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ARTICULATION THERAPY EFFECTIVENESS IN UNION COUNTY,  
NORTH CAROLINA

A Thesis  
Presented to  
the Faculty of the Graduate School  
Appalachian State University

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts

by  
Ruth E. Elias  
May 1981

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ARTICULATION THERAPY EFFECTIVENESS IN UNION COUNTY,  
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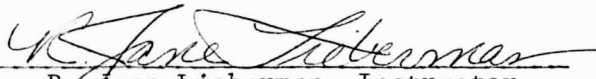
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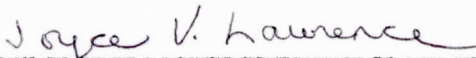
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by closing the lips for the /p/ phoneme. After the phonemic problem or target response is determined, it is repeated with many other phonemes to see in what contexts it can be correctly produced. The clinician says the phoneme and the client echoes it.

Gradually the client will produce the phoneme with "harder-to-produce" phonemes, decreasing the dependence on the easier contexts. The client's speech will be monitored through hearing and feeling cues (auditory and kinesthetic methods), such as feeling the phoneme in the mouth when it is produced.

(4) Paired Stimuli Program - This program enables the client to learn to modify phonemes in other contexts besides words. The basic theory is that a target phoneme, which can be produced correctly in a key word, will generalize to training words and then to other spoken phonetic contexts through the use of a behavior modification program. This program begins with words, as opposed to operant and traditional procedures, in which phonemes in isolation are the starting point.

The program is easy to administer. The clinician finds a "key word" in which the client can articulate the target phoneme correctly. This word must be one the client can say correctly nine out of ten times. The key word may have the phoneme in either the initial or the final position. This key word, which must be in the child's own vocabulary, is paired with ten other words in which the phoneme is misarticulated. The child will pronounce the word correctly with each of the ten misarticulated words. The key word is pronounced in pairs with incorrect words.

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Abstract of Thesis Presented to the Faculty of the  
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by

Ruth E. Elias

May, 1981

Chairman: Edward C. Hutchinson  
Major Department: Speech Pathology

Three methods of articulation programming are presented and compared for therapy effectiveness: Paired Stimuli, Baseline Probe and Traditional Therapy. Subjects for this study were third-grade children in Union County, North Carolina, tested with the Florida Phoneme Screening System and Goldman-Fristoe Sentences Subtest in October 1979. Speech therapy by one of these three methods was then administered for three months, at which time the children were again tested and given a clinical break after which the two tests were then readministered.

Four questions were posed: Is there a difference in therapy effectiveness for third-grade children working with a programmed method as compared to traditional therapy? Is there a difference in the performance of boys and girls in traditional therapy and programmed methods of therapy? Is there a difference between children in low or below average income groups and average or above average income groups? And is it possible to conduct a regular ongoing effectiveness program without interfering with the regular therapy programs?



The results showed a drop in scores for all groups, with a lower score for programmed therapy as compared to traditional therapy. The boys had a higher score than the girls in the final post-test but both the average and below average socio-economic groups had a similar drop in scores.

Clinicians were not restricted as to case selection, criteria for entrance, or for dismissal. The evaluative procedures were conducted without interference of the regular speech therapy program.

## Chapter I

### INTRODUCTION

According to the records, there are more children receiving articulation therapy in Union County Schools than any other type of direct clinical services. The percentage of articulation cases in the case load, according to the therapists, is about 60 percent. The remainder of the case load consists of language, voice, stuttering, hard-of-hearing and motor oriented problems. In this study the decision was made to look at school-based therapy as opposed to clinical-based therapy, since the bulk of articulation therapy is being done in the schools.

The Chicago Board of Education, Division of Speech Correction stated that more functional (non-organic) articulation problems are corrected and dismissed than any other type of speech case load (Powers, 1971).

There is a need to describe not only the effectiveness of articulation therapy but other types of therapy (language, voice) as well, in Union County.

There is also a need to describe the effectiveness of all types of articulation programs (traditional and non-traditional). For the purpose of this study, effectiveness is considered as the amount of change made in the two measuring instruments before and after therapy, according to an established criteria. Since there was no established standard criteria, the most effective therapy was the one that produced the lowest scores on the final post-test measurements. At the time the study was made there was not an accepted standard in use to measure a

child's progress in therapy, and be certain as to what changes are actually being made. Presently most therapists do not evaluate their own procedures on a regular basis. Thus, it can be difficult for the therapist, the parent, or any interested party to measure the results of the therapy.

The tests themselves may cause some of the problems, since different instruments focus on different problems. For example--some tests are more detailed than others, while some tests cover a context that others do not. One test that covers many different problems in detail is needed as a standardized evaluation tool.

#### Purpose of Study

For purposes of this study four questions were posed:

1. Is there a difference in therapy effectiveness for third-grade children working with a programmed method, as compared to traditional therapy?
2. Is there a difference in performance between boys and girls in traditional therapy and programmed methods of therapy?
3. Is there a difference between children in low or below average income groups and average or above average income groups?
4. Is it possible to conduct a regular ongoing effectiveness program without interfering with the regular program?

#### Limitations of Study

1. The subject population was limited to third-graders enrolled in articulation therapy in Union County Schools in North Carolina.
2. The study included a small number of children for making a statistical comparison. Since Union County is small, 63,000 population,

compared to some other counties, the number of children tested and number of schools included was small. Random sampling was not feasible under these limitations. The eleven third-graders in the study represent the entire third-grade case load, for the county, with phonemic problems.

3. The clinicians used three therapy programs.
4. The clinicians used no standardized criteria for client acceptance into speech therapy or client dismissal from speech therapy.
5. The amount of time for therapy was limited to three months.

## Chapter II

### REVIEW OF RELATED LITERATURE

Articulation means the joining of any two objects (Gray and Wise, 1946). In reference to speech, articulation means the joining of any two mechanisms that affect speech. The organs of articulation are those which act as valves or valve contacts for the interruption of the breath stream by stopping or constricting its passage. These organs include: the lips, the tongue tip, the tongue blade, the tongue dorsum (back), the velum and the vocal bands. Some of these organs at various times join with the teeth, palate or lips to interrupt the breath stream and separate the sounds into fricative, plosive, glide or glottal phonemes.

Unacceptable speech is "when it deviates so far from the speech of other people that it calls attention to itself, interferes with communication or causes its possessor to be maladjusted" (Van Riper, 1947). A mild deviation is not defective speech. Normal speakers are not always consistent in the way they say certain phonemes. For purposes of this study children were accepted for speech therapy who demonstrated unacceptable speech, according to the Van Riper definition. No attempt was made to insist that clinicians agree on their entrance criteria.

There are many children who demonstrate articulation problems. These misarticulations may be due to an omission, substitution, addition or distortion of phonemes.

A child of three may not be mature enough to produce a phoneme that is no problem for a child of seven. The maturity of the person who is

speaking must be examined to see if the phoneme is defective for the child's age or capacity. By third grade all phonemes should be used in a way not to deviate from the normal pattern of speech, or the area of the country where the child lives.

#### Programs for Articulation Therapy

There are many programs available to therapists to use for children who demonstrate phonemic problems.

John Irwin, in his monograph "Paired Stimuli" (1975), describes a number of methods for articulation therapy: (1) Stimulus Shift Generalization Program, (2) Operant Procedures, (3) Sensory-Motor Program, (4) Paired Stimuli Program, and (5) Traditional Method.

(1) Stimulus Shift Generalization Program - In this program the target phonemes to be corrected are determined. The clinician uses the phoneme and the client echoes it. When the phoneme is corrected, the context is shifted and the stimulus progresses to a picture, the printed word, and finally to spoken sentences. Some reinforcement, either praises or a reward, is given after each correct response.

The Stimulus Shift is a traditional articulation program that has been systematized.

Studies (McLean, 1970) of children with articulation problems have provided the author with enough information to devise a detailed program. If the children use this program up to its highest level (conversation), carry-over will be accomplished.

Generalization is accomplished totally within the therapy sessions. A child's usage of the new phoneme depends on how the new phoneme responses are internalized. This internalization is attained through

words (in different positions of words) and in sentences of varying degrees of difficulty.

If a number of responses said rapidly over a wide variety of word positions and configurations are evoked, conversational speech will occur. The person using the program must be familiar with the details of articulation movements which are necessary to produce the target sounds. They must also be familiar with the procedure and training manuals.

The training sessions should last from twenty to thirty minutes a day.

(2) Operant Procedure - (Irwin, 1975) In this method the clinician determines the phonemic problem, through testing and applies a hierarchy of steps to correct them. The level at which the client can operate is determined, and is then carefully raised, step-by-step. For example, if a child can say a word, with the target phoneme, correctly, the child then might move to the next step of sentences. A baseline is taken at each step.

Positive reinforcement is used following each correct response, so as not to allow an incorrect response to intervene. Any incorrect response moves the program back to the last correct level. This is determined through baseline procedures. In this program whatever behaviors occur must be considered the direct result of the therapy, since progress is checked at each level of the program.

(3) Sensory Motor Program - (McDonald, 1964) This program is based on the belief that a sound is influenced by any phonemes adjacent to it. For example, in the word ships, the /s/ phoneme can be influenced

A word is considered misarticulated if it is not said in a socially acceptable way two out of three times. Reinforcement is given after every correct response.

The model for this program is:

$S^D$  - stimulus or key word (word which can be said correctly)

S - misarticulated word (word which is said incorrectly)

R - reinforcement

You shift from  $S^{D1}$  (key word) to  $S^{D2}$  (newly learned word - formerly used as a training word) by training and reinforcement.

If a sound is to be considered trained, it must be said correctly in a word, not in isolation, to be reinforced by praise or some physical token. In order to train a phoneme, the clinician must have the child list and then imitate the clinician's pattern.

To test the training which has been done, this phoneme is then probed. Sentence responses to questions may use key words. Pictures and conversational speech samples are also used. If the first fifteen occurrences of the phoneme are correct in two sessions, the phoneme is considered corrected. The latter technique is a probe.

(5) Traditional Therapy - Similar to Stimulus Shift, this method uses a hierarchy of contexts. This therapy emphasizes teaching the client the correct articulation placement (phonetic placement) and teaching the client to recognize the correct phoneme (auditory discrimination). The hierarchy of program levels, as defined in Van Riper's Speech Correction and Principles (1961), progresses from the word in isolation, through syllables, words, sentences and eventually structured to unstructured conversation.



(6) Multiphonemic Program - The multiple phonemic approach to articulation therapy (McCabe, Bradley, 1975) includes procedures to correct all error phonemes according to specific steps with criterion performance levels that determine progression to the next step. Phase One establishes the accurate production of all phonemes in isolation, with visual stimulation given. If the client cannot achieve this, auditory-visual stimulation is given and the third step is auditory-visual-phonetic placement. All phonemes must be produced through only visual stimulation. This is the criterion. A sound production sheet of all phonemes is used. This takes about 10 - 15 sessions, to reach criterion.

Then, transfer into other speech units begins, using an articulation data sheet, as soon as criterion on two consecutive sessions are met. The data sheet shows counting of speech responses and the response rates in percentages.

The transfer is into units of syllables, words, phrases and sentences, oral reading and finally conversation. The client must have whole words, not just specific phonemes, correct. Criterion is 90 percent whole word accuracy.

Stimulus shift, operant procedures, sensory-motor and paired stimuli and traditional programs concentrate on mainly one phoneme at a time. Multiphonemic works with more than one phoneme simultaneously. Traditional may work with one phoneme or more depending on the individual clinician's preference.

The present study incorporated the baseline probe, the traditional and the paired stimuli methods. The baseline is a type of operant

procedure. The clinician tested a baseline of five words at all positions, taught these words at a single position, then retested the original five words, before the client moved to other words or the next step.

On the more traditional vein, Morris Winitz (1969) is a firm believer in teaching sound discrimination before learning a new phonemic response, since children with articulatory problems have poor sound discrimination (Lane, 1965; Cross, 1965). Lane (1965) also disputes this motor theory for learning phonemes on the basis that the articulatory mechanism cannot perceive sounds but that acoustic signals are the perceivers.

Another method described by Winitz is Approximation. The client is taught a phoneme approximating the new phoneme but not quite the target response. For example /x/, a snorting "sound" is taught to approximate the /k/ phoneme, later transmuted to the /k/.

All the programs need to transfer the new responses or generalize them into a carryover situation. Winitz describes a syllable stimulus evoking a response. It is assumed that the child can produce the original stimulus, then change part of the stimulus to the new target response. For example, the child says /as/. The /z/, the new target response is substituted for the /s/ and the syllable should be carried over to /az/. Since the /g/ and /k/ are articulated the same, he proposes teaching /g/ from /sk/, transferring the voiced /z/, /zk/, then producing /g/.

Winitz also describes reinforcement as an inducement to prevent regression outside of the clinical situation. Rice and Milisen (1954)

did a study on retention interval. The higher the degree of learning and the shorter the retention interval, the greater the retention.

Matheny and Panagos (1978) used a combined articulation and syntax program with children who had both articulation and language problems. These multi-linguistic problems are the subject of two different treatment theories. If the articulation problem is treated, the syntactic problem will remediate itself without special treatment. Another school of thought is that one should work on the syntax problems, and automatic correction of articulation will follow. In the Matheny and Panagos (1978) study the Monterrey articulation program was used. It was found that direct articulation therapy with indirect syntax development produced significant gains in the articulation skills. It can be concluded that a combination of syntactic, semantic and phonological components in a program is a safe approach (Scott and Marks, 1975).

There are a number of options opened to therapists using articulation therapy. The method best suited for the client must be the clinician's individual preference.

#### Criteria for the Evaluation of Articulation

Harris Winitz (1975) stresses several factors which should be considered in evaluating speech:

- (1) in what context is the sound deficient?
- (2) at what level is the sound stimulable (word imitation, etc.)?
- (3) are the errors consistent?
- (4) are the misarticulated phonemes enough of a problem to make a difference in the overall speech?
- (5) should the misarticulated sounds be corrected? These factors

should be taken into consideration when determining entrance criteria.

### Development of Articulation in Children

The following three studies deal with articulation and articulation in combination with the study of syntax.

A. Since articulation deals with the production of phonemes in language, there is an interrelationship between phonology (the study of phonemes) and syntax (the usage of words in a sentence). The study by Wolfe and Goulding (1973) showed that adequate articulation is achieved by most children by the age of seven or eight. The inference of the study is that an articulation program should be incorporated with a language program.

B. Most children overcome their articulation errors by grade three. This was found in a five-year study by Bralley and Stoudt (1977). The children who do not correct their own problems need a speech pathologist. Clinicians need to be more selective in an articulation-oriented program when dealing with kindergarteners through second graders.

C. A study by Parnell and Amerman (1977) shows a correlation between how sounds are produced and the age at which they are acquired. Children tend to substitute phonemes which require the least effort for more difficult sounds. These are the phonemes that are developed earlier in children (plosives and nasal phonemes).

In agreement with the Bralley and Stoudt study, the present project with third graders in Union County was implemented because the likelihood of spontaneous correction beyond this age is poor.

### Effectiveness

The term therapy effectiveness refers to the articulation changes resulting from therapy. The definition, for the purpose of this study,

is found in the introduction. Therapy programs and their effectiveness have not been researched to any great extent. A precise evaluation of articulation changes from therapy depends upon the establishment of a definite entrance criteria before the therapy begins. Research has been conducted on the comparative effectiveness of individual and group therapy sessions, the accountability of the instructional materials and the accountability of the clinician.

The accountability (or end result of effectiveness) for instructional materials was the subject of "Accountability in a School Speech and Language Program: Part II" (Work, Hutchinson, Healey, Sommers, and Stevens, 1976). This study was conducted in Broward County, Florida from 1971 - 1974. Materials are an important part of any form of clinical intervention or process of changing incorrect behavior. Two basic questions were asked: "How effective were the materials in the therapy programs in the school?" and "Do clinicians provide the best materials for the planned programs?" These questions were asked of both clinicians and students. A number of approaches were used by students and therapists to rate materials on an established set of criteria.

A study conducted in the Knoxville, Tennessee school system (Baird and Claybourne, 1974) compared the effectiveness of scheduling individual and group sessions. In Knox County the children were in individual therapy reporting on seven minute intervals. (The therapists in the Union County Study were instructed not to change their scheduling in any way.) The Knoxville study showed that individual therapy is more effective for progress than group therapy. In group therapy, part of the child's time is spent waiting to respond, listening to and

watching the clinician and the other children. In individual therapy, the child has all the attention and spends less time out of the regular classroom.

A study by Sommers (1966) showed that older children benefited most from individual therapy, while younger children benefited most from a group situation.

There is always the question of, "Is therapy appropriate for the child?" Referring to the competence of the clinician, O'Toole (1979) states that the clinician should have goals for each child, a justified therapy time, good progress data, and proper use of the knowledge and resources available. The children should be moved through therapy at the fastest speed of which they are capable. The part the clinician plays in therapy determines the effectiveness of the therapy and is especially important in view of larger school systems and larger budgets.

Van Hattum (1976) states that many of the speech services in the schools have been reduced, instead of intensified. The speech clinician should effectively communicate to the public the importance of all forms of communication. Even though clinicians are accountable in the schools, prevention should start at age one. The parent should not wait until the child is six or older, to recognize and seek treatment for speech difficulties.

Articulation testing is another important aspect of effectiveness, according to Ritterman, Zenner, and O'Steen in their study "Therapist Habituations and Purported Client Progress in Articulation Therapy" (1976). They believe that clinicians are more subjective toward client dismissal than they should be. Habituation is an overrating of a

person's errors. Are the measures being used for testing reliable? Many therapists might dismiss a client prematurely because of the influence of the need to show successful therapy. The goals may not be successful. There was a variation in pretesting and retesting. The clinicians giving therapy may settle for an inaccurate phoneme, whereas the non-therapy clinicians (those not giving therapy to the client being tested) will be more accurate in testing.

The present Union County Study was conducted in a rural school system, similar to the system in the study by Hildegard Traywick (1977), in Madison County, Alabama. In Madison, an inservice course was conducted for teachers to increase their awareness of communication, since many of the teachers referred students to therapy. A course was given to eleventh and twelfth grade students to help them evaluate their own speech and correct their own communication problems. The entire study demonstrated some expanded services and their effectiveness in improving the entire speech program.

## CHAPTER III

### PROCEDURES

Four speech clinicians in Union County, North Carolina took part in this study, which was conducted in seven elementary schools. A total of eleven children were included in the study, six boys and five girls.

Each clinician used her third grade population for the study. This grade level was selected because of the theory that any spontaneous change in speech will take place by the third grade (Bralley and Stoudt, 1977), and that these children were past the time of spontaneous correction and needed remediation of any persisting problems.

All of the children were tested with the Florida Phoneme Screening System (Flaps) (Hutchinson, Lieberman, and Kelly, 1976), and the Goldman-Fristoe Sentence Subtest (Goldman and Fristoe, 1972) to determine the level of articulation development. A description of Flaps appears in Appendix A.

The Flaps test is an experimental test developed by Hutchinson, Lieberman, and Kelly (1976). It tests picture naming, syllable imitation, word repetition, and sentence imitation. Each phoneme is weighted according to the difficulty of articulating it in isolation, in various combinations, and in various positions.

The index value of the phoneme depends on its context, its frequency of use in the language, and the number of errors relative to the child's chronological age. For example, a child is shown a picture of a rabbit to identify. The initial /r/ sound counts three points. The



child is then shown a picture of a car to identify. The final /r/ sound counts for six points. After spontaneous picture naming the child repeats the word "raw" and then the word "near". If the initial /r/ in raw was incorrect the child is scored three points, and six points if the final /r/ in near is incorrect. The clinician then repeats two nonsense syllables, such as /rUz/ and /θor/. Again, three points are scored for an incorrect initial /r/ and six points for an incorrect final /r/. The next model is sentence repetition. The clinician has the client repeat "Clean the rug at home," and "Wash the car with soap." Three points are scored for an incorrect initial /r/ and six points for the incorrect final /r/.

The child is scored on the total number of incorrect phonemes. Thus, no score would mean correct speech. After the Flaps test has been scored, the degree of stimulability or the extent to which a child can correctly repeat a sound, can be shown by examining the change in scores from conditions 1 to 2, 1 to 3, and 1 to 4. Conditions refer to: (1) pictures, (2) words, (3) nonsense syllables, and (4) sentences. The greater the change, the more stimuable the child. Consistency indices can be tabulated. The smaller the degree of change, the more consistent the error. Children who show little error consistency and maximum stimulability will demonstrate developmental articulation patterns that will probably be resolved through maturation, not intervention. Thus, the test can be used to determine which children should be in therapy and which will improve on their own. The more often similar mistakes are made, the poorer the prognosis. The Goldman-Fristoe Sentence Subtest (1972) consists of two short stories with key sounds.

The clinician tells the stories, one at a time, to the client. Then the client retells the stories, while the clinician scores the test on the correct use of the key phonemes. The sounds are scored according to the type of speech error, such as substitution, omission and distortion. For this study the phonemes were scored by the same method used on Flaps. Example, three points for initial /r/ six points for final /r/.

#### Pre-Study Observations

The four participating clinicians were given instructions to give Flaps and the Goldman-Fristoe Sentence tests to all third graders from their referral lists. Clinicians were not restricted in case selection. Therefore some children with organic pathologies are included. The tests were the measures to be administered before and after therapy.

The principals were asked to supply free lunch information for use in determining socio-economic levels.

#### Participants

Therapist A had a total of five children - three boys and two girls. All were nine years old and had received previous therapy. One girl had a repaired bifid uvula. This was the only organic defect. Three children were of average or above income; two, below average.

Therapist B had one child, a boy. He was an eight-year old and had previous therapy. There were no organic defects. The family income level was average or above.

Therapist C had a total of three children - one boy and two girls. There were two eight-year olds, and one ten-year old who was repeating the grade. One child had previous therapy; two had had no treatment.

The only organic defect was found in one girl - a mild hearing loss in the left ear within the speech frequencies. One girl had a low IQ (five years three months on the PPVT compared to her chronological age of eight years four months). Two of the children had below average incomes; one had average or above average income.

Therapist D had two children - one boy and one girl. Both children were eight years old. Only the boy had previous therapy. One child's family income was average; one, below average.

These children are typical of the types of children in Union County.

#### Administration of the Program

The program to evaluate effectiveness began in October 1979, when the therapists were instructed to test all third graders from their referral lists with the Flaps and Goldman-Fristoe Sentence Test. The referrals were from the therapists' case loads, and teacher, parent or outside agency referrals. Using the three methods to be evaluated - traditional, baseline probe, and paired stimuli - the clinicians conducted therapy as they would in their normal routines. The chart below enumerates the method of therapy and materials used, the number and type of sessions, the phonemes worked on and the criteria for dismissal.

The phonemes were selected for each child's therapy, as a result of the retesting. The clinicians were not questioned as to their criteria for selecting phonemes.

In December, 1979, following the final training session, the children were retested with the Flaps and Goldman-Fristoe. The children were then given a clinical break until April 1980. The purpose of the break

was to determine the amount of carryover in the four months without treatment. The two tests were then administered again in April, 1980.

### Methods Used by Individual Therapists

#### Therapist A

##### Method Used:

Baseline Probe Method. Therapist A tested a baseline of five words at all positions (initial, medial, and final), taught these words at a single position, then retested with the original five words.

##### Materials Used:

Drill work, Goldman-Fristoe articulation cards, ditto sheets, Games Children Play.

##### Number and Types of Sessions:

Subject 1 received individual therapy working with the sibilant sound.

Subjects 2, 3, 4, and 5 were in group therapy.

A total of 12 to 16 sessions, two times a week were given.

##### Phonemes Worked on:

Subject 1 worked on the sibilant phonemes, /s/, /z/, and /s/ "sh". (individual therapy).

Subject 2 worked with /θ/ "th", /v/, /s/, and /z/ phonemes (group therapy).

Subject 3 worked to correct the /r/ blends, /s/ blends and a hypernasal voice quality.

Subject 4 worked on /r/ sounds.

Subject 5 worked to correct the /r/, /θ/ "th", and /r/ blends.

Criteria for Dismissal:

The target phonemes are to be corrected at 90% to 100% accuracy at the spontaneous conversational level.

Therapist BMethod Used:

Traditional Method. Therapist B emphasized showing the child the correct placement of his articulators and training him to recognize the problem phoneme when he hears it. His phonemes were corrected through the hierarchy of program levels - first in isolation, then in syllables, words, sentences, naming pictures, structured conversation, and unstructured conversation.

Materials Used:

Articulation cards, teacher-made sentences, games, stories, reading books.

Number and Types of Sessions:

Subject 6 had a total of 20 thirty-minute sessions, two times each week.

Phonemes Worked On:

Subject 6 worked on the /r/ phoneme.

Criteria for Dismissal:

100% correct word repetition and the phoneme corrected 95% of the time in reading, with the child correcting his own mistakes (self-monitoring procedures). His conversational speech is to be 90% correct with self-monitoring procedures.

Therapist CMethod Used:

Traditional Methods

Materials Used:

Peabody articulation cards, drill books, teacher-made sentences, Go-Mo cards, and worksheets.

Number and Types of Sessions:

Subject 7 had twenty-two hours of therapy.

Subject 8 received twenty-two hours of therapy.

Subject 9 had thirteen hours (26-1/2 hours) sessions.

Phonemes Worked On:

Subject 7 worked on the distorted /r/ phoneme.

Subject 8 worked on the distorted /r/.

Subject 9 worked for carryover of the /l/ phoneme, which he had previously distorted.

Criteria for Dismissal:

Correct production of phonemes in conversation 80% of the time.

Therapist DMethod Used:

Paired Stimuli Method.

Materials Used:

Pictures included in the program, Peabody articulation cards, drill games, tokens for reinforcement, conversational speech for probing purposes.

Number and Types of Sessions:

Subject 10 had 15 thirty-minute group sessions twice a week.

Subject 11 had 16 thirty-minute group sessions twice a week.

Phonemes Worked On:

Subject 10 worked on /r/ blends.

Subject 11 worked on /r/ blends.

Criteria for Dismissal:

- (1) Perfect score on the story part of the Goldman-Fristoe test.
- (2) Subjective opinion of the classroom teacher.
- (3) Phoneme /r/ corrected in a 5-minute conversation between the students.

## CHAPTER IV

### RESULTS

Eleven children were tested with the Flaps test and the Goldman-Fristoe Sentence Subtest in October 1979. This group showed a mean score of 46.5, as shown in Table 1. The mean score of children going into programmed therapy (Child Nos. 1, 2, 3, 4, 5, 10 11) was 45.2 on the Flaps and Goldman-Fristoe and the children going into Traditional therapy (Child Nos. 6, 7, 8, 9) had a mean score of 48.7.

The children were again tested in December 1979. As shown in Table 2 the retest Flaps showed a mean of 15.9, a mean difference of 18.9 between the original test in October and the December retest.

After the clinical break, the children were again examined to determine the extent of carryover. The mean score (see Table 2) was 11.9, suggesting no loss during their therapy free period.

Since one of the questions posed was to examine the difference in performance between lower and higher socio-economic groups, the scores of these two groups were tabulated. The lower average students' original mean test score was 39.2, and the higher socio-economic group had a mean score of 52.6. The lower socio-economic group had a retest mean score of 14.2, while the higher group had a score of 21.0. Figure 1 shows a similar pattern between the two groups. The lower group dropped to a mean score of 12.0, while the higher group dropped to a mean score of 20.0.

The scores of the boys and girls were compared, and are presented in Table 3. The boys started with a higher mean score of 55.1 than the



THERAPIST	CHILDREN	TYPE THERAPY	AGE	SOCIO-ECONOMIC LEVELS	LUNCH INFORMATION	PREVIOUS THERAPY	COMBINED FLAPS AND GOLDMAN FRISTOE TEST RESULTS		
							Oct. 59.	Dec. 36	Apr. 9
A	1 Girl	P	9	Lower	Free	Yes	61	11	32
	2 Boy	P	9	Higher	Regular	Yes	16	14	8
	3 Girl	P	9	Lower	Free	Yes	46	24	19
	4 Boy	P	9	Higher	Regular	Yes	60	39	29
	5 Boy	P	9	Higher	Regular	Yes			
B	6 Boy	T	8	Higher	Regular	Yes	45	0	9
C	7 Girl	T	10	Lower	Reduced	No	30	16	15
	8 Girl	T	8	Lower	Reduced	No	46	5	29
	9 Boy	T	8	Higher	Regular	No	74	52	34
D	10 Boy	P	8	Lower	Free	Yes	45	0	0
	11 Girl	P	8	Higher	Regular	No	30	0	0

Mean Scores - 46.5 17.9 16.7

TABLE 1 -- PARTICIPANTS IN STUDY

THERAPIST	CHILD	FLAPS (OCT.)	FLAPS (DEC.)	DIFFERENCE (OCT.-DEC.)	FLAPS (APR.)	DIFFERENCE (OCT.-APR.)	LOSS (DEC.-APR.)
A	1	48	36	-12 pts.	8	-40	-28
	2	47	11	-36 pts.	31	-16	+20
	3	15	14	- 1 pt.	7	- 8	- 7
	4	37	24	-13 pts.	12	-25	-12
	5	51	39	-12 pts.	22	-29	-17
B	6	36	0	-36 pts.	9	-27	+ 9
	7	14	10	- 4 pts.	7	- 7	- 3
C	8	36	2	-34 pts.	15	-21	+13
	9	39	39	- 0 pts.	20	-19	-19
	10	36	0	-36 pts.	0	-36	0
D	11	24	0	-24 pts.	0	-24	0
	Mean	34.8	15.9	-18.9	11.9	-22.9	-4.0

TABLE 2 -- FLAPS TEST RESULTS

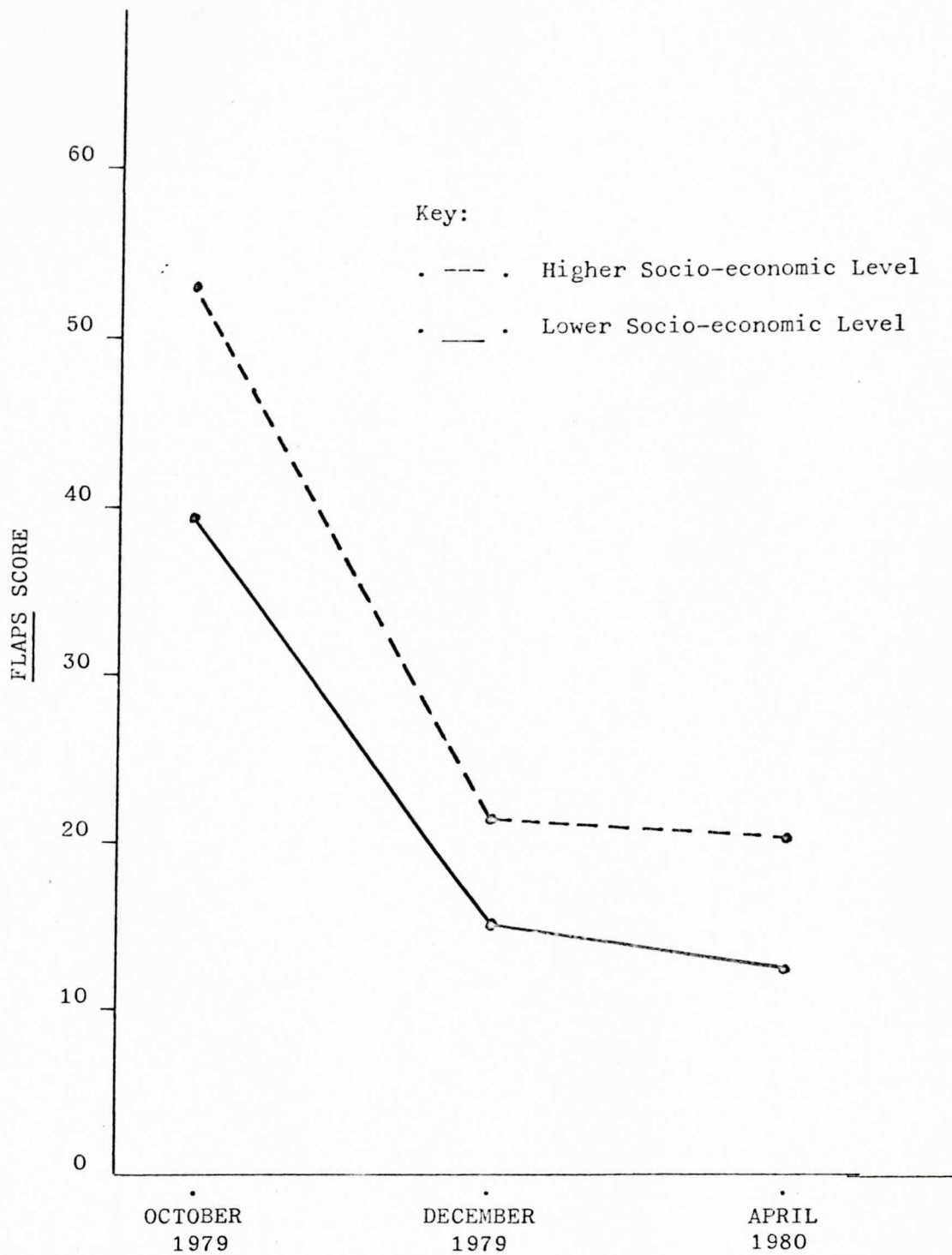


FIGURE 1

Performance on FLAPS as a Function  
of Socio-economic Level

TABLE 3  
COMPARISON OF TEST RESULTS FOR BOYS AND GIRLS

	<u>BOYS</u>			<u>GIRLS</u>		
	PRE-TEST	RE-TEST	FINAL POST-TEST	PRE-TEST	RE-TEST	FINAL POST-TEST
	61	11	32	59	36	9
	46	24	19	16	14	8
	60	39	29	30	16	15
	45	0	9	46	5	29
	74	52	34	30	0	0
	45	0	0			
	331.0	126.0	123.0	181.0	71.0	61.0
N=6	55.1	21.6	20.5	36.2	11.8	12.2
						N=5

girls' 36.2 and showed higher mean scores on all three Flaps tests. The final mean score was 20.5 as compared to the girls' 12.2.

The final post-test score for all the children was 16.7, suggesting that phonemes had stabilized.

In Table 4, the Traditional and Programmed approaches are compared. The final mean score of the Programmed approach was 13.8 as compared to the Traditional final mean score of 21.7. These changes are depicted in Figure 2.

It took approximately 10 weeks for the phonemes to be stabilized or corrected, counting days off for vacations. This included the start of therapy from October, 1979, through December, 1979, at which time the children were retested.

The phonemes worked with were: /s/, /z/, /s/, /θ/, /v/, /s/ blends, /r/ blends, /l/ blends and a distorted /r/. The two phonemes corrected were two defective /r/ phonemes (see Table 5).

TABLE 4  
RESULTS OF PROGRAMMED THERAPY  
AS COMPARED TO TRADITIONAL THERAPY

CHILD	<u>PROGRAMMED THERAPY</u>		FINAL POST-TEST
	PRE-TEST	POST-TEST	
1	59	36	9
2	61	11	32
3	16	14	8
4	46	24	19
5	60	39	29
10	45	0	0
11	30	0	0
Mean	45.2	17.7	13.8

CHILD	<u>TRADITIONAL THERAPY</u>		FINAL POST-TEST
	PRE-TEST	POST-TEST	
6	45	0	9
7	30	10	15
8	46	5	29
9	74	52	34
Mean	48.7	16.7	21.7

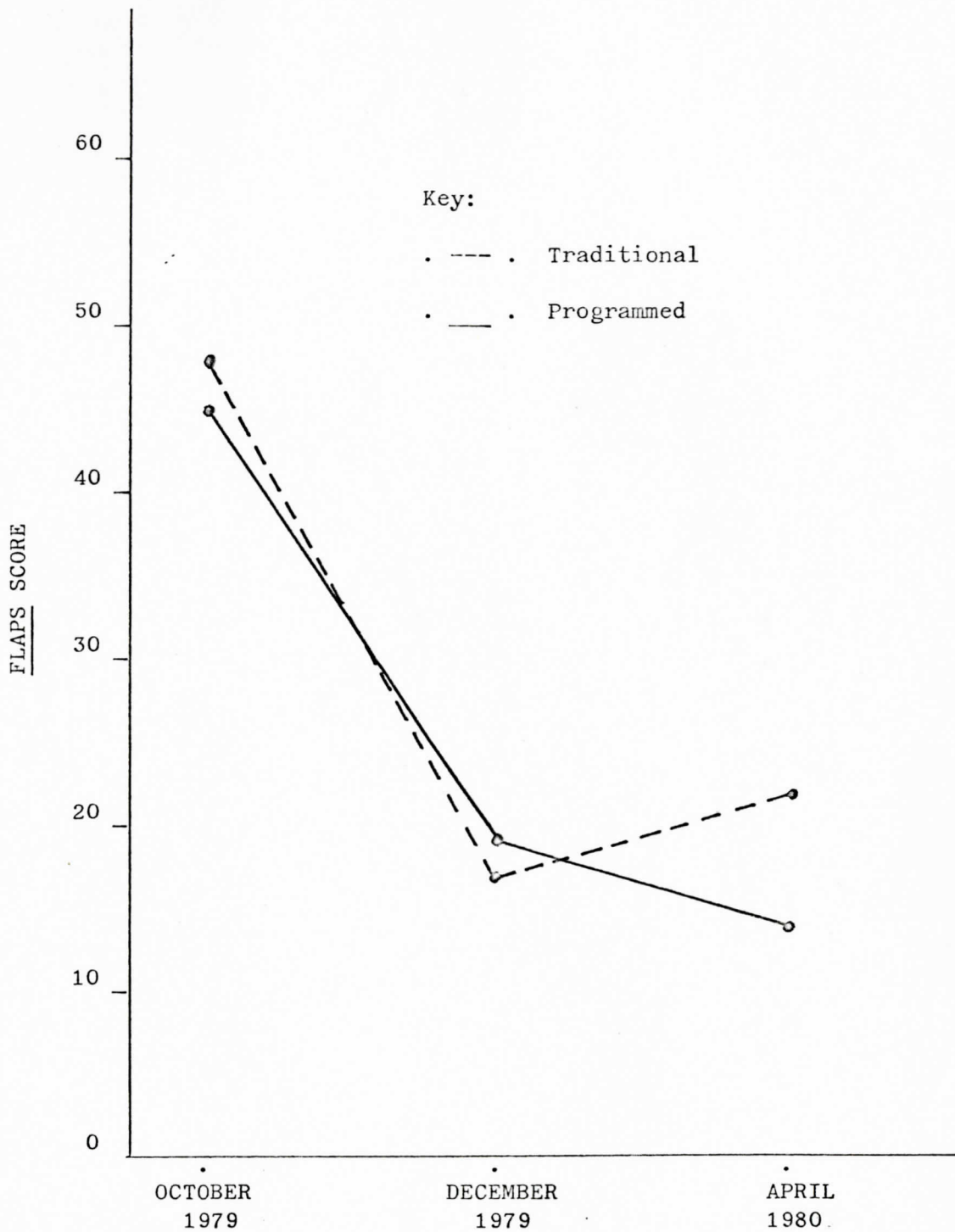


FIGURE 2

Performance on FLAPS as a Function of Therapy Approach

THERAPIST	CHILD	s	z	S	θ	v	s blends	r	l blends	distorted r	w/l substitution	r blends
A	1	X	X	X								
	2	X	X		X							
	3						X					X
	4							X				
B	5				X			X	X			
	6							X				
C	7									X		
	8									X		
D	9										X	
	10							X				
	11							X				

TABLE 5 --- DEFECTIVE PHONEMES WORKED WITH IN THERAPY



## CHAPTER V

## DISCUSSION

To review the questions posed, Programmed therapy is shown to be more effective with the children in the short time allowed for this study. Because this study showed good results with Programmed therapy it is not necessarily good to use with all children. Certain programs are more effective with some children than others. All types of children were not tested. This would include deaf children and emotionally handicapped children. Effectiveness can be looked at through measurements, providing there is a standard entrance and dismissal criteria, which we did not have. Therapists' normal programs were not interrupted. There would be some allowance for therapists' normal routines in future studies.

The methods shown, testing, retesting and a final testing with the same instruments, charts and tables to measure scores, are a way of looking at effectiveness.

During the therapy period from October 1979 to December 1979 some children had group therapy and some individual therapy. All except four had previous therapy. This didn't seem to interfere with the outcome of the final score.

To be considered is the difficulty of correcting certain responses. The phonemes all have different degrees of difficulty for the students. A phoneme which is easier for one child to correct may not be easier for the next child. The children (except for subject 4) going into Programmed therapy had less problem sounds than the ones going into Traditional therapy. This may or may not have had an effect on the

final score. The students in the Paired Stimuli group had a complete correction of their /r/ responses, while the other students did not.

The mean score for the children going into Programmed therapy showed 44.2 which was lower than the mean score of the children going into Traditional therapy.

Another variable was the socio-economic levels of the children. This did not have a negative effect on the final score since both groups had a similar drop in score. (See Table 6 and Figure 2.)

The ages of the children did not seem to have a negative effect. Though they were all third graders, there was some difference in age because of grade retention. Three of the eight year-olds scored above the mean of 16.7 in the final post-test, and two eight year-olds scored zero on the final post-test.

The child scoring 5.5 on the Peabody Picture Vocabulary Test had a final score of 29 which was above the mean of 16.7 but below the scores of the other "normal" children. This child, subject 8, had the most loss during the therapy-free period. Intelligence would seem to be a factor in phoneme retention.

Children in the Traditional therapy seemed to have the most loss during the clinical break, from December 1979 until April 1980. Therefore the best maintenance was produced by the therapists conducting the Programmed therapy. The Paired Stimuli was the only program to have a complete correction of phonemes at the end of the clinical break.

To answer the original questions:

(1) There is a difference between traditional and non-traditional methods in the final stabilization of scores. The stabilization was better in non-traditional therapy.

(2) There is a difference between therapy performances of boys and girls. This is true even though the boys seemed to start with more articulation problems than the girls.

(3) There is no difference between low and high socio-economic children in therapy performance.

(4) Program effectiveness can be evaluated.

#### Implications for Further Study

A wider sampling of a third grade population is needed to test therapy effectiveness, though this is not feasible in Union County. Another grade can be tested, such as the sixth grade starting Middle School. This would allow for testing therapy effectiveness on older children.

If feasible, testing children in individual therapy would be beneficial. Also, a further study can test children with similar phonemic problems and eliminate children with organic problems.

A similar effectiveness study can be made with language, or voice therapy. All tests, whether articulation, language or voice tests need to have an entrance and dismissal criteria. There is a need to establish this criteria in the county, especially the dismissal criteria. Since this study was undertaken a standardized speech and language test was adopted in the county. This test has a percentile for entrance criteria.

The tests need to be systematically used. The clinicians should look at the need for more commercial or unpublished programmed types of articulation therapy. These therapies should be consistently evaluated according to the methods in this study.

Different methods need to be evaluated with different types of populations within the school system, to see if these methods are the most effective for those particular children they are servicing.

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## APPENDIX A

## FLORIDA PHONEME SCREENING SYSTEM (FLAPS)

1976 EXPERIMENTAL EDITION

## INTRODUCTION

The Florida Phoneme Screening System (FLAPS) is designed to sample sound production in a variety of contexts. It provides information about the acceptability of a child's articulatory skills in both spontaneous and modeled productions at the single word and phrase levels. Although the format of FLAPS resembles traditional articulation tests, it is unique in several respects:

- 1) It examines production of all consonant phonemes under several conditions providing an opportunity to sample target phonemes more than once;
- 2) It provides a weighted index value of unacceptable phoneme productions based upon the frequency of occurrence of phonemes in certain positions of words. For example, an unacceptable production of a more frequently occurring phoneme in a particular position would receive a greater index value than an unacceptable production of a less frequently occurring phoneme (e.g. an unacceptable word final production of /p/ receives a weighted index value of 1; an unacceptable word final production of /t/ receives a weighted index value of 7);
- 3) It includes an indication of phoneme error consistency by noting response flexibility of rigidity throughout a variety of stimulus conditions;
- 4) It assesses stimulability by asking children to produce previously misarticulated phonemes when given additional stimulation;
- 5) It includes a developmental index of severity by age. The index assigns a numerical severity rating to error productions relative to the chronological age of the child. For example, a child of 4 years who misarticulates the /m/ phoneme would receive a greater severity index than a child of the same age who misarticulates the /r/.

## DESCRIPTION OF THE TEST

FLAPS provides a systematic screening system of 24 consonant phoneme sounds in four contexts;

- 1) Sounds in spontaneously named words
- 2) Sounds in modeled words

- 3) Sounds in modeled nonsense words
- 4) Sounds in modeled phrases

Phonemes are sampled in syllable initial and final position except where inappropriate as in the case of the /z/ phoneme which only occurs in syllable final position. Vowels and blends are not systematically sampled although marginal notes may be made if unacceptable productions of these sounds are noted.

Black and white line drawings are used to elicit sounds in spontaneously named words. The other three stimulus conditions use an imitative or modeled testing paradigm which requires no additional materials other than the response form. A response form is provided for recording unacceptable productions of target sounds.

#### ADMINISTRATION OF THE TEST

For purposes of testing the test, all items in each of the four stimulus conditions will be administered to every child. To avoid a possible order effect, the presentation of conditions will be randomized and a different order will be randomly assigned to each subject. In all instances, a particular stimulus condition will be presented in its entirety before proceeding to the next condition.

Unacceptable phoneme productions for each condition will be recorded on the response form (see attached form) by circling the appropriate index value. For example, if a child unacceptably produces the phoneme /s/ in word final position during spontaneous picture naming, the index value 3, alongside that condition, would be circled.

In the final version of FLAPS, a different administration procedure will probably be adopted. Spontaneous picture naming will be presented first and performance on this condition will determine the subsequent test items to be presented. Modeled words will be presented next but only those items which contain phonemes misarticulated in the prior condition will be included. Similarly, the presentation of modeled nonsense words will include only those items misarticulated during condition one, spontaneous picture naming. The final stimulus context, sounds in modeled phrases will be presented in its entirety.

#### SCORING

Index values of unacceptable phoneme productions will be calculated for each stimulus condition:

- 1) Sounds in spontaneously named words
- 2) Sounds in modeled words
- 3) Sounds in modeled nonsense words
- 4) Sounds in modeled phrases

From these calculations, error consistency indices will be tabulated by quantifying the degree of change from one condition score to another.



For example, it will be shown that the smaller the degree of change, the more consistent the error pattern; conversely, the greater the degree of change, the less consistent the error pattern. Similar scores from condition to condition, then, indicate rigid error response patterns.

Degree of stimulability may also be demonstrated by examining the change scores from conditions 1 to 2, 1 to 3, and 1 to 4. Again, it should be noted that the greater the magnitude of change, the more stimuable the child.

Finally, a severity index may be assigned to each error production. These indices have been established with respect to developmental norms of articulation. Thus, those phonemes which are generally acquired early in a child's development would receive a relatively large severity index when misarticulated at lower age levels. The index remains fairly stable or increases slightly as the child grows older. Thus, misarticulation of the /p/ phoneme by a 10 year old child is rated only slightly more severe than misarticulation of the same phoneme by a 4 year old since both children should have already acquired the sound.

By the same token, those phonemes which are not expected to be mastered until late in a child's development, would receive a greater severity index when misarticulated as the child increases in age. In other words, misarticulations of these phonemes by younger children would not be considered as serious a problem as misarticulation of the same phonemes by older children who should have mastered them. Ultimately, this type of information will serve to identify which phonemes should be worked on in therapy.

#### INTERPRETATION

FLAPS represents a phoneme screening system that will determine which children need further indepth phonemic evaluation before being placed in a remedial program. Specific guidelines for future recommendations have not yet been established but will become obvious as a result of testing the test. For example, it has been speculated that children who show little error consistency and maximum stimulability probably demonstrate developmental articulation problems which will be resolved through maturation and not intervention.

FLORIDA PHONEME SCREENING SYSTEM (FLAPS)  
1976 Experimental Version

	Spontaneous Picture	Index	Model	Index	Model	Index	Model	Index	Model	Index	Model	Index	Severity by Age							
													4	5	6	7	8			
m	matches	2	meat	2	mok	2	Drink your <u>m</u> ilk today.													
	comb	2	Tim	2	vem	2	Bang the <u>m</u> drum slowly.							4	4	5	5	5		
w	wagon	4	wait	4	watʃ	4	Find the <u>w</u> ool sweater.							4	4	4	5	5		
	horse	3	who	3	hək	3	Paint the <u>w</u> house yellow.							4	4	4	5	5		
p	pot	1	pull	1	pos	1	Turn the <u>p</u> age quickly.													
	cup	1	leap	1	fip	1	Wash with <u>p</u> soap daily.							4	4	4	5	5		
n	nest	3	nose	3	nuv	3	Stop that <u>n</u> oise right now.													
	phone	7	lawn	7	kən	7	Shoot the <u>n</u> gun at night.							4	4	4	5	5		
b	book	2	ball	2	bək	2	Take the <u>b</u> us to school.													
	web	1	Bob	1	táb	1	Watch the <u>b</u> crab walking.							4	4	4	5	5		
k	kite	2	keep	2	kub	2	Eat the <u>k</u> andy bar.													
	cake	2	duck	2	wək	2	Give the <u>k</u> fork to Jim.							3	3	4	5	5		
g	girl	2	goat	2	gæv	2	Play the <u>g</u> ame with Bill.													
	flag	1	dog	1	rig	1	Feed the <u>g</u> pig some grain.							3	3	4	5	5		
d	door	1	dip	1	dqv	1	Spend the <u>d</u> ime wisely.													
	bed	6	food	6	sud	6	Push the <u>d</u> red wagon.							3	3	4	5	5		
t	tire	4	toe	4	təm	4	Put your <u>t</u> oys away.													
	bat	7	coat	7	wut	7	Wear your <u>t</u> shirt and pants.							3	3	4	5	5		

FLORIDA PHONEME SCREENING SYSTEM (FLAPS)  
1976 Experimental Version

Spontaneous Picture	Index	Model	Index	Model	Index	Model	Index	Model	Index	Model	Index	Severity by Age									
												4	5	6	7	8					
ring	2	bang	2	faŋ	2	Play the song loudly.	2	Play the song loudly.	2	Play the song loudly.	2	3	3	4	4	5					
fan	2	fun	2	fig	2	Take the four kittens.	2	Take the four kittens.	2	Take the four kittens.	2										
leaf	1	knife	1	raf	1	Buy a loaf of bread.	1	Buy a loaf of bread.	1	Buy a loaf of bread.	1	3	3	4	4	5					
yarn		young		joɪ		Take the yellow bus.		Take the yellow bus.		Take the yellow bus.		2	2	3	4						
rabbit	3	raw	3	ruːz	3	Clean the rug at home.	3	Clean the rug at home.	3	Clean the rug at home.	3										
car	6	near	6	θer	6	Wash the car with soap.	6	Wash the car with soap.	6	Wash the car with soap.	6	1	2	2	3	4					
ladder	3	laugh	3	lev	3	Mow the lawn next door.	3	Mow the lawn next door.	3	Mow the lawn next door.	3										
ball	3	roll	3	səl	3	Push the wheel in here.	3	Push the wheel in here.	3	Push the wheel in here.	3	1	2	2	3	4					
sink	4	serve	4	sɛv	4	Wear your suit today.	4	Wear your suit today.	4	Wear your suit today.	4										
bus	3	leaso	3	fəs	3	Clean the mess up now.	3	Clean the mess up now.	3	Clean the mess up now.	3	1	2	2	3	4					
chair	1	chew	1	tʃim	1	Give the child a toy.	1	Give the child a toy.	1	Give the child a toy.	1										
watch	1	match	1	gætʃ	1	Move the couch inside.	1	Move the couch inside.	1	Move the couch inside.	1	1	2	2	3	4					
shoe	1	shell	1	ʃɪg	1	Take the short pencil.	1	Take the short pencil.	1	Take the short pencil.	1										
fish	1	push	1	keʃ	1	Find the brush and comb.	1	Find the brush and comb.	1	Find the brush and comb.	1	1	2	2	3	4					
zebra	1	zoo	1	zuː	1	Pull your zipper up.	1	Pull your zipper up.	1	Pull your zipper up.	1										
hose	4	raiso	4	teɪz	4	Blow your nose quickly.	4	Blow your nose quickly.	4	Blow your nose quickly.	4	1	1	2	3	4					
jack-in-box	1	jar	1	dʒɛb	1	Push the jeep uphill.	1	Push the jeep uphill.	1	Push the jeep uphill.	1										
bridge	1	budge	1	fɒdʒ	1	Put the cage in there.	1	Put the cage in there.	1	Put the cage in there.	1	1	1	2	3	4					
valentine	1	vino	1	vɪl	1	See the view from here.	1	See the view from here.	1	See the view from here.	1										
stove	1	cavo	1	sʊv	1	Watch him dive again.	1	Watch him dive again.	1	Watch him dive again.	1	1	1	2	3	4					

FLORIDA PHONEME SCREENING SYSTEM (FLAPS)  
1976 Experimental Version

Spontaneous Picture	Index	Model	Index	Model	Index	Model	Index	Model	Index	Model	Severity by Age								
											4	5	6	7	8				
0	1	thing	1	0ok	1	Saw a <u>th</u> ick board now.													
ø	1	bath	1	nəθ	1	Close the <u>no</u> th window.					1	1	2	3	4				
	4	them	4	ðeɪz	4	Show me <u>th</u> ose pictures.													
3	4	bathe	4	fəð	1	Watch her <u>ba</u> the the boy.					1	1	2	2	3				
	1	measure	1	leɪz	1	Buy the <u>rou</u> ge for her.					1	1	2	2	3				

TOTALS																			
--------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

CHANGE 1 - 2

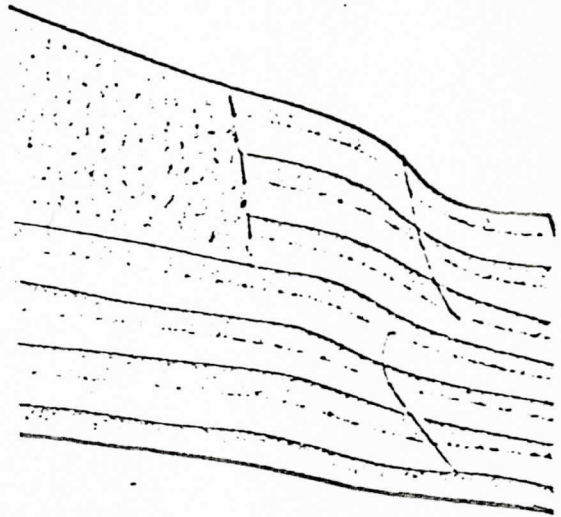
CHANGE 2 - 4

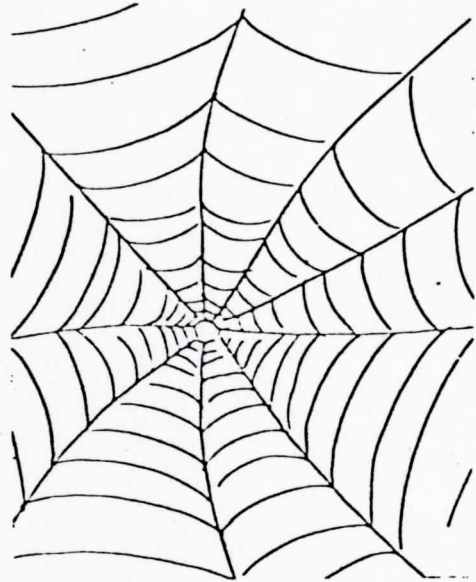
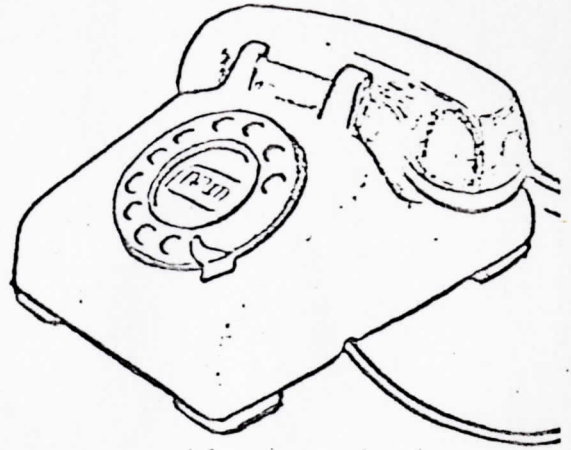
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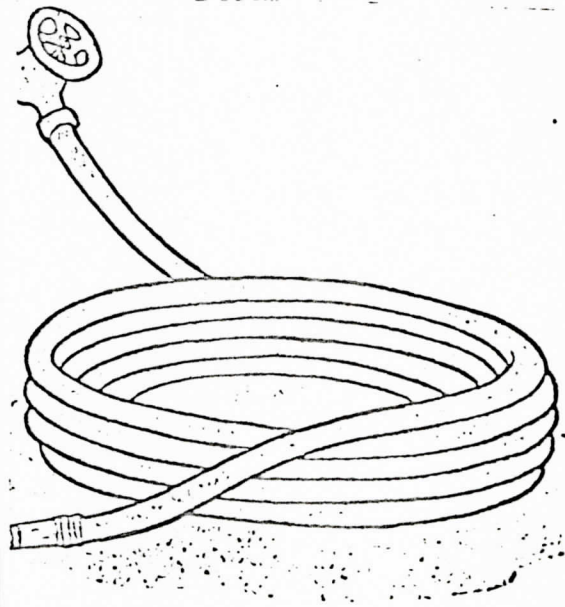
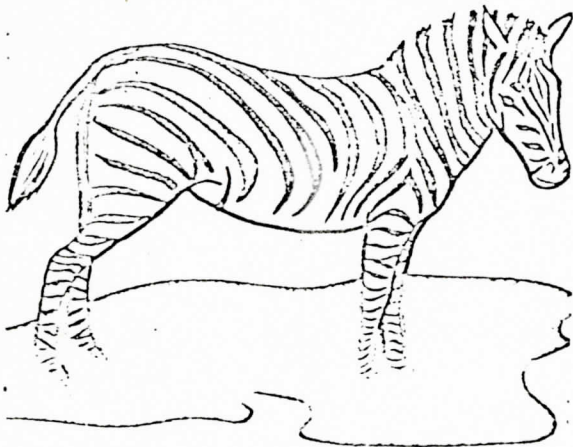
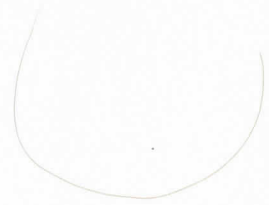
CHANGE 3 - 4

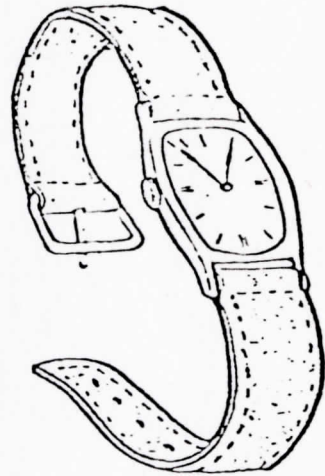
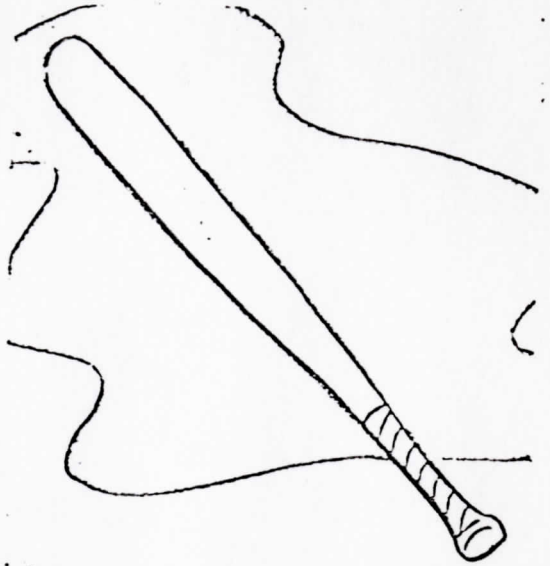
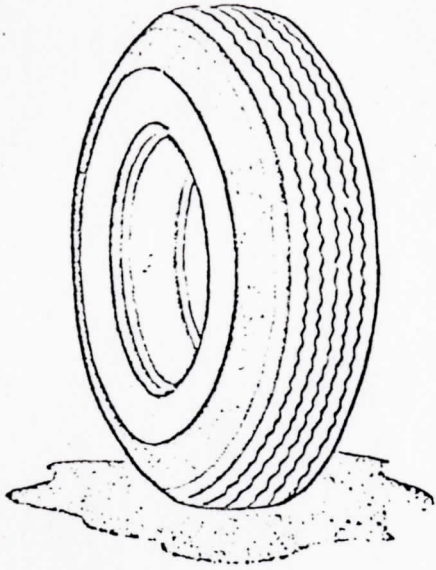
CHANGE 1 - 3

CHANGE 1 - 4

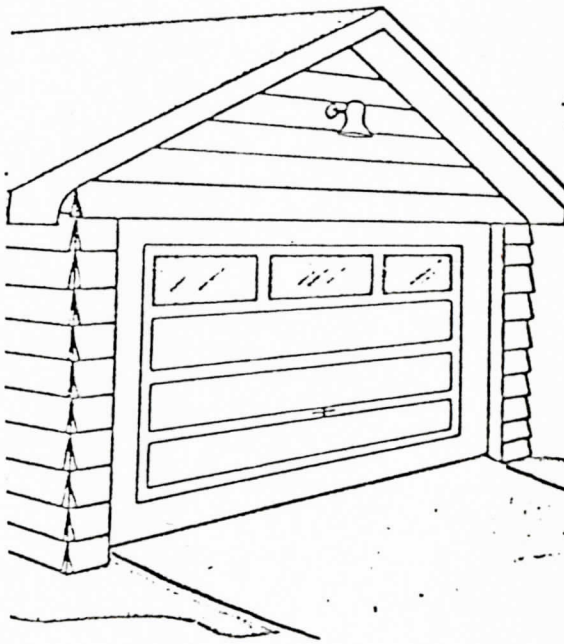


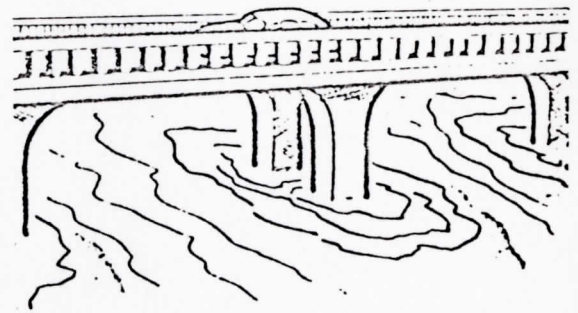
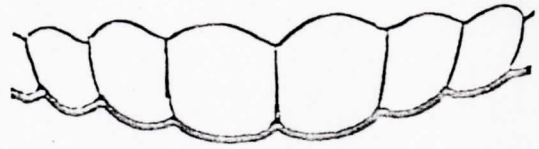
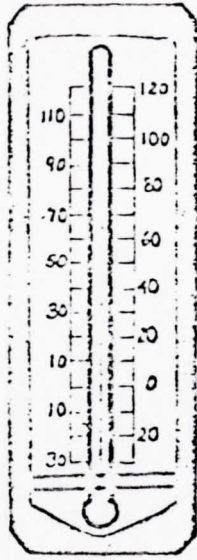


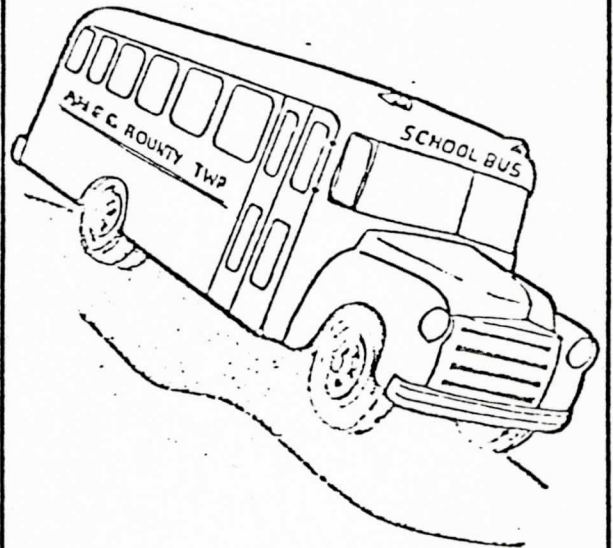
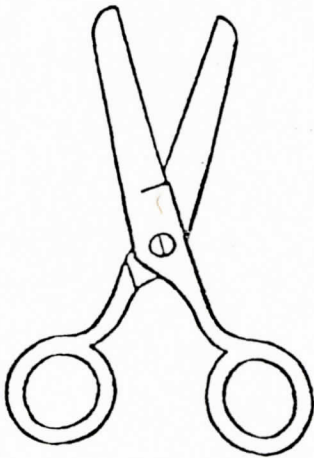
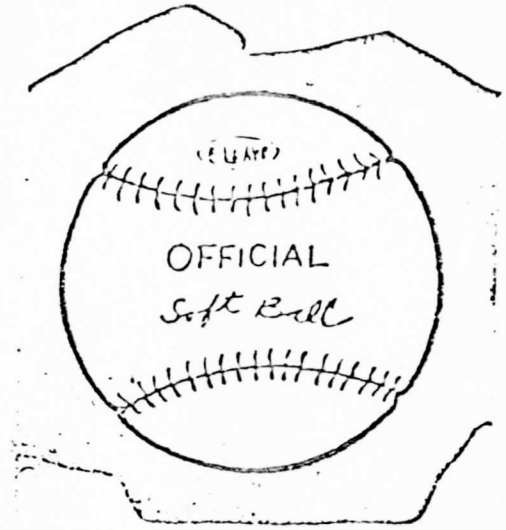
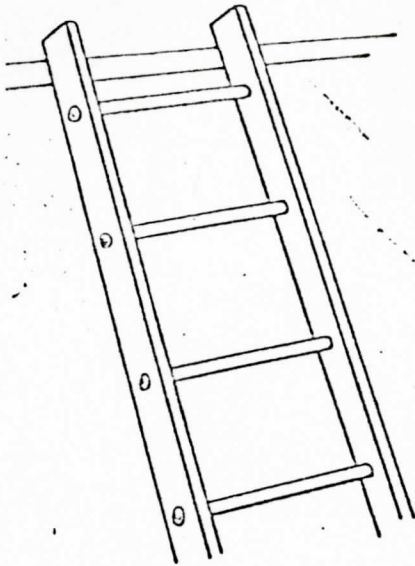


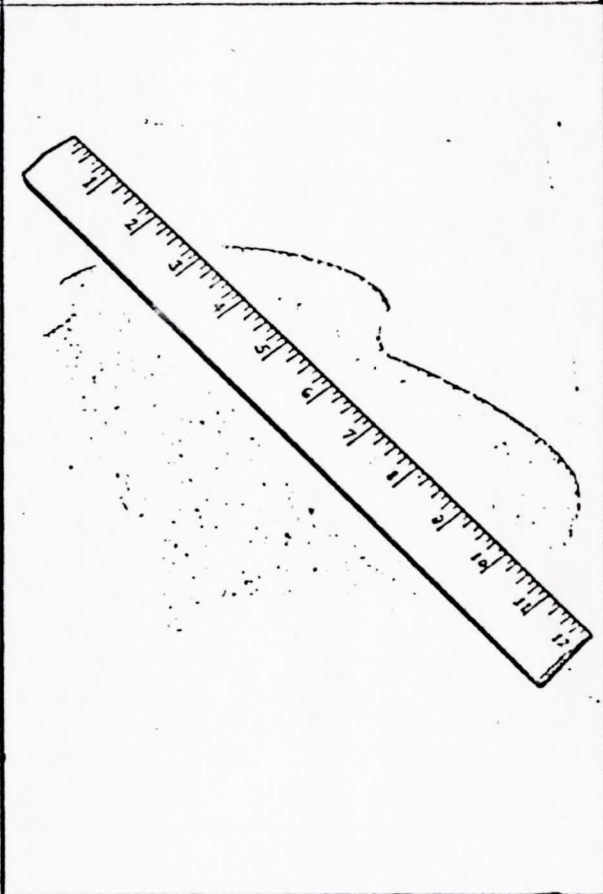
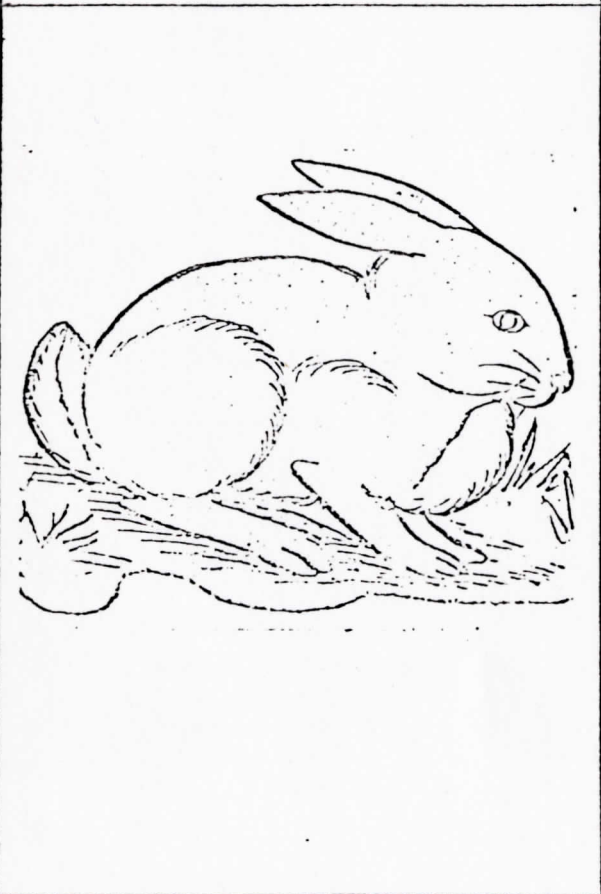
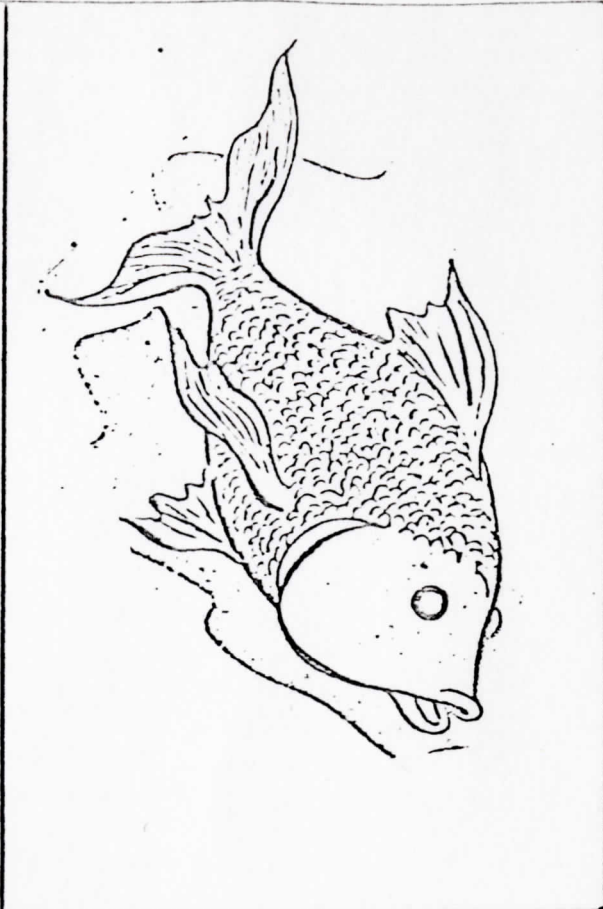
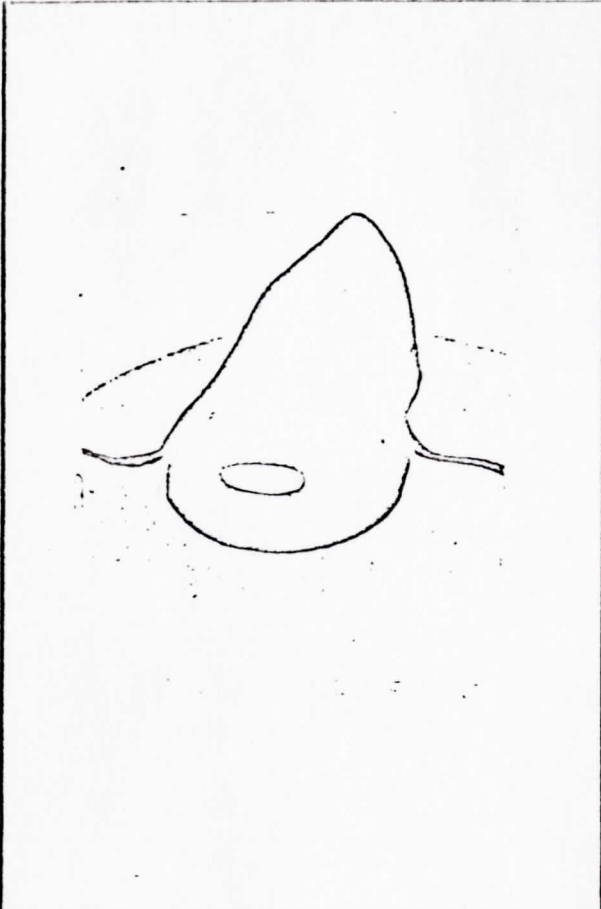


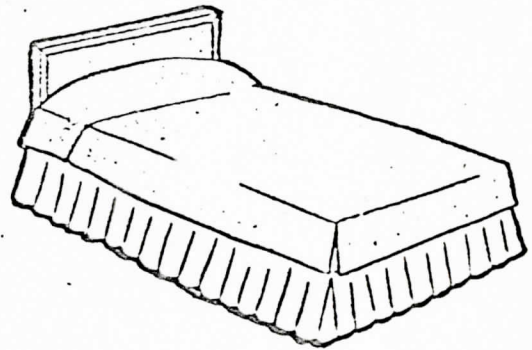
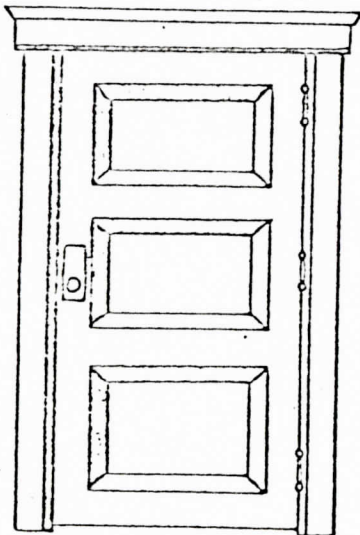
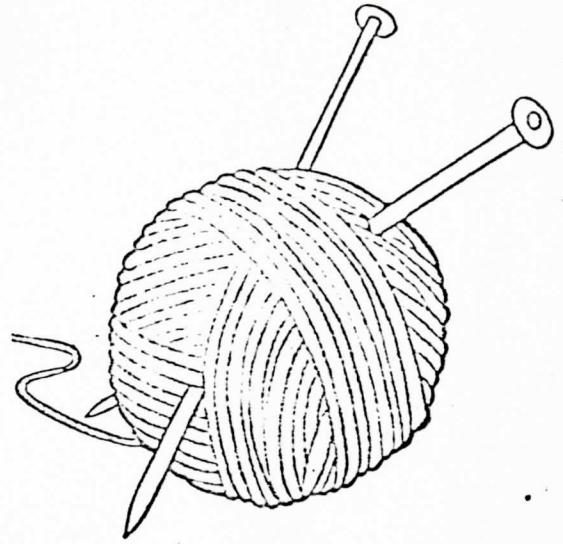


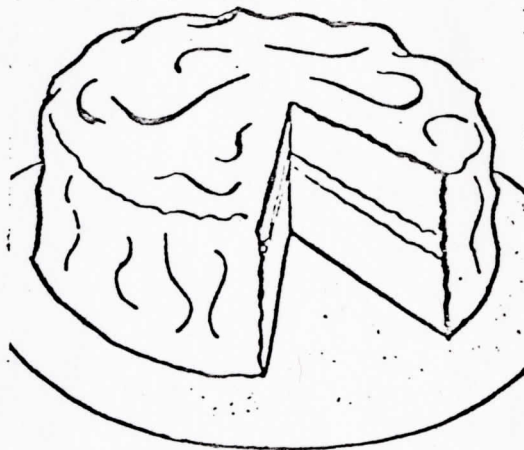
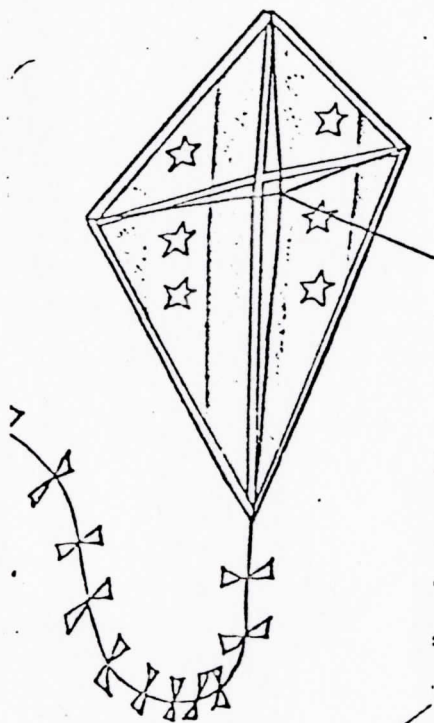
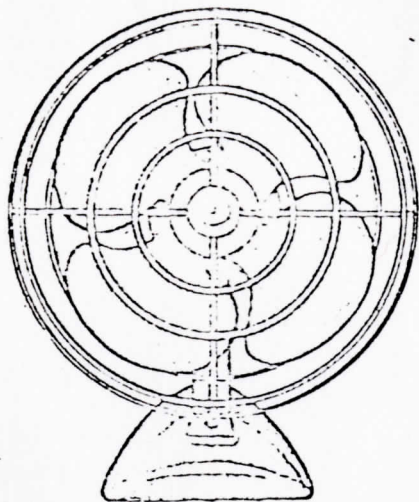


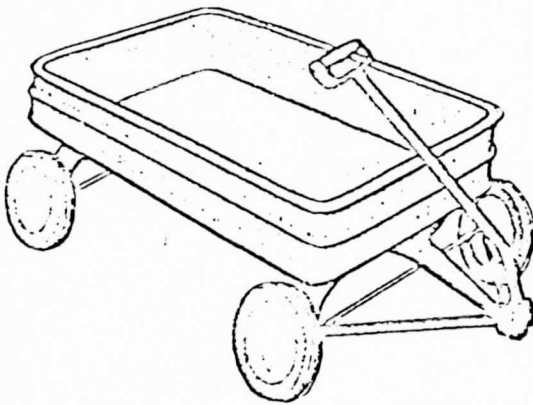
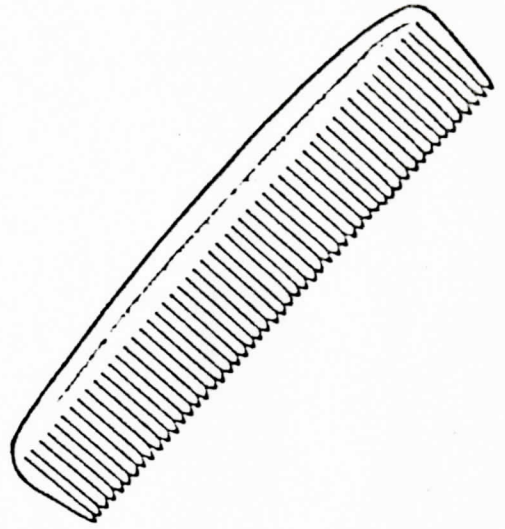
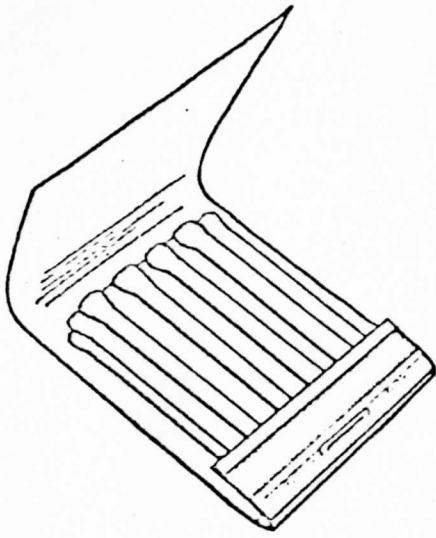


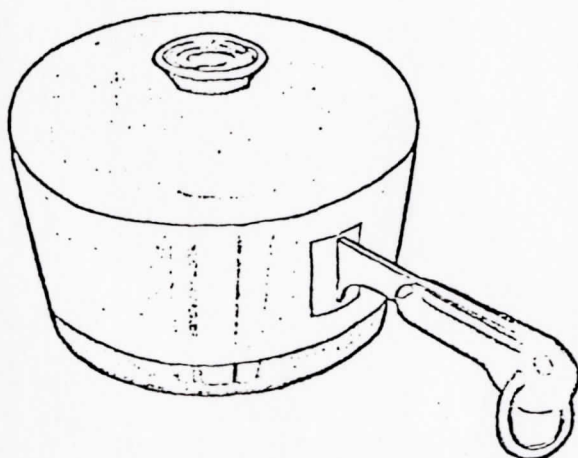














# RESPONSE FORM / Goldman-Fristoe Test of Articulation

by Ronald Goldman, Ph.D. and Macalayne Fristoe, Ph.D.

NAME \_\_\_\_\_ AGE \_\_\_\_\_ GRADE \_\_\_\_\_

SCHOOL \_\_\_\_\_ TEACHER \_\_\_\_\_ DATE \_\_\_\_\_

EXAMINER \_\_\_\_\_ COMMENTS \_\_\_\_\_

	SOUNDS-IN-SENTENCES RESPONSE MATRIX			SOUNDS-IN-WORDS RESPONSE MATRIX			STIMULABILITY RESPONSE MATRIX		
	INITIAL	MEDIAL	FINAL	INITIAL	MEDIAL	FINAL	SYLL.	WORD	SENT.
1 p									
2 m									
3 n									
4 w									
5 h									
6 b									
7 g									
8 k									
9 f									
10 d									
11 ŋ									
12 j									
13 t									
14 ʃ									
15 tʃ									
16 l									
17 r									
18 d <sub>3</sub>									
19 θ									
20 v									
21 s									
22 z									
23 ð									

Sounds-in- Words Syllable Stimulability	Number of Errors		Percentile Rank