdrawn from the stand.
Putting the pointer through the deck at the other hole would not
permit the extraction of the card.

The boxes were not constructed in time for the Spring tryout
but will be piloted this summer.

2.15   Workbook

One of the major problems encountered early in our Spring try-
out was how to assess the child's mastery of a skill so that he
could be directed to unmastered skills.   A workbook was devised for
this function and also for teaching thorough search strategies.

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The workbook as developed was not completely self-contained. We know that the children had already been taught to do similar activities in either math or other prereading workbooks. Thus we did not have to begin by teaching the child to look for items which were the same as the standards which had been circled on the page.

Fifteen workbook pages were tried. The first four required matching letter sequences when all the incorrect alternatives contained order permulations. The other eleven pages required the child to look for one or more words (two to six letters) or letter sequences within words. The workbook did not contain orientation material because of an erroneous assumption that there was little need for further materials in this area.

Template overlays that let children check their own papers were used. The results from the workbook indicated almost perfect mastery of letter order sequences of three or fewer letters and problems with sequences of four letters. Almost all word detail materials indicated mastery, even with searches for letter sequences in words when the alternatives were highly similar. Observation, however, indicated reasons for suspecting these results. Children often use the overlays as a means of marking items they had not correctly marked. There was also some indication that children who were not able to perform copied from their classmates.

2.16 Letter Naming

Teaching the names of the letters of the alphabet was not one

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of our major goals. But we did feel that being aware of letter

names might (1) make the child aware that there are different names for

what he might regard as the same object depending upon its orien-

tation and thus lead him to figure out what makes the objects dif-

ferent and (2) provide the child with a temporal means of sequencing

objects by naming them in an order which is analogous to spatial

sequencing from left-to-right.

Teachers were encouraged to use the letter names when they

played the games with the children. Using the Lotto game, a child

might be required to give the name of the letter before he was

allowed to place it on his board. One specific activity was used

primarily for orientation. A set of wooden letters was provided

for each classroom. The teacher held up the letter p and had the

children name it. Then she changed the orientation of the letter

and asked the children what its new name was. This activity was

also used for letter order.

One innovative teacher used the wooden letters to play an unusual

game with her children. She would introduce a letter to one of her

children as, e.g., "This is my friend 'f'." The child would then

introduce "f" to one of his friends. Then she might change the

orientation of the letter and ask "Is this my friend 'f'?" to which

the children would reply "No!"

The amount of time spent on letter-naming varied widely depend-

ing upon the teacher. The fact that some children could name the

letter sequences correctly and in order and yet still made order

errors on the BPST indicates that the naming ability does not provide

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a surefire means of teaching the child to attend to order in a matching task.

2.17 Conclusions

All of the visual skill games were playable. They were all enjoyed by the children when first introduced and played. After extended practice with the games, however, the children lost interest in some versions. Because of the overlap in content, it was decided to eliminate the version that the children seemed to become bored with.

In the matching activities such as Lotto and Battle, children who are able to play the game may not show mastery on the visual skills tests. We believe that the skill involved in these games requires attention to some relevant dimension but not memory of the value of that dimension. For instance, the child may pay attention to order, but not remember the specific order. The BPST tests, on the other hand, may involve memory for the specific information.

There was little attempt made to encourage teachers to focus their time and attention on children who had not yet developed the visual skills. More individualized attention may be necessary in order for the child to be given enough informative feedback to master the tasks. This seems to pose a major problem for successful implementation of the program.

2.2 Noise Matching

Noise Matching is the name of an activity in which kindergart-ners play with sets of rattles in order to practice hearing whether non-speech sounds sound alike or different. We do not claim that ability to discriminate non-speech sounds is related to success in reading. The activity was included in the PSP as a means of introducing certain concepts and related vocabulary, such as "sound the same," which in turn are needed for the basic prereading acti-vities. Also, playing the Noise Matching Game provides a preliminary experience of cooperation in small groups, which is fundamental to the success of the PSP.

The game consists of eight sets of four rattles each. Four rattles which belong together have labels of the same color and shape. Within each set, one rattle, marked by a white top, is the standard, and one other rattle makes the same sound as the standard. The object of the game is to determine which of the three alternates sounds like the standard.

The Noise Matching Game was developed on the basis of a brief experiment in December, 1970. That experiment, which compared two forms of the game on ten children, indicated that a child performs the task more easily if he holds both the standard rattle and each of the alternates than if another person controls the standard and he manipulates only the alternates. The experiment also indicated that the game serves its purpose equally well regardless of how difficult the sound discriminations are among the rattles.

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Teachers agreed that Noise Matching is valuable for teaching peripheral skills as intended. Teachers S and L, who taught less able classes, commented in particular that they used Noise Matching to teach the children that they must be quiet and listen carefully whenever they play games about sounds.

Revisions of the Noise Matching Game involve the mechanics of producing the rattles rather than techniques for using them in the classroom. The rattles used for the tryout were hand-made from metal film roll cans, with 2-inch machine screws put through the caps as handles. This design allowed great variation in how the rattles sounded and difficulty in matching them correctly. Future design should promote consistency in the sound of each rattle.

Children want to open the rattles to see what is inside. Not only must the containers be sealed, but teachers recommended that a strip of tape or stripe of paint be added to remind the children that the containers are not meant to open.

Teachers liked the labeling of the sets of rattles with geo-metric shapes of different colors. They used the game to teach organization of objects into sets, as well as for the other purposes mentioned.

2.3 Picture-Sound Learning

Picture-sound correspondences were the means used in the first phase of the instructional program to make the children aware of each speech sound as a separable unit. Such an awareness is prerequisite to tasks such as determining whether a given sound is present in a

word (sound matching) and combining a series of sounds to form a
single word (blending). Each of 36 speech sounds was associated
with a line drawing of an animal or a person who "made" that sound.
For example, /k/ was associated with a "great big crow" who says
/k, k, k/; /i/ with "a scared old lady" who is pictured standing
on a chair with a mouse beneath it and who says /i, i, i/.[13]

The picture-sound correspondences were presented in sets of
four, first in the context of a story, then in a verse of "The
Sound Song." The song was the chief medium for teaching the children
to associate each sound with its picture. After the children had
mastered three sets, they began to use those twelve sounds in sound
matching practice. Meanwhile, they went on to learn additional pic-
ture-sound correspondences.

2.31   Materials and Methods

The activities used to teach the picture-sound correspondences
and to test mastery of them are listed below.

Teaching and Testing of Picture-Sound Correspondences

1. Picture-Sound Stories
2. "The Sound Song"
3. Picture-Sound Charades
4. Picture-Sound Drill
5. Picture-Sound Drill Game
6. Picture-Sound Testing
7. Sound Song Coloring Sheets (reinforcement)

However, the list above may give a distorted impression of the

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[13]IPA symbols are used here to represent sounds; in the teacher's
handbook, Thorndike-Barnhart symbols are used.

proportion of the program devoted to the teaching of picture-sound

correspondences, which are after all a means to gain other skills

rather than an end in themselves. The activities developed to serve

this purpose have few variations, so many different activities were

devised. By contrast, the Sound Matching Cards come with instructions

for five different games, and teachers may devise others.[14]

The basic materials for all of the teaching and testing activi-

ties were 5 1/2" x 4 1/4" cards on which the line drawings associated

with each sound were printed. The cards were used in various ways

for different activities. One variation was a set of posters: each

set of four cards that went together in a story and in a verse of

the song was mounted on a separate sheet of colored posterboard. The

teacher displayed the appropriate posters when the class discussed

a story, sang the song, or played charades. After she had read a

story, the teacher could call on a child to retell it, using the

poster as a guide. When the class sang, one child was designated

as "leader" for each verse, to point to each of the pictures in the

order they were mentioned in the song. Sometimes, during charades,

the posters were used to provide suggestions to the child chosen

as actor of what he might do and also hints to the group of what he

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[14] An additional reason for the disproportion between the two
groups of activities was that in the single-semester tryout, a far
greater proportion of time was spent learning picture-sound corres-
pondences than will be the case in a full-year program. The results
and conclusions presented below indicate the additional materials
that will be used for teaching sound skills.

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could be showing.

Children were tested individually for mastery of the picture-sound pairs; when a child gave the correct sound for a card he was shown, he was given a copy of that card of his own. The children kept cards earned in this manner in cubby holes marked with their names.

For the sound song coloring sheets the four pictures for each sound song verse were reproduced on an 8 1/2" x 11" sheet. As reinforcement, the sheets gave the children an additional opportunity to handle the pictures. When they were completed, the children could take the sheets home and show them to their parents.

Assessment of the children's learning of picture-sound correspondences was accomplished by picture-sound testing. Teachers had a record sheet on which they marked off the cards earned by each child.

2.32 Results

As expected, the children in all three tryout classes were successful in learning the picture-sound associations taught by means of the activities described in the preceding section. In the course of the tryout, classes M and S worked on six verses of "The Sound Song," class L worked on five verses. Toward the end of the tryout, teachers did not have time to test every child on the most recently-learned picture-sound associations. The records for the earlier part of the tryout suggest that with more time, almost every

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child could have demonstrated mastery of all the picture-sound associations. The table shows the number of children in each class who had mastered all 16 sounds in verses I - IV and the numbers of sounds mastered by children who fell short of 16.

Distribution of Children According to Sound Mastery

Class	Total # Ss	# Ss knowing all 16 sounds	# Ss knowing 15	14	13	12	sounds fewer
M	27	21	4				2
L	19	15		1	1	2	
S	8	7	1				

2.33 Conclusions

Some of the activities must be renamed to eliminate verbiage. For example, all the activities called "Picture-Sound This or That" could be called just "Sound This or That." Labels should be self-explanatory to teachers and, if possible, to children as well. The latter is of secondary importance, because a kindergarten teacher will in any case develop labels for activities that her class will become familiar with and understand.

The program should include more activities which the children

can participate in without close supervision. Development of such activities is particularly difficult in the case of sound skills, because the child's response is momentary rather than being recorded temporarily by his placement of a card on a lotto board or some other device. This problem is discussed more fully in the report of Sound Matching.

The Teacher's Handbook is inconvenient for reference to "The Sound Song" and the stories, which the teacher always needs copies of at a particular place, for example, the piano or the chair where she reads to the class. Perhaps the teacher should receive a separately bound "Songbook" and "Storybook" to use in class, aside from the reference copies in her handbook.

Materials for picture-sound activities should include a pocket-board which the teacher can rest on an easel or on the chalktray of the blackboard. Teacher M used a pocket-board she had from another set of materials and found it valuable for class work on particular picture-sound pairs.

Teachers suggested that the white picture-sound cards should be coded in some manner, so that a person can sort them without reference to the text of "The Sound Song." Numbering them in the order in which they are introduced would suffice.

2.34   The Picture-Sound Associations

At the end of the tryout, teachers commented on the effectiveness of each of the picture-sound pairs. These comments are given here following the order in which the sounds are presented in "The

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Sound Song." If a sound is not mentioned, the teachers agreed that

the picture and the label associated with it were satisfactory.

/n/. The lady wagging her index finger was unsatisfactory,

because the children's (and the teachers') natural reaction to

the picture was that the lady was saying "no, no, no." It was very

difficult for them to say only /n, n, n/. Teachers suggested a

buzzing mosquito as an alternate.

/u/. Children tended to say "boo," rather than /u/ in reaction

to the ghost picture. Teachers suggested that if the ghost were in

the same verse as the baby who says /b/, there would be less con-

fusion.

/k/. The crow is not a logical associate in the children's

experience. At this point in time, there is no good suggestion for an

alternate.

/f/. Teacher M referred to "a frightened cat"; Teacher L

called it "an angry cat." The label made no difference in the

children's learning the sound, but one or the other should be sug-

gested for consistency.

/aI/. The drawing should show a finger next to the eye, as in

the corresponding line of the song, "I put my finger by my eye."

/ ɪŋ/. The ringing phone was not a successful association, per-

haps because children are accustomed to imitating household noises

as realistically as they can rather than with speech sounds. Again,

there is no good alternate. A flying arrow was suggested, but this

may be another traditional adult association, outside the children's experience.

/I/ and /ə/. Teachers commented that both these sounds were difficult for the children to produce accurately. It was not the pictures which caused them trouble, however.

/ℓ/. This sound was particularly troublesome. The picture should be redrawn to show the singers' tongues. In the present drawing they are singing /o/.

/s/. A siren is a good associate for this sound, but a fire engine should be substituted for the police car because many children are frightened by police cars.

None of the tryout classes reached verses VIII or IX of "The Sound Song," so that comments on the pictures for these verses are surmises rather than observations.

/j/. Teachers doubt that a half-sung taunt generally begins with /j/. Often children yell "nah, nah, nah."

/d/. A "big old dummy" who says /d/ is too mature a concept for kindergartners. Also, it is semantically too closely related to the boy who can't remember (/ə/). Teachers suggested a man drilling in the street as a picture associate for /d/.

/t/. Raindrops pattering is too abstract a concept. Teachers suggested using the picture of the lady wagging her forefinger, which was originally drawn for /n/. She could be saying /t, t, t/ (tut, tut).

/æ/. The drawing should look more like a lamb, less like a sheep.

2.35 Picture-Sound Stories

Teacher S recommended that the events of the story related to each sound should follow a logical sequence. In verse 2, for example, David heard both the crow (/k/) and the snake (/s/) in the garden, and the sequence is reversible without changing the story. Aside from making it easier for both children and teacher to learn the song, logical sequencing will appeal to the teacher because it will reinforce any teaching of order of events and relative time that she is doing outside of the Prereading Skills Program.

Teacher S also made the following suggestions for revision of the stories: (1) Each sound should be repeated more often; (2) The text should alert the children to the sound with lines like, "Listen!" and with questions like, "What do you think David heard?"

All teachers found that for review of the stories (and of "The Sound Song"), it was effective to designate one child to come up in front of the class to point to the pictures on the poster and retell the story associated with them.

2.36 "The Sound Song"

The sequence in which the sounds are presented should be revised, taking into account ease of "blendability." As the verses are now, the first 12 sounds include 4 vowels; it should be considered whether another proportion of vowels to consonants would provide a better initial set for blending and also what specific phonemes should be included.

The children in all classes had particular difficulty distinguish-

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ing between certain phoneme pairs. The pairs observed causing
trouble during the tryout, that is, without reference to controlled
studies of discrimination and production, were the following:

$$
\begin{array}{ll}
/\check{s}/ & /\check{c}/ \\
/f/ & /s/ \\
/n/ & /m/ \\
/ɔ/ & /ə/ \\
/ɛ/ & /e/
\end{array}
$$

In the present version of "The Sound Song," /ɔ/ and /ə/ are intro-
duced in the same verse (IV); in all the other pairs, the two
sounds occur in different verses. A discrimination drill must be
incorporated into the picture-sound activities to insure that
children are hearing the difference between easily confusable
sounds and are producing them differently.

"The Sound Song" must have the sounds in the same order as
they occur in the stories. There were some discrepancies in the
tryout materials.

Teacher L in particular felt that a tape recording of the song
would help teachers to learn it themselves and to teach it to their
classes. For the tryout, a tape of "The Sound Song" was used by
Teacher L who found it helpful. On the tape each verse was heard
twice in succession. The first time, the singer sang the entire
verse. On the repetition, the singer was silent on the sounds, so
that the children would sing them alone. In general, Teacher L
preferred having her class sing along with a record to leading them
with her own voice, and there are surely many other teachers who
will share her preference. However Teacher L thought the use of
complex chords in the musical accompaniment was confusing to the

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children. Teacher S felt it essential that the teacher introduce each verse of the song by singing it herself, regardless how inadequate a singer or song leader she feels she is. Teacher S felt the children would enjoy singing along with a tape once they have learned a part of the song. In Teacher S's classroom there was a tape recorder with earphones set up, and children could listen to tapes if they chose to during free play. Project observers thought that in similarly equipped classrooms children would enjoy having a tape of "The Sound Song" to listen to and to sing with while looking at their own picture-sound cards. The purpose of a tape--whether it will be for teaching the song or for sing-along review--must be decided, as that factor will indicate how fast the text should be sung, how complex possible piano accompaniment should be, and other variables.

Teacher S also suggested with regard to materials that the arrangement of the pictures on the posters for each song verse should encourage left-to-right eye movement. Specifically, the drawings should be mounted

1	2
3	4

or even

1	2	3	4

rather than

1	3
2	4

, as they were for the tryout.

Teachers M and S rested the sound song poster on an easel or on the piano and this arrangement seemed more comfortable than that used by Teacher L, who either supported the poster herself or asked a child to support it.

2.37 Picture-Sound Charades

None of the three tryout teachers was enthusiastic about the

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charade game; all felt their classes lacked the imagination necessary to make the game fun. The project observers, however, felt that children enjoyed the game. Unlike an adult audience, they are happy to see the same dramatization repeated, rather than expecting original interpretations each time the game is played. In a school which stresses creative play, the inclusion of the charade game in the Prereading Skills Program should increase the desirability of the Program.

2.38   Sound Testing

In the picture-sound association learning experiments conducted in Fall, 1970, $\underline{E}$ repeated the picture's description when testing $\underline{S}$ on the sounds. For example, $\underline{E}$ asked, "What does the hissing snake say?" In sound testing in the classroom, the teacher must ask only, "Do you remember what this says?" The child must recall both the identification of the picture and the sound it "makes." If the identification is given, the child may be able to quote the appropriate line of "The Sound Song" although he wouldn't have remembered the picture-sound association outside of that context.

2.39   Sound Song Coloring Sheets

Many schools prefer that children not be asked to color in outlines; in any case, the picture-sound drawings are too detailed for kindergartners to color accurately. The sheets could be handed out as "song sheets" only, for the children to look at while reviewing verses of the song. For additional reinforcement of

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the picture-sound associations, a teacher could ask her class to
make freehand drawings of the events in the stories.

2.4 Sound Matching

Sound matching refers to a child's ability to hear whether a
given sound is present in a word. Competence in sound matching in-
cludes the ability to determine in what position (initial, medial,
final) a given sound is present and the ability to hear whether two
words begin (or end) with the same sound. These skills are consid-
ered prerequisites to the skill of blending, described in the follow-
ing report of this series.

2.41 Materials and Methods

The Sound Matching Game was devised for teaching sound-matching
skills. It consists of decks of standard white picture-sound cards
plus "word cards," which are light brown on one side, white on the other.
On the colored side is a picture representing a word that includes one
of the "Song" sounds, and on the white side is the picture corresponding
to that sound. The decks of Sound Matching Cards are differentiated by which
sounds are included and by what position in the word (any, beginning, middle,
end) the sounds occupy.   The goal in any game with the cards is to accu-
mulate pairs by correctly matching a sound card to a word card which has
that sound. Visually matching the sound card to the picture on the white
side of the word card provides a check for the auditory matching skill.

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Late in the tryout semester, an oral form of the Sound Matching
Game was developed for play by three to five children with supervision.
The teacher or aide designates four picture-sound cards, and the
children bring their own copies of these from their cubby holes
and lay them out on the floor or table. The aide then pronounces
a word for each child in turn; the child says the first sound
in the word and repeats the whole word. Also, he points to the
picture-sound card for the sound he has isolated. If he does the
task correctly, he is given a bead as a token. For further rein-
forcement, the aide then asks the whole group to repeat the sound
and the word. Four to five words per child determine a satisfactory
game.

Assessment of sound matching skills was informal. Teachers and
aides observed children playing the Sound Matching Game or played
with them. Afterwards they recorded their impression of whether a
child had mastered the skill, was progressing satisfactorily on it,
or needed help with it.

2.42   Results

In the course of the Spring tryout, classes had time to work on
sound matching skills only with the 12 sounds introduced in verses
I - III of "The Sound Song." Only teacher M submitted a completed
assessment record of her class's achievement on sound matching skills.
These results are summarized below.

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Assessment of Sound Matching Ability in Class M

Sound Match Position	Need help	# Ss Learning	Mastery	Total Ss in class
Initial	5	6	16	27
Final	7	11	9	27
Middle	9	11	7	27

All five children who had difficulty with sounds in word-initial position also had difficulty with sounds in other positions.

The evaluation of the tryout by performance on the BPST reported separately indicates that the sound-matching activities used in the tryout led to significant improvement in the children's performance of this skill. In an independent test, teachers S and L found that children who had mastered sound-matching as it is tested in the BPST could not perform the more difficult task of saying which two words of a set had the same initial sound. Apparently the ability to say whether two words begin or end with the same sound does not follow from the ability to identify a given sound in each of two words. The difficulty may result from the added memory work involved or from the child's lacking a strategy for aural comparison. Training on this skill ("word-matching") will be included in the revised version of the PSP.

Teachers and researchers found that without supervision, children misused the Sound Matching Cards. Instead of checking themselves by

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visual matching, they played a visual matching game along the lines of "Concentration," that is, they memorized what pictures were on the white side of the "word cards" and matched sound cards to them without going through the sounding-out process that the game was intended to encourage.

The oral Sound Matching Game successfully "devisualized" the task. Teachers also liked the game, because it gave the children an opportunity to use their own copies of the picture-sound cards. The game has the major disadvantage that it requires constant adult participation. It should perhaps be adapted for use with the whole class except in classes that are privileged to have regular aides.

2.43 Conclusions

A suggestion for a game that would not require immediate and constant supervision was to give the child single-faced "word cards" and ask him to sort them by, for example, initial sound; when he had finished, the teacher would check his word card piles, preferably with him there to redo with her help any he had missed. This game could also train children in the skill of "word matching." A game of this form would have the additional advantage that it gives the teacher a more objective means of assessing sound matching skill.

Another suggestion was a Sound Matching Blindfold Game: a child would wear a blindfold while answering a sound-matching question put to him by another child, for example, "Do you hear the /s/ -sound in bus?" The question could be suggested by an array of SMG word cards and sound cards laid out in front of the players.

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Whatever sound matching games are used, each child must be re-
minded to repeat the sound he is list ing for before every word
that he considers for it.

Whenever the question put to a child involves word-position,
e.g., "What is the first sound in . . . ?", the word in question
should include two "Song" sounds from the set the child is working
on. Otherwise, he can give the correct answer by elimination,
possibly without realizing the significance of position.

An important observation made during the tryout was that a
child must be expressly taught the concept of order as it pertains
to sounds in a word before he can understand what he is being asked
to do in a sound-matching activity. Teacher S successfully used a
toy train to introduce this idea, letting [engine]—[car]—[caboose]
serve as place-holders for first-middle-last sounds in a word.
Teachers and aides must be alerted that simple terminology can cause
the children confusion. For example, one should refer to "the last
sound" in a word, rather than "the sound at the end" of the word,
because to a child, "the end" could be either end, the beginning
sound or the final sound.

The original Sound Matching Card Game was a favorite of both
teachers and children, but it can be substantially improved by a
number of recommended changes in the materials: 1. Immediate
introduction of position discrimination. In the first set of word
cards introduced with the Sound Matching Game, no word had more than

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one of the 12 sounds in verses I - III of "The Sound Song." Chair
was included, for example, but not chain. It was expected that
this restriction would simplify the task for the children. Since
only one sound in each word corresponded to a picture-sound card,
the children did not have to distinguish the position of the sounds
they were listening for. The only correct sound match for chair
is /č/ (picture of train), but for chain it could be /č/ (train) or
/n/ (lady wagging forefinger), depending on whether the beginning
sound or the final sound is the target. It was also hoped that
initial practice in finding sounds in all word positions would pre-
vent the children from later getting stuck on beginning sounds, for
example, so that they would not have difficulty at the next stage
in listening for final and middle sounds. It turned out, however,
that initial experience of finding correct sound matches in all word-
positions confused the children when they were subsequently restricted
to beginning position only. Also contrary to expectation, once the
children had mastered distinguishing beginning sounds, they had
little trouble changing their focus to final sounds. These observa-
tions indicate that position discrimination should be included in
the Sound Matching Game from the start.

2. Reduction of deck size. The original decks had 20-30
word cards. Only children who had already mastered sound matching
could cope with the full array of these decks. Future editions of
the game will be organized in decks of ten; children who require
additional challenge can play with two or three decks at once. With
a larger number of smaller decks the teacher can vary the materials

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the children use while they continue to work on the same skill, thus minimizing the likelihood that they will memorize the word-sound pairs and the likelihood that they will become bored with the game.

3. Color coding. In the original decks, the color of a word card indicated the verse of "The Sound Song" in which the sound to be matched occurred, e.g., a <u>witch</u> for final /č/ (verse I) was beige, but a <u>witch</u> for initial /w/ (verse VI) was gray. This system failed on two counts: it gave the children a significant visual hint as to what sounds occurred in which words, and it did not help the teacher to recognize from a distance what set of sounds a group of children was working on. In revised editions of the game, color of a word card will indicate the position of the target sound. Using the same color for beginning (final, middle) sounds from all nine verses will allow the teacher to arrange decks of cards for children who need matching drills on any particular set of sounds.

4. Item selection. Word cards proved unsatisfactory for various reasons. These reasons should serve as guidelines for selection of future items, but no doubt further experience will reveal additional selectional criteria for words to be used in sound matching games.

(a) Children's unfamiliarity with label. Children consistently misnamed the following drawings:

Picture	Misnomer
ship (š)	boat (o)
jacket (k)	coat (k, o)
brush (š)	comb (k, o)

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(b) Real pronunciation versus spelling pronunciation.
Items like "mirror" and "bottle" are unsuitable as examples of final
/r/, /l/ if a non-literate person does not necessarily enunciate the
final consonant.

2.5 Blending

Because of the limited time available for the Spring tryout,
blending activities which were scheduled to follow sound matching
were not introduced. Experimental work by the project staff, how-
ever, ruled out at least two indirect approaches to blending. One
approach, teaching children to select the appropriate sequence of
sound pictures for a spoken word ("picture spelling"), was dropped
because the skill did not transfer to blending. The second
approach, teaching children to substitute consonants in sequences
like fee-fi-foe, see-si-so, was dropped because we could not find a
successful way to teach the activity.

Direct teaching of blending, in contrast, proved relatively
successful when tried late in May with a small number of slow learners
from kindergarten classes not using the PSP. This tryout is described
in the following sections.

2.51 Materials and Methods

One preliminary trial was run with six children from class M_1.
Six children, two of whom had participated in the preliminary trial,
were then given four learning sessions. Six children from class L
were given one learning session.

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On days 1 through 4, E worked individually for 10-20 minutes
with each S. Ss were generally told that they were going to play
a game with E. The task was introduced each time by the use of
S's first name; E would segment S's name into three to four parts and ask,
"If I say _-_-_-_, what/whose name am I saying?" Ss rarely had
difficulty answering correctly. E would tell S and repeat the
example if S didn't know. E then would say, "Now we are going to
do something just like that" and proceed with the task. If S
seemed tired, the length of a session was cut short.

The list used on day 1 was taken from the BPST Blending subtest.
S's memory of picture sound card associations was first checked by
E. Then, five words were given aurally (one used as an example) with
the first C separated from VC, five words (one used as an example)
were given with the final C separated from the first (C)V, and then
five words were given (one used as an example) with all three sounds
isolated by E.

The list used on day 2 was taken from form B of the BPST Blend-
ing subtest. Picture-sound association items on which S's memory
had been poor on day 1 were given to S again. Then three sets of
five words each were given to S to blend, with the initial sound
isolated from the last two, with the final sound isolated from the
first two, and with all sounds isolated from each other.

Day 3 was begun with the use of ten sets of picture sound cards
by E; sounds were identified by E who then said the sounds three times
(with decreasing intervals between the sounds) and blended the word
(green word card) for S. S was asked to participate and to try to

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do the last four sets himself. $\underline{S}$s were then aurally given words to blend with initial, final or all three sounds isolated by $\underline{E}$, according to what previous data indicated was $\underline{S}$'s weakness.

On day 4, $\underline{S}$s were given eight words to blend (seven of them common nouns) which were all composed of affricates, or fricatives, or nasals and vowels. Two $\underline{S}$s who were doing well and who did not seem tired were given seven more words (less common nouns, pronouns) to blend.

On a fifth day, ten $\underline{S}$s from class M_1 were given blending sounds for closed sets (colors, girls' and boys' names in the classroom) to guess. Words were divided $P_1 \ P_2: P_2 \ P_3$ (re-ed) with each P representing one of three phonemes in the word. The same words were then given to the children with all three pronouns isolated. Their results were so good that it was decided to try the same exercise with one variation in Class L where the children's progress was generally slower than Class M_1's.

2.52 Conclusions

There is probably no causal relation between picture spelling and blending: children who make errors in picture spelling (confusing /s/ for /z/, e.g.) can blend.

The child should master the sound matching exercise before he is taught to blend; if he is able to work with one isolated element (matching it), and if he has learned to hear beginning, middle and final word position sounds, he will understand better when the teacher tries to explain that another sound should go at the beginning of the word. One must remember that the concept of order in a word is connected with literacy and that it must be taught to a child; children trying to picture spell (who had had some sound matching practice) could select sound cards but did not usually place them correct-

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ly, and never said the word out loud. Also, if there is a word within the blended word, the child might get stuck on the smaller word and not go beyond it to complete blending all of the given elements. (This obviously cannot be avoided in the case of blending plural forms.)

It is good to introduce the concept by using the child's name as an example. This is so familiar to the child that he can usually infer what word is formed when the elements are combined. The teacher can then refer to what the child did with his own name, rather than trying to explain the task with long words the child does not know.

One should work at first with only two- and three-element words. The order of difficulty for three-element words seems to be: final-isolated (bee + t); initial isolated (b + eet); and then all three iso-lated.

Using picture-sound cards to represent the elements to be blended interferes with the child's progress. The child is slowed down and distracted each time that he stops to recall what the picture says. (This problem does not seem to be alleviated when the child is given additional drill with memorizing picture-sound card sounds; no matter how well he has memorized them, he delays in giving the appropriate sounds for them.) Picture-sound cards are only valuable here for reminding a child about what a "sound" is.

It is necessary but not sufficient for the child to say out loud the sounds he should be blending. In fact, the process of saying the sounds out loud is often exhausting and distracting, hindering a child's progress in blending. Whenever a child stops

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saying the sounds out loud, say them for him. Later on a child can
be asked to blend the sounds which only he says out loud.

Although examples are better than complicated verbal instructions,
some verbal instructions may convey the idea if used during training
(in complementary distribution): "What does it _sound_ like?", "Say
them (the sounds) together faster without stopping." If all the
elements of a word to be blended are voiced, let the child touch
your larynx and then his own while both of you say all the sounds. Emphasize
the visual aspects. Have the child watch you say the first element
and imitate you (drawing out the duration of the sound) and then tell
him to say that and say x (the second sound).

Whenever a child makes an error, tell him what the correct
answer would be: for example, say "If it were 'house,' I would
have said $\left[\text{h+au+s}\right]$, but I said $\left[\text{m+au+s}\right]$." If he cannot come up with
the right answer tell him what it is, and go back over the sounds to
suggest how you got there.

If a little cheating will help the child to figure out what is
going on, or if a child has been getting discouraged, cheat. Start
to say the elements so close together that the child can really hear
the blended word, or blend two or three elements and let the child
work from there to blend the third element to the other two or
categorize the blended word ("It's something you eat.").

A great deal of practice is necessary even after a child seems
to have caught on. Often a child may intuitively sense the word or
a portion of the word without having mastered the task (for transfer);
he may have blended two of three elements and failed to comprehend

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that a third is missing (even if the three elements are repeated

for him) or he may guess the correct word or one that rhymes with

it.

2.6   Picture-Letter Learning

Picture-letter correspondence learning is viewed as an inter-

mediate step between picture-sound training and letter-sound corre-

spondence. It is assumed that, just as it was easy for children to

learn speech sounds associated with pictures, it is relatively easy

for children to learn letter sounds if each letter (or pair of letters) is

matched with one of the picture-sound card pictures.

After picture-sound and picture-letter associations are learned,

the pictures may gradually be removed from classroom use, leaving

children who know letter-sound correspondences.

2.61   Materials and Methods

Picture-sound cards which children had already earned in

picture-sound testing were the primary material. Each class was to

be introduced to three or four picture-letter correspondences at a time.

(with one or two class days available for review of new correspondences

taught). Instructions given to teachers were three activity sheets

for (1) picture-letter exercises, (2) picture-letter drill game (re-

medial), and (3) picture-letter charades.

Two teachers were prepared to try out picture-letter activities

before the end of the spring semester. Class M spent ten to twelve

half-hour periods on these exercises. Class S spent four half-hour

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periods on picture-letter learning. Class L did not work on picture-
letter learning.

It was suggested that teachers first introduce the following
picture-letter correspondences:

Picture	Letter(s)	Key Word
snake	s	<u>s</u>un
girl cleaning eyeglasses	h	<u>h</u>ot
woman pointing finger, saying "no"	n	<u>n</u>ut
woman pinching her nose	i	p<u>i</u>t
boy at doctor's office	o	p<u>o</u>t
boy scratching head	u	n<u>u</u>t
frightened cat	f	<u>f</u>un
crow	c	<u>c</u>up
boy eating cake	m	<u>m</u>op
wind	w	<u>w</u>it
ghost	oo	m<u>oo</u>n
girl with finger to lips, saying "sh"	sh	<u>sh</u>ip
baby	b	<u>b</u>oot
popping corn	p	<u>p</u>in

Teacher M followed activity sheet (1) to introduce picture-
letter correspondences and then added ideas of her own for reinforce-
ment of correspondences taught. Her class was introduced to the
following letters: s, f, n, i; o, u; c.
Picture-letter charades was tried once with her class. Teacher S--
following procedures similar to M's--introduced her class to: s, f,
n, oo, m. The picture-letter drill game (activity sheet 2)-- as
such-- was not tried by either teacher.

Children in both classes, following the teacher's example,
wrote appropriate letter(s) on the backs of their own picture-sound cards.
Within two days, all children's cards were checked (and corrected or
replaced if necessary) by the teacher or an aide. Teacher M, most
often using magic slates which each child in her class owns, reviewed

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picture-letter correspondences with the entire class--saying a speech sound, showing a picture-sound card, or saying the name of a letter and asking children to write appropriate letters on their slates. Teacher M reviewed with her class words (they suggested) a specific letter could be heard in: for example, goose, moon, shoo ("go away") were suggested for the letters <u>oo</u>. Later on , some children in Teacher M's class sounded out given words with picture-sound cards (at the front of the class) and then turned cards over to write the word on the blackboard.

Teacher S used a puppet, Styrofoam letters, and the blackboard to rein-force picture-letter learning.

2.62 Results

Some children in each class had not yet mastered all the picture-letter correspondences introduced. Most seem to have grasped what was taught, but would surely have benefited from further reinforce-ment had there been time. The BPST does not have a section devoted to picture-sound or picture-letter learning. No other objective measure was used to get precise results.

Children in class M loved playing the charades game; and those who caught on enjoyed picture-letter exercises. However, some were confused, either because they had not mastered letter names or be-cause so many picture-letter correspondences were taught at once.

Teachers liked the activity in general, but suggested that (1) (S) one letter <u>might</u> be more difficult to draw than others and therefore should be taught later; (2) (M) picture-sound cards should

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be given out to children only when they are ready to use them for picture-letter work. The time span between picture-sound testing and picture-letter exercises was too long. (3) Graphemes in instructions (such as oo) are confusing in light of the Thorndike-Barnhart list of speech sounds (u for example) the teacher had already been given.

2.63 Conclusions for Procedure

1. Children should have mastered letter names, if they are taught overtly, before beginning these exercises.

2. There should be provision for practicing (as a class) the distinction between letter sounds and letter names.

3. Picture-letter correspondences should be introduced slowly (one or two at a time) and reinforced frequently: for example, with a "picture-letter of the day."

4. Visually similar letters should be justaposed to force the child (and any unimaginative teachers) to notice important distinctions: for example, the orientation distinctions (such as u and n); the tail distinguishing h from n; the lines distinguishing o and e, a and d, f and t, y and g.

5. If the child can not write a letter well enough, the teacher should write the letter on his card for him.

6. Some way must be found to make management of bunches of picture-sound cards by 30 children simpler. In teacher M's class children kept their picture-letter cards separate from other picture-sound cards, and the aide functioned as a pony-express, replacing picture-letter cards children had lost. However, it was hard for children to get

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half a dozen relevant cards separated out for a day's practice, and
those who did required a great deal of floor space and time to have
access to the six to ten cards in question.

7. Teachers must be instructed how to handle apparent spelling
exceptions: for example, (1) if a child is taught the letters ou for
the diphthong, should he be encouraged to spell cow or cou, or (2) if
a child spells goose as goos, should he be told about the missing e?
We must decide whether to risk reinforcing inadequate spellings or
to risk confusing children with too many rules.

8. More varied methods to make review and reinforcement of
correspondences interesting (for slower children) must be found.

2.64 Conclusions for Materials

1. A flap-type holding board (approx. 17" high) with at least
two rows for holding picture-sound cards would be very helpful for
the teacher, and should be inexpensive if made of cardboard.

Picture-
sound
Card
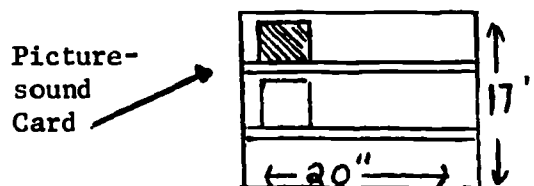
2. Teachers should be given--with their activity sheets--lists
of commonly used words in which each new letter (or pair of letters)
appears: for example, on one page, cup, mud, sun, fun, cut, and
others for the letter u.

3. There may be value in providing mimeograph masters of
letters for children who want to practice tracing or copying letters
they are learning in their free time.

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4. Wooden letters might be a helpful supplementary material.

5. Magic slates can be distracting, but they can also save a lot of waste and clutter of paper when children are answering the teacher's questions and identifying letters.

Further research is necessary to determine which letter-sound correspondences to teach in the entire set of 36 sounds--to give the child the largest possible sight vocabulary and the least confusion meeting counter-examples to our teaching. Further questions to answer are:

1. whether to distinguish long and short vowels and to teach the final e;

2. which of several graphemes for each vowel sound should be taught: for example, aCe (ate), ai (bait), ay (play) or eigh (eight).

3. which of two graphemes which represent the same consonant sound should be taught juxtaposed or in sequence, and in what sequence: for example, c and k; s and c; g and j.

3. General Evaluation

3.1 Summary of Informal Evaluation

The general format of the program and the majority of the activities were judged to be successful by both teachers and the project staff. The informal assessment procedures, on the other hand, were found to be wanting.

In spite of production and scheduling problems, the program ran smoothly and continuously from February through the end of May. Variations in grouping, from whole class to small group to individuals, were managed without excessive difficulty, yet problems did occur, the most obvious being the inability of the low-ability children to

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profit from unmonitored groups. For these children both the rules

of the various games and the need to interact cooperatively with

other children posed difficulties. Where discipline is a problem,

an aide is essential for working in small groups. An alternative

to homogeneous grouping, that of placing high and low ability

children in the same group, depends for success upon the patience

of high-ability children, which is often lacking.

A group size of three children was found to be optimal for

most activities. Five children seldom could play cooperative games,

chiefly because the wait time between turns for any child was too

long.

Initial faults in the program schedule derived mostly from

pacing the introduction of new activities too rapidly and from too

little review. These problems were corrected by the end of the

second week. A more serious fault which was detected only after

end-of-the-year testing and informal evaluation was that the teachers

had been given too little time in the program for teaching. This

time must be increased, even at the expense of small group activities.

Some of the concepts required for the visual skills, such as attention

to order and orientation, which were not learned very well from the

games, appear to require overt explanation as well. Furthermore,

for lower socioeconomic areas, a considerable amount of background

information will need to be taught overtly, e.g., "front," "middle,"

"back"; "up-down"; "first," "second," "last." The possibility of

imparting these notions through cleverly constructed games is con-

sidered to be low.

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Assessment for picture-sound learning was based on individual testing on each set of four cards. The child was allowed to keep each card he properly identified; in addition, the teacher recorded the child's performance in her log. This procedure was accepted by the teachers and used without difficulty. Assessment for visual skills, originally based upon a highly unsuccessful informal observation scheme, was finally resolved through the use of workbook pages which a child marked individually. Stencils were provided for grading and were used by the child when the workbook pages were serving as practice, and by the teacher when the pages were for assessment. Although this assessment procedure was not begun until late in the semester, it appeared to be satisfactory. No similar procedure was found for sound matching and sound blending, although the workbook procedure may be adaptable for these. What did not work was an informal observation procedure by which the teacher was to grade four children each day on a three point scale (mastery, progressing, needs help) for whatever activity he was doing. The need for simple but formal assessment procedures which require a minimum of teacher time was evident. Without accurate assessment, many children who require extra help will not receive it because the teacher will not be aware of their deficits. If assessment is too elaborate, however, teachers will ignore it.

3.2 Formal Evaluation

The purpose of this section is to evaluate the tryout program in terms of its effect on children's performance on the BPST. The

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points which are important to reiterate in interpreting the data
to be reported include the following:

1. The specific target skills of the instructional program
included those tested by the BPST--sound matching, sound blending,
letter orientation, letter order, and word detail--and, additionally,
letter names and specific picture-sound associations.

2. With the exception of sound matching, the BPST tests used
have internal reliabilities better than .80, making them respectable
evaluative instruments.

3. The program was being tried out for the first time and
developed concurrently with the tryout; to evaluate its effect on
children's performance this time around is a very conservative test
of its potential effectiveness. In particular, provisions for
organizing, evaluating, and individualizing instruction were rudi-
mentary; and the total time spent on the program was up to half a
year shorter then that envisioned for later tryout.

3.21 Materials and Methods

Ten children having February BPST scores were randomly sampled
from each of the two large tryout classes (L & M) and the two develop-
mental classes which had received considerable experimenter
attention in the Fall $(S_1 \& M_1)$. Children in class S_1 also had access to
program materials throughout the spring. (Teachers of the developmental
classes were teaching the prereading program to their other class.)
The mean correct on each of the BPST February tests is presented in
Table 1 for each of the four classes and each of the four samples

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selected for end-of-year retest. (Class L_1 was excluded from this study because no February test scores were available.)

The same version (II) of the BPST used in February, 1971, Form A only, was used again in the June testing. Segmentation and Picture-Sound Association Learning were excluded from the June testing, the former because it is to be dropped in Version III and the latter because it is a test intended to provide an index of learning rate for grouping rather than to identify ability in a target skill. Order of testing was as follows: Orientation, Order, (Rest break), Sound Matching, Word Detail, (Rest break), Sound Blending, and Letter Naming. The last test (10 capital letters) was included to sample the teacher's success in teaching letter names.

Children were tested individually by graduate students familiar to the children and experienced in giving the BPST; the same conditions were true for the developmental classes in the February testing. Testing time was approximately 15 to 20 minutes in the end-of-year administration.

Two scores were defined for each of the five BPST tests: number correct and mastery--non-mastery (mastery was identified as better than 90% correct on a test).

3.22 Results

Performance on the June tests by each of the four samples is summarized in Table 1. The mean gain scores from February to June are presented in Table 2. Six of these gains are statistically significant ($p < .01$) by one-tailed t test; with one exception, these

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Table 1

BPST Performance in Two Tryout

and Two Developmental Kindergartens

	SOUND MATCHING	SOUND BLENDING	LETTER ORIEN- TATION	LETTER ORDER	WORD DETAIL	LETTER NAMING
TRYOUT: M						
FEB CLASS $\bar{X}$	7.5	9.8	14.0	12.4	12.7	6.9
FEB SAMPLE $\bar{X}$	7.4	9.8	14.1	12.5	13.0	7.4
JUNE SAMPLE $\bar{X}$	8.8	13.1	14.3	13.9	14.5	8.5
TRYOUT: L						
FEB CLASS $\bar{X}$	6.3	10.2	12.2	11.4	12.0	5.6
FEB SAMPLE $\bar{X}$	6.3	12.1	11.3	10.5	11.9	5.0
JUNE SAMPLE $\bar{X}$	8.3	12.3	13.0	13.9	14.0	7.5
DEVELOPMENTAL: M_1						
FEB CLASS $\bar{X}$	8.0	10.0	14.2	13.8	14.0	8.0
FEB SAMPLE $\bar{X}$	7.4	10.1	15.1	13.9	14.5	7.8
JUNE SAMPLE $\bar{X}$	8.8	13.7	15.7	15.5	15.1	8.9
DEVELOPMENTAL: S_1						
FEB CLASS $\bar{X}$[a]	6.5	10.6	13.0	12.0	12.7	5.6
FEB SAMPLE $\bar{X}$	7.0	10.2	12.8	12.5	13.2	6.8[b]
JUNE SAMPLE $\bar{X}$	7.1	11.0	14.7	14.2	14.9	8.4[b]

[a]Includes $\underline{S}$s participating in additional special class, who were excluded from sample.

[b]$n = 8$

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gains occurred in the tryout classes. Thus, modest gains from the instructional program can be claimed. Every target skill except orientation showed a significant gain in one or the other of the tryout classes; indeed, there was no overlap between the two classes in those skills showing significant gains. The latter fact suggests that the two tryout teachers spent different amounts of time on the different skills. According to their own reports, teacher M stressed sound blending using commercially available materials in preference to sound matching; teacher L stressed matching, spending no time on blending. These emphases correspond to classroom gains. Both teachers, however, reported spending more time on letter orientation than order (few materials were specifically designed for detail); if so, the gains do not reflect this fact.

A more effective criterion of instructional success than a simple gain score is an estimate of the proportion of children initially lacking the skill who acquired it during instruction. Arbitrarily defining skill mastery as better than 90% correct on the appropriate test, we find that the number of children in the sample who lacked a given skill in February ranged from 18 for orientation to 36 for sound matching. The proportion of such children acquiring skill mastery in each skill by June is given in Table 3, broken down by class. According to this measure, approximately a quarter (orientation, sound matching) to a half (blending, word detail) of the children needing instruction in a skill benefited substantially in the tryout groups; almost none (sound matching) to three-quarters (orientation, word detail) of the children in developmental classes showed skill acquisition. In general, success rates on the two

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Table 2

Mean Gain on BPST Scores from February to June Testing

	SOUND MATCHING	SOUND BLENDING	LETTER ORIEN- TATION	LETTER ORDER	WORD DETAIL	LETTER NAMING
TRYOUT						
M	+ 1.4	+ 3.3**	+ 0.2	+ 1.4	+ 1.5**	+ 1.1
L	+ 2.0**	+ 0.2	+ 1.7	+ 3.4**	+ 2.1	+ 2.5**
DEVELOPMENTAL						
M_1	+ 1.0	+ 3.6**	+ 0.6	+ 1.6	+ 0.6	+ 1.1
S_1	+ 0.1	+ 0.8	+ 1.9	+ 1.7	+ 1.7	+ 1.6

**Significant gain, $p < .01$, 1-tailed $\underline{t}$ test, $\underline{df} = 9$

sound skills were higher in tryout classes; on the three letter

skills success rates appeared higher in the developmental classes.

It may be helpful to identify the procedures used for teaching the

letter skills in developmental classes, in case the success rates

there reflect different teaching activities as well as differing

emphases.

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Table 3

Proportion of Children in Sample Without Skill Mastery in February

Acquiring Mastery by June[a]

CLASS	SOUND MATCHING	SOUND BLENDING	LETTER ORIEN-TATION	LETTER ORDER	WORD DETAIL
TRYOUT					
M	1/9	3/6	2/7	4/8	3/8
L	4/9	5/8	1/4	1/6	4/6
Both	5/18(.28)	8/14(.57)	3/11(.27)	5/14(.36)	7/14(.50)
DEVELOPMENTAL					
M_1	0/9	5/8	2/2	2/3	3/3
S_1	1/9	0/8	4/5	4/8	3/5
Both	1/18(.06)	5/16(.31)	6/7(.86)	6/11(.55)	6/8(.75)

[a] Test mastery is defined as better than 90% correct.

Appendix A

Sample Schedules

and Activity Sheets

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UNIT 3

	Activity	Variation	Class Organization
Review	Picture-Sound Song	I	Class
Introduce	Picture-Sound Story AND	II	Class
	Picture-Sound Song	II	
	Noise Matching OR		Group
Introduce	Letter Lotto	Order #1	1 Group

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UNIT 4

Review	Picture-Sound Song	I, II	Class
Introduce	Letter Lotto	Order #1, fn, tz, . . .	Class
	Letter Lotto	Order #1	Groups

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UNIT 18

Visual Skills Page	.	Class
Letter Match Board Game	Order #2,	
OR	mks, . . .	Groups
Letter Lotto		
with		
Letter Name Practice	m, k, s	
AND		
Picture-Sound Testing (or Drill)	sounds from I-VI	Individual
Picture-Sound Charades	IV-VI	Class

UNIT 19

	Visual Skills Page		Class
	Sound Match Game	I-III$_B$	Groups
Introduce	Picture-Letter Exercises	s, h, n, i	Class
	Picture-Letter Exercises	s, h, n, i	Class Groups

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ACTIVITY: Picture-Sound Story

GROUP SIZE: Whole Class

PURPOSE: To introduce (with "The Sound Song") 4 new picture-
               sound associations

MATERIALS: Story
               (Optional) Poster board for corresponding verse
               of "The Sound Song"

DESCRIPTION: Explain that you will read a story which will tell
               the children about some new sounds. As you read the
               story, emphasize the new sounds and be careful to
               pronounce them precisely.

COMMENTS:

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ACTIVITY: <u>Picture-Sound Drill</u>

GROUP SIZE: Individual

PURPOSE: To teach picture-sound associations to children
              who have had difficulty learning them.

MATERIALS: Four picture-sound cards for which the child has
              had difficulty learning sounds.

DESCRIPTION: Put the four cards face up in front of the child.
              Pronounce each of the sounds and ask the child
              to point to the picture that says that. If the
              child points to the wrong card, correct him.
              Repeat this several times, varying the orders in
              which you give the sounds. Then show each of the
              cards--one at a time--to the child and ask him to
              tell you what each card says. Whenever the child
              gives the correct response, repeat it and praise
              him. If the child does not perfectly pronounce a
              sound, correct him until he imitates what you say
              perfectly, and then say "Good." Repeat this several
              times, varying the order in which the cards are
              presented.

              Note: When a child has just learned the response to
                     a card, it is good to show him that card
                     soon again. This helps reinforce what he
                     has just learned.

COMMENTS:

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ACTIVITY: Picture-Sound Charades

GROUP SIZE: Whole Class (or a portion of the class)

PURPOSE: To reinforce picture-sound associations recently
                taught.

MATERIALS: None

DESCRIPTION: One child silently imitates the action illustrated
                on a picture-sound card which the class has been
                taught: for example, the woman who says "no." The
                audience must guess what the child is imitating.
                Whoever first gives the correct sound is the next
                performer.

                This could also be done with teams which must
                guess fastest what sound their team members are
                imitating. In this case, the teacher should
                assign a card to each child to imitate.

VARIATIONS: Have each child bring his set of picture-sound
                cards. The person who first holds up the correct
                card and can perfectly imitate the sound of that
                card (when called upon) is given the next turn
                to perform.

COMMENTS:

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ACTIVITY: Picture-Sound Drill Game

GROUP SIZE: Two or three children with supervision

PURPOSE: To teach picture-sound associations to children
                who have had difficulty learning them.

MATERIALS: Several copies of each of four or five picture-
                sound cards

DESCRIPTION: Place one of each of the cards face up and ask the
                children to point to a card when you give its
                sound. If a child points to the wrong card, correct
                him. After you have demonstrated the sound for
                each card, place the cards, shuffled, face down in
                a pile.

                Have each child take a turn picking a card. If he
                perfectly pronounces the sound for that card, he
                gets to keep it.

                If he does not pronounce the sound correctly,
                the other children may try to pronounce the sound
                to win the card.

                If no one perfectly pronounces the card's sound,
                pronounce the correct response for the children
                until each of them imitates you accurately. A
                card for which no one remembers the correct
                sound is placed in a discard pile.

                Whoever has the most cards wins the game.

COMMENTS:

ACTIVITY: Picture-Sound Testing

GROUP SIZE: Individual

PURPOSE: To find out whether children have learned the
               picture-sound associations taught up to a cer-
               tain time and to find out which children need
               special help and on what sounds. Children receive
               their own copies of pictures for which they know
               the sounds.

MATERIALS: Picture-sound cards

DESCRIPTION: Explain to child that this is to see if he remem-
               bers the sounds he learned in "The Sound Song."
               Show the child one card at a time, and ask him
               if he can say what the _____ says. (Refer to
               each card with whatever label was used in the
               song.)

               Whenever the child pronounces a sound perfectly
               on the first try give him that card to keep. Write
               child's name or initials on the back of the card.
               Each child should store the cards which are his in
               his cubbyhole.

               If a child does not pronounce a sound perfectly,
               correct him until he accurately imitates your
               correction. He should be re-tested with that sound
               card on the next picture-sound testing day.

               If a child is physically unable to pronounce a sound
               perfectly--for example, if he is missing teeth--but
               he has indicated that he knows when it is pronounced
               perfectly by others and that he can distinguish it
               from similar sounds, assume that he has passed the
               test for that sound.

COMMENTS:

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Appendix B

Order of Introduction

of Activities in Class M

and Total Number of Sessions Used

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Introduction of Activities in Class M

Day	
1 - 2	"Sound Song" - Verse I Letter Board - Orientation I
3	"Sound Song" - Verse II
4 - 6	"Sound Song" - Verse III Lotto - Order I
7	Charades - Verses I-III Lotto - Orientation I
8 - 11	Sound Matching - I-III: any position Letter Board - Order I Picture-sound testing Noise Matching
12 - 13	Lotto Order II Lotto Orientation II
14 - 15	Letter Board - Orientation II Letter Board - Order II
16 - 18	"Sound Song" - Verse IV
19 - 20	Letter naming $\underline{b}$, $\underline{d}$, $\underline{p}$, $\underline{q}$
21	Letter naming $\underline{f}$, $\underline{n}$, $\underline{t}$, $\underline{z}$ Lotto with spinner
23 - 24	Sound Matching - I-III: end position Workbook pages - page 1 "Sound Song" - Verse V
25 - 26	Workbook pages - page 2
27	Workbook pages - page 3
28 - 29	Letter naming - $\underline{e}$, $\underline{a}$ "Sound Song" - Verse VI Sound Matching - I-III: beginning position Workbook pages - page 4
30	Workbook pages - page 5

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Estimated Number of Class Periods During Which

an Activity Was Used by Class M

I. Visual Skills

			Total
Letter Board	Orientation	I	5
		II	1
	Order	I	3
		II	1
Lotto	Orientation	I	4
		II	3
	Order	I	6
		II	6
Lotto with spinner			2
Workbook pages			16
Battle - p, q			1
Patience			1

II. Sound Skills

"Sound Song"	Verse	I	11
		II	9
		III	8
		IV	10
		V	7
		VI	5
Sound Matching - I-III		any position	4
		beginning	4
		end	4
		middle	2
Charades	I-III		2
	IV		2
Picture-Sound Testing (individuals)			8
Noise Matching			3+
Picture-Sound Drill			1

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III. Letter-Sound Skills

		Total
Letter naming	b, d, p, q	5
	f, n, t, z	2
	e, a	1
	m, k, s	1
Picture-letter Exercises	s, f, n, i	5
	o, u, h	3
	c, m, w, oo	3
	sh, b, p	2

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