1967

An Evaluation of Commonly Used Speech Articulation Tests From the Standpoint of a Public School Therapist

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AN EVALUATION OF COMMONLY USED SPEECH ARTICULATION TESTS FROM THE STANDPOINT OF A PUBLIC SCHOOL THERAPIST

A Thesis

Presented to

The Graduate Faculty

Central Washington State College

In Partial Fulfillment

of the Requirements for the Degree

Master of Education

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by

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June, 1967

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ACKNOWLEDGMENTS

The writer wishes to express her deepest appreciation to Dr. Katherine Egan, Mr. O. W. Wensley, and Dr. Dohn Miller for their guidance and counseling in the development of this thesis.

Special acknowledgment is made to Dr. Donald Von Pein and the Yakima County Cooperative Program for Special Education, Mr. John Zeutenhorst and the teachers of the Tieton-Cowiche School District whose interest and cooperation made this study possible.

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CHAPTER I

THE PROBLEM

The process of learning to articulate speech sounds, whether correctly or incorrectly, has its origin in the early developmental period from birth through the eighth to tenth year of life (Milisen, 1954). Correction of articulation is seldom attempted before school age except in the most severe cases. Most articulatory defects are not so severe that they prevent the child from attending public school. The teacher is often the first person to recognize the need for and recommend remedial speech.

Development of articulation and the conditions affecting the development of articulation must be considered as a multidemensional language behavior. These are probably best understood and described in reference to the child's total school performance. The school environment also provides an opportunity for limited longitudinal study of speech sound articulation of individuals and groups over an extended period of time. Research principles applied to practical problems in the public school therapy program would be an advantage in coordinating research activity throughout the field.

It is of great importance to choose the most suitable test vehicles for the public school articulation testing program. The tests should clearly indicate which children have defective speech. The tests should also indicate which

children will benefit from a remedial program, give some indication of their prognosis, and give assistance in planning therapy. Many tests are titled articulation tests, but a brief comparison will show little similarity beyond the name and the fact that they all provide a means of eliciting speech sound production from the test subject.

Clinical research has provided several rationales (Milisen, 1954; McDonald, 1964; Templin, 1957) from which articulation tests have been constructed. Sounds to be tested, methods of elicitation, and the order of elicitation vary according to the rationale of the author. Other factors, especially that of administration time, are of importance to the public school therapist.

It is difficult to judge the advantages and/or disadvantages of an articulation test before making a thorough evaluation of the test through use. The physical characteristics of the test must be evaluated in terms of ease of administration, based largely on the way the test is constructed. Of no less importance is the nature of the information the test is designed to elicit. For example, does the test provide a simple method by which an adequate sample of the child's sound production abilities can be evaluated? Or does it involve language abilities to a degree that it distorts the articulation sample? The general descriptions in the brochures and test names do little to inform the therapist of the actual content of the test or the rationale of the test maker.

The check sheet that accompanies the test is nearly as important as the test itself. The information elicited from the test must not only be pertinent and complete but must also be charted in a meaningful, convenient manner that will give the therapist the maximum amount of information in a minimum of time and space.

Much of the success of establishing therapy in the public schools is dependent on the test vehicle used to evaluate and diagnose a child's articulation.

It is the purpose of this study to administer five commonly used tests and evaluate them according to ease of administration and the value of the information received.

Because this study is to be essentially exploratory in nature, and not experimental, the evaluation of the tests will be largely subjective and will attempt to compare factors involving the administration of the tests to the child, the check sheets used to record information, and the adequacy of the information resulting from the administration of the various tests.

The children to be tested will be chosen so as to give a fairly representative sample of the children likely to be tested in a public school. Children in first grade will be chosen to represent typical younger children, and children in the third and fourth grades will be chosen to represent older children likely to be past the age of maturational articulation

development.

Children in special education classes will be chosen to ensure the inclusion of children with special problems other than possible speech deviations. The special education classes will include children with ages up to approximately thirteen years. The school system chosen for the testing will be a large county system in central Washington state varying from suburban to rural in character. The subjects will be chosen by random selection to represent children likely to be tested in a public school. The children might be referred to the therapist by the teacher for articulation testing. Not all referrals have deviant articulation. Many children who have normal articulation are tested when screening an entire class or grade, as is done in many school systems. For this reason it is felt that the testing should not be limited to children with speech problems.

CHAPTER II

REVIEW OF THE LITERATURE

Research in the area of articulation problems pertinent to this study could be divided into four main categories. First to give credence to the manner in which the test procedure was conducted, the literature concerning the reliability of individual listener ratings of articulation was reviewed.

Studies by Sherman and Morrison (1955) and Jordan (1960) report that reliable quantitative measures of severity of defective articulation can be obtained from ratings of speech samples by trained individual observers. Sherman and Cullinan (1960) evaluated the reliability of mean scale values of articulation defectiveness based on single observer ratings of consecutive versus separate ten second speech segment samples. Reports of both methods proved to be similar and satisfactorily reliable. Prather (1960) studied the psychological scaling method of direct magnitude estimation for obtaining measures of defectiveness of articulation along a ratio scale. Her conclusion was that scale values are reliable and the method was practicable in terms of experimenter and observer time. Thus according to the literature it appears that a single trained observer can reliably evaluate and measure degrees of defective speech from various forms of speech samples. The preceding studies were conducted from recorded speech samples as a measure of consistency and convenience.

Correlation between live and recorded speech is high. (Morrison, 1955; Sherman and Moodie, 1957) It has been suggested that a phonographic scale is an effective means for training listeners to effectively measure defective articulation (Curry et al., 1943; Wright, 1954). In addition, Wright showed that it is possible to make consistent evaluations between examiners.

Secondly, one should consider the purpose of the evaluation of articulation. Templin (1947a) suggests that articulation be measured for two purposes. One is to determine correctness or incorrectness of the articulation of specific sounds and to determine the general adequacy of articulation. If the purpose of the test is non-diagnostic then it is sufficient to consider only the correctness or incorrectness of the response. If, however, the purpose is also diagnostic, then it is necessary to obtain a complete appraisal of the accuracy and inaccuracy of specific sounds (Templin, 1947b). Janet O'Neil Barker (1960) states:

> "Any measure of articulation, whether it is to be used for clinical or research purposes, should fulfill certain criteria: (1) It should include a consideration of all speech sounds - consonants, vowels, and diphthongs. (2) It should represent speech adequacy in a quantitative manner. (3) It should be numerically accurate and allow for statistical manipulation. (4) It should be simple and convenient to use. (5) It should be easily interpreted."

Wood (1949) also suggests applying a quantitative description

of the person's ability to articulate consonant sounds not only as a measure of immediate test results but to make possible comparisons of articulation changes. His 'Articulation Index' allowed numerical credit for partial learning of consonant sounds, thus a person under treatment could have a score indicating progress in correcting deviant sounds. Snow (1954b) has also devised a numerical articulation score that can be used for comparative purposes.

Next for consideration, although not more or less important, is the factor of case selection. This is still a highly controversial issue according to the reports in the literature. Case selection becomes mandatory because there are always, in all systems, more children with speech problems than the therapists can handle effectively. Research has proved (Roe and Milisen, 1942) that young children under the age of eight or nine years may develop adequate articulation without therapy. At present, it is not possible to identify these children accurately. The author found recommendations that the classroom teacher be responsible for speech improvement skills such as pronunciation, poise, projection, and inflection. Although the therapist should diagnose, the classroom teacher should assume responsibility for articulation difficulties due to development and maturation, foreign dialect, regional dialect, careless pronunciation, poor usage, and slight deviations. Joint responsibility for articulation defects other than

developmental, delayed speech, severe voice defects, organic speech defects, nonfluency and stuttering therapy should be a joint responsibility of the classroom teacher and the therapist (Pendergast, 1963).

Flower et al. (1967) suggest that case selection is due largely to each clinician's view of his responsibilities based on his interpretation of the child's readiness for speech therapy. He states that his concern has altered as he sees cases to whom he assigned favorable prognosis appear three or four years later in the clinic. Some of the rationale for case selection can be based on the child's psychological need, organic involvement, maturation, response to stimulation, severity scale, functional involvement, availability for grouping, and possible case load of the clinician. All or any of these may be involved in case selection (Rice, 1957; Carter and Buck, 1958; Farquhar, 1961; Allen, 1966).

It appears that the type of stimulation used to elicit the articulation response is largely the clinician's responsibility. This brings up the second controversial issue concerning choice of an articulation test. There is considerable statistical evidence supporting both the spontaneous and the imitative method for articulation testing. The research by Carter and Buck (1958) and Snow and Milisen (1954b) indicated that the type of stimulation is significant in the resultant test scores and has prognostic value. In an analysis of Carter

and Buck test results, it was found that there was a significant difference between spontaneous (picture) and imitative (word) testing. Children in their study made less errors imitating than in spontaneous speech. They recommend that the picture test be preferred when testing the articulation of children.

In a further study Snow and Milisen (1954a) indicate ... "that the difference in a child's responses to an oral and a picture articulation test could be used as a valuable factor in predicting his progress in correcting his articulation errors".

Templin (1947) reports that ..."neither the spontaneous nor imitative method is superior ... there is no difference in measured articulation when a sound is tested in a word spontaneously uttered or in a word repeated after an examiner". She also states that articulation can be measured regardless of the child's vocabulary level.

It is not the purpose of this paper to resolve the controversy. Rather it would draw attention to the factors involved in arriving at an articulation measurement. It suggests that problems in the field have not been resolved with any degree of certainty. There is much room for research in the field and in related areas. The Milisen et al. report of the Subcommittee on Articulation Problems (1959) suggest research needs beginning with the definition and description of terms

such as articulation and articulation disorder. They recognize the need of greater professional understanding of what is described as developmental conditions of the child. Improving methods of measurement, diagnosis, and remedial techniques are fruitful areas for research. It is significant to this author that none of the studies reported findings based on fatigue of the clinician or child. Most test procedures reported in the literature were relatively simple, but some depend upon a multiplicity of skills simultaneously required of the clinician. No comparison has apparently ever been made between different articulation tests covering details of test construction, test administration, and test results. Evaluation of clinician time and fatigue could offer material for future comparisons of test score reliability. In the public school situation where testing may be done for long periods of time this may prove an important variable factor.

CHAPTER III

GROUPS STUDIED AND TEST MATERIALS USED

The subjects were chosen to give an approximate cross section of the children a public school therapist might be asked to evaluate during the course of testing to establish therapy groups for the school year. Table 1 gives details of age, grade, and sex of the children tested.

Table 1. Age, grade, and sex of children tested

Students		Age Range	Median Age	Sex M	Sex F	Total
Group 1	Special Education	9.8 - 12.3	10	7	7	14
Group 2	First Grade	6.6 - 8.2	6.9	8	6	14
Group 3	Third Grade	8.0 - 10.1	8.9	4	3	7
Group 4	Fourth Grade	9.1 - 10.7	9.9	4	3	7
					Total number of students	42

The children in the special education program are all considered educable with WISC (Wechsler Intelligence Scale for Children) scores ranging from:

60 to 84 on verbal IQ

55 to 109 on performance IQ

60 to 94 on full scale IQ

All testing was done by the psychologist employed by the

school system. These children have previously been in the regular classrooms of various schools in the district before this special room was formed in the fall of 1966. The WISC was the general test used to determine placement in special education although several cases had also received Stanford Binet, Goodenough, Bender, and Frostig testing over a series of years of testing. The chronological age of these children ranged from nine years eight months to twelve years three months. These children have no physical defects severe enough to warrant special treatment. They all walk well enough to join the regular classroom children on the playground at recess and at noon. One or two wear glasses at least part-time. There were no other severe physical handicaps.

None of these children in special education classes are receiving speech therapy directly from the therapist this year. Instead, a program has been instituted in which the therapist spends some time in the room observing. She then makes suggestions for listening and motor skill activities to the classroom teacher who carries out the actual activity. The children in grades one, three, and four were randomly selected from these grades. No attention was given to the presence or absence of speech problems. Five out of twenty-eight were, however, receiving speech therapy.

TEST NO. 1 Developmental Articulation Test

Revised 1959 by Albert Hejna

Speech materials, Box 1713, Ann Arbor, Michigan

Price $2 - Pictures - 25 scoring sheets and instructions

26 picture cards 4 3/8" by 6"

Matte finish, white background

2 or 3 pictures per card

One color to a card, brown, blue, orange, red, and green

Single line drawings

The cards are white with pictures in brown, orange, green, blue, one color to a card in most cases. The only exception being the yellow square and a brown onion on the same card. The finish on the cards is flat and non-glazed, thus soiling and subsequent replacement must be considered as part of these tests detrimental points.

Tested are: 24 single consonants, 4 consonant blends, 0 vowels, 0 diphthongs some in more than one word position.

Sample scoring sheet in Appendix A

TEST NO. 2 The Templin-Darley Test of Articulation

Mildred C. Templin and Fredric L. Darley
Bureau of Educational Research and Service Extension Division
State University of Iowa, Iowa City, Iowa

Includes a manual and discussion of the screening and diagnostic tests

Test items - record blanks available at extra cost

A green 6 1/2" by 9 1/4" manual and discussion

Screening and diagnostic tests

Page 1 Introduction

Page 2-12 Diagnostic test: Discussion and procedure

Page 13-15 Discussion and procedure of screening test

Page 16-17 References

Page 18-19 Age norms for diagnostic and screening test with cut off scores by age

Table 1 - mean scores on 176 item diagnostic test by age for boys, girls, sexes combined, and upper and lower socioeconomic groups

Table 2 - mean scores on 50 item screening test by age for boys, girls, sexes combined, and upper and lower socioeconomic groups

Table 3 - cut off scores on 50 item screening test at eight age levels

Page 20 Index

Page 21-25 Appendix A words used in articulation test

Page 26-37 Sentences for diagnostic test items to be read by older subjects

Page 39 Test cards with carrier sentences

Pages 1-57 Single line drawings in black on white page 2, 3, or 4 drawings to each page

Corresponding number of sentences on back of each page with phonetic symbol for sound tested.

Tested are: 25 single consonants, 90 consonant blends, 12 vowels, 6 diphthongs; many consonants and blends tested in more than one word position.

Sample scoring sheet in Appendix B

TEST NO. 3 Milisen Articulation Test - teacher made adaptation

Looseleaf ring notebook 7 1/4" by 9 3/4".

Seventeen pages of pictures of objects.

Phonetic sound on back of each page.

Stimulus words on back of each page.

One general interest picture page which could be used to elicit conversational speech and 17, 5" by 7" glossy photographs or pictures of objects mounted on heavy white cardboard 9 1/2" by 6" with three holes punched to fit binder.

(All optional as this is a teacher made test following the Milisen Rationale and adapted for use with his record blank)

Tested are: 17 single consonants, 0 consonant blends, 0 vowels, 0 diphthongs, some in all word positions.

Scoring sheet in Appendix C.

TEST NO. 4 Photo Articulation Test (PAT)

Kathleen Pendergast, Stanley Dickey, John Selmer, Anton Soder

1965 The King Company, Publishers, Chicago

Kit contains a manual of instructions, colored test photographs, 100 recording sheets, 72 card deck of color photographs and supplementary word list. $11.

Ring type manual - 10 1/2" by 8 1/2" containing:

Page 4 Test materials in PAT kit

Page 5-6 Directions for administering and recording

Page 7 Scoring

Page 7 Explanation of supplementary test words

Page 7 Directions for use of the deck of individual test cards

Page 8 Long form

Page 8 Short form

Page 9 Administration time

General Information

Page 9 Test construction

Page 11 Standardization 1. Validity 2. Reliability

Page 12 Acknowledgements

Page 12 References

Appendix

Page 13 The PAT words

Page 14-15 Supplementary test words list

Page 17 PAT recording sheet

Subsequent eight pages contain duplication of the PAT photo

card deck.

The photographs are the same size as on the card deck, nine photos per page.

The card deck contains 72, 3 1/2" by 2 1/2" cards.

Photos are 2 3/4" by 1 7/8" with approximately 1/2" white borders.

Photos are of objects in natural colors on dark background.

Card finish can be compared to regular playing cards, opaque, with patterns on the back.

Tested are: 25 single consonants, 3 consonant blends, 14 vowels, 4 diphthongs, some in more than one word position.

Scoring sheet in Appendix D.

TEST NO. 5 A Deep Test of Articulation

Eugene T. McDonald

Stanwix House Inc., Pittsburgh

Includes text on Sensory-Motor Approach to Articulation Testing and Treatment.

Sentence and Picture form of the test. Pad of recording sheets.

Black plastic covered 5 1/8" by 4 1/4" ring notebook (not looseleaf).

White pages with black type print.

8 1/2 pages of general directions.

38, 2 1/2" by 4" cards on left side of booklet.

5 practice pictures with word printed below

22 pictures comprising test sounds, word below

11 alternate test pictures with words below

Approximately 1/2" separates left and right hand sets of cards.

Pictures are black line drawings, some are colored in pastels, red, and black.

Sentence form

7 1/4" by 5 5/8" ring notebook (not looseleaf).

Three pages general directions.

Twenty-five pages of sentence corresponding to test sounds (large print).

Tested are: 22 sounds as end of words to be combined with the following, 25 sounds as beginning of words combined with the above.

CHAPTER IV

PROCEDURE

The five tests were administered individually to each of the students in the three groups. The testing took place over a period of all or part of nine school days. One of these days was February 14, Valentines Day. Testing was discontinued in the afternoon of this day to allow the children to participate in party activities without interruption. A rotation schedule was followed in administering the tests. The time sequence in which the child took the test was also staggered to eliminate fatigue.

For example, test No. 1 was given to the first student, he was excused and the second student called in. He also received test No. 1 and was excused. The third student was called. He received test No. 2 and was excused. The fourth student also received test No. 2. The fifth and sixth students received test No. 3 and so on. This double rotation continued over the nine day testing period, thus a student may have received a test at any time of the day during the nine days.

Occasionally the same child was tested more than once in the same day, but of course, never the same test and the test intervals were far apart.

Testing for each room was completed before moving to the next to facilitate setting up the test environment in a loca-

tion convenient for calling and dismissing the children for individual testing.

The instructions in the test manual were followed and the check sheet filled according to spaces allotted. Each test was timed as a partial measure of administrative ease. Timing began after instructions had been given and ended with the last response.

Marginal notes were made of factors that were considered important but were not part of the standard test procedure. one such comment on the Hejna Developmental Test concerned two special education students. The first, a girl, had an especially quiet voice which made it difficult to evaluate her articulation or her vocabulary. The comment column was ruled for each sound and a running description of voice and vocabulary must disregard the lines. The other, also a girl, was remarkably slow to stimulate. This would not show in the timing results because the stimulability was not included as a measure of test administration since some children had far less errors than others. The stimulus for the sound in isolation had to be repeated several times but then the subject responded correctly to sounds that had been in error in the timed test procedure. Repeated stimulation could be considered a form of practice that could invalidate the test results. It certainly alters the time spent with each child which is not revealed by the timing chart.

Several notes referred to more total involvement of incorrect sounds as used in words than this test revealed. For instance, the child would respond correctly to the m sound and then say, "My birthday is after chrisis." (Christmas) Others changed their pattern of misarticulations after stimulation but the sound was still a distortion. Also noted was the order in which the child named the pictures. Generally they began at the top and named the objects from the top to the bottom, similar to normal reading procedure. Occasionally a child would respond in no obvious order. He might begin at the bottom or side picture and move randomly over the page.

Three other notations concerned children who responded within an acceptable time range but were obviously distressed during the test. No attempt was made to determine the nature of the distress due to the short administration time required. It was never serious enough to terminate the test administration.

The marginal notations on the Templin-Darley test were almost wholly concerned with word substitution. One note states, "The child's articulation is adequate but his vocabulary is low, much stimulation must be given before he will respond by repeating the word." In cases of termination a marginal note was made. Generally this concerned a lack of vocabulary on the child's part. The sentence used to elicit

a sound would be read and either an incorrect vocabulary response occurred such as bee for wasp or no response occurred because he seemed to have no word. In both cases it was then necessary to say the correct word for the child, thus changing the test from spontaneous response to imitative response. In the case of no response it should be noted that several seconds were allowed to determine whether the child was slow to respond due to searching for the correct word or was not going to respond due to lack of vocabulary.

The Milisen Teacher Adaptation Test required the least marginal notes. Here again, order of response was noted and certain words were jotted down when the error occurred in the word and not specifically in the sound being tested. This information was then transferred to the proper area for an estimate of language ability. For example, one child had a correct l, but said fwag for flag, and a correct z, but said glassen for glasses. A consistent marginal note for one seven year old child was to note his addition of an s or z to all the stimulus pictures even after attention was called to the fact that the stimulus was singular. For example, to the stimulus of gun and book he replied guns and books.

The ample, non-ruled comment column on the PAT leaves room for notes about unusual happenings that had to be made in the margins of the other tests. In the McDonald Deep Test, several notes state that the subjects made mistakes on a sound

other than that being tested apparently because of the word combinations. These children had normal articulation on all the other tests. There was also a strong tendency to separate words into two singles rather than use the nonsensical double words on difficult combinations. It is particularly questionable to combine two words that are both nouns. Except for spondee words such as railroad, duckpond, etc., two nouns are never used consecutively in English making the process completely artificial.

CHAPTER V

TEST RESULTS

As a result of using the five tests on the 42 children, it was found that there were important differences in the ease of administration and the information secured. Table 2 is a summary of significant facts discovered about the five tests.

TABLE 2 Inventory of Factors on Scoring Sheets of the Five Tests

	Test #1	Test #2	Test #3	Test #4	Test #5
Child's name	x	x	x	x	x
Child's age	x	x	x	x	x
Grade	x			x	x
School	x		x	x	x
Date	x	x	x	x	x
Birthday			x		
Sex		x			
Examiner's name		x			x
Parent's name			x		
Sound being tested	x	x	x	x	
Frequency of sound in speech			x		
Isolated word			x		
Sound in isolation (stimulation)	x		x	x	
Word in isolation (stimulation)	x		x		
Column for physical aspects			x		

Referred by ...			x	
Evaluation of understanding spoken language			x	
Intelligibility of speech		x	x	x
Rhythm		x	x	
Voice			x	
Estimate of language ability			x	x
Comparison of norms		x		
Analysis of misarticulation		x		
Description of test situation		x		
Developmental age of sound	x			
Card number	x			
Comment column	x	x		x
Home address			x	
City			x	
State			x	
Phone			x	
File number			x	
Key for marking	x	x		x
Column for vowel and diphthongs		x		x
Therapy goals and progress				x
Picture stimulus for connected speech				x

Test #1 Hejna Developmental Articulation Test
Test #2 Templin-Darley Test of Articulation
Test #3 Milisen Articulation Test - teacher made adaptation
Test #4 Pendergast Photo Articulation Test (PAT)
Test #5 McDonald, A Deep Test of Articulation

Test No. 1

The Hejna developmental articulation test proved to be facile to administer. It had three elicitations of words represented by three pictured objects per card, making 26 card changes for the therapist each time the test is administered. No comment need be made by the therapist on most items. Other than items the child may not know due to a limited vocabulary (scooter, onion, bib) there are perhaps three which need special instructions to elicit the desired response. Sic. If dog is given for puppy the therapist might ask "What is a small dog called?" To elicit the correct response of 'yellow' for a square of color, the therapist may ask the child to name the color. Very often the response to the desired elicitation of 'fingers' was 'hand'. There are no instructions for better performance on this item. To elicit the voiced th /ð/ in the initial position the therapist must ask which is bigger, this one or that one? In general, the stimulus pictures are simple and are easily responded to by the child. The test is based on the developmental age of the child as evidenced by his articulation. The children in this study are all of school age, therefore, in most cases, some sounds were tested before arriving at the crucial sounds concerned with development of these subjects. Only occasionally were defective sounds below expected age norms and these were generally in the special education group.

The time involved to administer this test is relatively short, the norm being 2 min., 45 sec. No child in any of the groups was unwilling to finish the test. Interest was easily maintained during the time necessary for the administration. There is minimal space on the scoring blank concerning personal data of the child. Indications are made for the child's name, age, grade, school, and the date. There is a key for systematic scoring of the test sounds and a list of sounds according to the rationale of developmental age level. Chronological numbers are matched to corresponding numbers on the test picture cards. Scoring space is allotted for checking the sound in the three positions, initial, medial, and final and in isolation. This check sheet does not allow for stimulation data other than testing the misarticulated sound in isolation. It does not give statistical information or norms other than division of the sounds into the developmental age at which 90% of the children are expected to have acquired the sound. Hejna does not indicate the source of his information on the developmental age norms. There is no systematic stimulus material nor space allotted for eliciting and evaluating connected speech and language. Neither does it leave specific space for a notation on general physical aspects nor for therapy prognosis.

Test No. 2

This test is in book form. The Templin-Darley test proved very time consuming when administered in its entirety. Mean administration time of the screening and diagnostic test was 14 min., 24 sec. Mean administration time of the screening portion was 3 min., 54 sec. Only the 50 item screening test should be used for timing comparisons as the diagnostic material was not timed on the other tests. The fifty item screening test shortened administration time, but was difficult to follow on the check sheet as items are not numbered consecutively. Items are elicited by sentences given by the examiner. The child fills in the missing word according to the picture cue. In some cases the word denotes the object in the picture. In others, it is a verb depicting what the person or object is doing. In another instance, the answer demands that the child make a comparison or an analysis of the whole sentence before he can respond. Sic. "When the merry-go-round is playing, we hear ____". "The ice isn't rough. It's ____". "This pin can stick because it's ____". "This nail is first, this second, this third, and this ____". The therapist must read 128 sentences, turn 57 pages, follow a non-consecutive check sheet, plus evaluate responses both visually and aurally.

Use of either the screening or the diagnostic test through an entire day of testing would be extremely fatiguing for the

therapist in voice use and attention to the multiple skills needed to administer and evaluate the test. Indicative of the difficulty of these skills is that the child and the therapist must sit across from each other as the picture is on one side of the page and the sentence is on the back. This means that the therapist must place himself very carefully so that the light can come through the page in case he needs to point to the picture. Or he must look over the top of the test as there are from two to four objects to the page and pointing may be necessary to help the child follow the order of the sentences and decrease distractibility.

During the elicitation it is necessary to read simultaneously the sentence on the back of the test page facing the therapist, point to the picture on the front of the page facing the child, lift the eyes to make a visual evaluation of the child's response, find visually and manually the correct space on the check sheet to record the response, pick up the pen or shift it from pointing position and mark the response. Then repeat this procedure for the 128 sentences.

The analysis sheet leaves room to compute statistically the norms according to the number of items correct or incorrect, the mean according to this child's age and sex, the cutoff score for adequate or inadequate performance. However, these scores are based on number of correct and incorrect responses only and may be a poor indication of overall articulation if the

child makes several errors on one sound. A child who distorted an s in blends could get a score of only 39 out of 50 items on the screening test, even though all other sounds were produced correctly. Neither does it take into consideration that the child may give a wrong word or no word to a stimulus which in strict statistical analysis would give meaningless articulation scores if the child was unable to respond because of lack of vocabulary. If the therapist must give the child the stimulus word due to vocabulary lack, this too should be indicated, however, there is no specific space provided for this information on the check sheet. The nature of the test then became one of mixed stimulus, partly spontaneous and partly imitative, which according to some studies may make significant differences on evaluating performance (Templin, 1947b; Snow and Milisen, 1954).

In several instances as indicated on the time sheet this test was terminated due to lack of correct response and because of fatigue on the part of the child. They became disinterested when they could no longer successfully perform. It cannot be proved here which factor was most responsible for discontinuation of response on the part of the child. Perhaps in a later experiment the test could be given in reverse to lessen the fatigue factor on the later test items leaving the simpler responses for the end of the timed period.

The information that can be elicited by this test con-

cerning sounds is perhaps the most detailed of the five tests selected for this study. The information on sound production goes into more detail in the r, s, l, two element and three element blends than any of the other tests. Research has indicated (see particularly Curtis and Spriestersbach, 1951) that the production of some sounds, particularly r, is actually facilitated in blends. Conversely, sounds produced correctly as single consonants in words may be omitted or otherwise misarticulated in blends. The large number of blends tested in the Templin-Darley Test therefore may give very valuable information. A vital criticism is that there is no test of the s sound other than in blends in the fifty item screening test. It is felt that this is an important sound to be tested as a single in the basic sounds of any test of articulation and certainly within fifty elicitations of a screening test.

The third and fourth pages of the check sheet also allow a place for an analysis of the misarticulations as singles and/or blends in any of the positions or if the error sounds were ever used correctly in any of the positions. There is a space for noting possible factors related to the patterns of misarticulation. This could be used to describe physical characteristics involved. There is a space for rating and noting errors in connected speech. There is also a space for describing the test situation. The space for personal data is minimal on this test. It leaves room to note only the

name, age, and sex of the child, the date and the name of the examiner. There is a key for systematic scoring. Although this test gives a great deal of detailed, useful information, it is confusingly organized for the person who is not familiar with it.

Test No. 3

The teacher made adaptation of the Milisen articulation test was simple to administer. It was in ring notebook form so it could be used either as a book or taken from the notebook and used as cards. It tested seventeen sounds on as many pages, with three elicitations to the card, one each for initial, medial, and final positions of a sound. The mean time for administration was 2 min., 58 sec.

Seventeen consonant sounds were tested in three positions. As an added page there was a general picture as the first page that could be used to gain rapport and to elicit a standard sample of connected speech and language by asking the child to describe the picture or its contents. There is a space for description of these items on the accompanying check sheet.

The pictures for this notebook had been collected and put through a plastic covering process that protected them from soiling. A few of the items were consistently misinterpreted by the subjects, such as, spoon was named for the picture of a balloon. Also a whole face is intended to elicit the word mouth or teeth. Face was often the substituted response. The most difficulty arose on the elicitation of the voiced th sound /ð/. The therapist had to disrupt the general trend of object naming and ask a question to elicit the initial sound and ask for a comparison to elicit the final sound. Otherwise, it was generally acceptable, easy to administer,

and well within acceptable time limits.

No child failed to complete this test, therefore, fatigue seems to be an inconsequential factor in administration. Interest remained at a satisfactory level throughout each performance.

The use of this test is exceptionally easy as the child is able to turn the pages of the notebook with as much ease as the therapist. This leaves the therapist's hands free to record the responses. The only drawback to this procedure is that the child is inclined to drop his head and make visual evaluation of his response difficult. This can be eliminated by proper seating where possible with the desk and book elevated more than for normal reading practices. This allows the therapist full view of the child's face.

The information elicited by this test is sufficient for screening the most important sounds in articulation therapy. The sounds on the scoring sheet are consecutive corresponding to the order in which pictures appear in the notebook.

Space has been provided for data most important to therapeutic placement. It provides for sound testing in an isolated word in the three positions, for the sound production in isolation, and the scoring of the stimulability of all misarticulated sounds in the three positions in words. This allows the child to perform both spontaneously and imitatively. Recording is convenient with the stimulability test directly

across from the isolated word test, one sound per line.

Subsequent information is fairly well distributed on the check sheet. There is space for the name, age, birthdate, file number, address, phone, parent's name, referral information, examiner's name, date, and address.

Some of this seems superfluous for public school therapy, but this sheet was designed for clinic use in a college. With minor changes it asks for mostly pertinent information. One suggested change is in the placement of the date. This is perhaps information that will be used more often than its placement on the blank would suggest. The date of the test should be close to the age of the child as this is an important point of comparison.

Following this general information there is adequate space to evaluate understanding of spoken language, the intelligibility of speech, the rhythm of speech, the voice quality, and the general language ability.

Consideration is made in the right hand column for a brief evaluation of the hearing, eyes, teeth, jaw, tongue, palate, larynx, nasal cavity, and/or brain injury. These are important factors for evaluation and noting of same in case the child has had a medical evaluation before being referred to the speech therapist or for the medical report if it becomes the duty of the therapist to refer for such reports.

This test provides for a generous view of the child in a minimum of space and with very adequate ease of administration.

Upon completion the examiner has a sound inventory, stimulability, and an estimate of speech and language. There is adequate personal data including birthdate, which is important in public school therapy, since these are the developmental years. Space is provided for the therapist's physical description of the articulators or for medical evaluation. After interpretation of stimulability data a therapy prognosis can be made.

This check sheet lacks a key for systematic scoring and statistical data for computing norms. The importance of these lies in the preparation of the therapist using the test. If he has had basic therapy courses, he should have at his command the common marks for scoring articulation tests. The emphasis on computing norms for public school therapy is of lesser importance than the other information which this test and check sheet offer.

Test No. 4

The Pendergast Photo Articulation Test has many advantages. First, it comes in two forms. The book form comes in a set of nine pictures to a page in eight pages. It also has a card form of 72 individual color photograph cards. There is also a supplementary test word list.

The picture cards allow for much flexibility. They could be sorted to allow for testing of certain sounds according to the developmental levels or frequency whichever rationale the therapist feels advisable, according to the subject being tested. They could also be mounted in any order desired to cut down on page turning motions. The colors are bright and the pictures very clearly portrayed. Since they are photographs of real objects there is little confusion in determining what the objects are. As described in the manual, they are helpful to subjects with visual problems because of their clarity and bright colors. The individual test cards were used exclusively in this study. It is suggested by the author that they could also be incorporated into the later therapy.

The check sheet enables the examiner to evaluate sounds, common blends, some vowels, and diphthongs with the first 69 cards. Connected speech may be evaluated by eliciting a story from the pictures on the last three cards. There is room on the back of the check sheet for an evaluation of connected speech and language, voice, fluency, additional diagnostic

information, therapy goals, and procedures. The blank column on the front plus the comment column could be used to indicate stimulability of error sounds.

The test is identical in either card or book form as to sounds elicited and manner of scoring. The median administration time was 3 min., 09 sec. The cards can be compared to a deck of regular playing cards for ease of handling. However, there are no numbers or phonetic symbols on the cards to compare order with the check sheet. The check sheet does contain all the test words. If the cards were dropped or disarranged they would have to be sorted by visual comparison with the words on the check sheet or by comparison with the order of the pictures in the book form of the test. The cards come held together by a rubber band. A suggestion for safer transport would be a small box or packet similar to those in which playing cards are purchased.

The fatigue for the tester in this case amounts to turning the sixty-nine cards and marking the check sheet. There is some adapting in holding the marker and turning the cards at the same time but this is minimal. As long as the cards are kept in order testing procedure is rapid and simple.

All children were able to complete this test in a very reasonable time allotment for public school speech evaluation. The colors of the cards and the clarity of the photographs made this test especially pleasant for the children.

The PAT recording sheet asks for a very minimum of personal information concerning the child. It provides for name, age, grade, school, and date. It does not ask for a birthdate, but this could be inserted in the age blank. There is a key for standard marking. There is the usual three word position area for marking the response sounds, but no area is specifically designed to mark response to stimulation in isolation or in words. There is room to check for 18 vowels and/or diphthongs. This is one of two tests of the five that takes these sounds into consideration. The space on the check sheet labeled comments could be adapted to testing the sound after stimulation.

This test has the most standardized material for eliciting an example of connected speech and language. The last three test cards can be combined so that the child can make up a story or conversation by which the tester can evaluate the language, intelligibility, voice, and fluency. The space provides for descriptive data about the speech rather than check spaces of merely good or bad, etc. The next spaces leave room for notes on additional diagnostic data such as physical condition of the child including hearing, motor coordination, perceptual deficiencies, and emotional factors. There are no instructions or materials provided by the test to determine this information. The last space is devoted to notes on therapy goals and progress. This test is quite suitable for public school speech testing if as suggested, the

comment column be used to determine stimulability.

Test No. 5

The McDonald Deep Test was perhaps the least rewarding regarding amount of information elicited of the five tests evaluated.

The picture form of the deep test was used in this study. It consisted of a ring type notebook with sets of pictures on the right and another set on the left. These are divided by approximately one-half inch. The left side can then be 'set' to whatever sound is desired to be kept constant. The right side is then manipulated from the various combinations. The procedure can then be reversed and the right side pictures kept constant while the left side is manipulated to change the words. The child is then instructed to say the two words (pictured objects) together as one word. For example, if the sound you are testing is s you would set the right hand set of pictures to the word 'sun'. The left hand column is then manipulated to combine the sounds you wish to test with the s. The first word appearing in the left hand column is cup. The child would then say cupsun as one word. The second would be tubsun, etc. through the test. If the order is to be reversed, the word is house in the left hand column and the first word in the right hand column is pipe, making the first elicitation housepipe. The second housebell etc. through the test. Decision as to what sound should be tested is determined by listening to the child speak in a spontaneous situation or by

asking the child to count or name the days of the week, etc.

The greatest difficulty of administration does not appear in the time element of the test as instructions to the child were given before timing began. It is indicated, however, in the termination of some of the tests due to many interruptions for repeating instructions of making one word out of the two stimuli. These instructions were difficult for most of the students to grasp within the practice pictures and timing was often stopped to reinforce combining the two pictures or words into one 'funny big word' as per instructions. Attempts at combination by normally articulating children resulted in misarticulations on this test. They became something that best could be described as a tongue twister or difficult to articulate at best. The combination of two unnatural nouns, used to test consonant blends in a medial position, has been mentioned earlier.

The short time for administration prevented much fatigue on the child's part, but little interest was shown in combining nonsense words, especially in children above the first grade.

There is room for personal information on the check sheet, such as name, age, grade, date, address or school. There is also a space for the tester's name and a space to indicate whether the picture or sentence test was used. There is a minute space to indicate the nature of incorrect articulation,

substitution, omission, or distortion with instructions on how to determine the percent of correct articulation. Lines below the sound tested provide for percent correct and the date tested. There are four of these columns per page, so that four sounds could be tested per record sheet or the same sound on four occasions. This is the only information the test is designed to elicit and all that the check sheet leaves room to indicate.

Instructions in the manual advise the tester to converse with the child or have him repeat familiar rhymes or name the days of the week as a sample of their speech from which to determine what sound or sounds should be deep tested. Mean time for administration was 2 min., 23 sec. This was for one consonant sound preceded by and followed by 23 or 24 other consonant sounds in the two-noun combinations.

As mentioned in the review of the literature, the value of approximating two consonants next to each other with no meaningfulness is questionable. In an analysis of the test results, it was found that subjects who had no articulation difficulties on any of the other tests misarticulated certain sound combinations in this test. Sic. the s, z combination appeared to be especially difficult. The word being housezebra. One or the other sound was not clearly enunciated. The second tendency was to separate the two words if articulation of the two together was difficult. This required stopping the timing and

giving instructions again. The writer does not feel that it was a misunderstanding of the instructions, but a natural inclination to divide difficult combinations of consonants or words not naturally spoken together in spontaneous speech. This is not the usual order of words or sounds in English in which adjectives frequently precede nouns and verbs frequently follow nouns. A one page recording sheet seems adequate and more desirable in most cases than one consisting of several pages.

It is easier to compare information on one page than by turning several pages. If a child will be in therapy for several years, a multiple check sheet would make his case file unnecessarily bulky.

Table 3 gives a complete enumeration of results by subjects.

TABLE 3 Enumeration of results by subjects

Subject	Sex	Age (yr-mo)	Grade	Mis-Artic.	Previous Therapy	66-67 Therapy	Testing time in minutes-seconds					
							Test #1	Test #2a	Test #2b	Test #3	Test #4	Test #5
1	m	9-11	Sp.Ed	x	x	x	3-50	--	20-18	3-29	3-46	2-12
2	m	10-11	"			x	2-05	--	14-13	2-07	2-39	3-55
3	m	10-4	"			x	2-14	4-17	14-22	2-55	3-03	2-44
4	f	10-4	"		x	x	2-18	3-46	13-22	2-35	3-25	2-36
5	f	9-8	"	x	x	x	3-28	--	18-14	4-06	3-25	2-59
6	f	10-9	"			x	2-28	--	16-23	3-24	2-15	2-18
7	m	10-7	"			x	2-34	--	17-02	2-15	2-58	2-57
8	m	9-9	"		x	x	--	--	18-21	2-25	--	--
9	f	9-10	"	x	x	x	3-25	--	16-23	2-29	2-26	1-48
10	m	10-9	"	x	x	x	3-14	--	21-27	3-32	3-22	--
11	f	11-8	"	x	x	x	2-48	--	17-08	2-14	3-27	1-30
12	m	9-8	"		x	x	3-24	4-27	15-31	3-19	3-32	--
13	f	11-1	"			x	3-43	3-28	13-05	2-10	3-28	--
14	f	12-3	"	x	x	x	2-26	4-31	14-11	2-30	3-01	4-27
15	m	6-8	Grade 1				2-21	3-21	13-12	--	3-10	2-29
16	f	6-6	"	x			2-41	4-11	16-10	3-26	3-17	2-15
17	m	7-8	"				2-35	3-07	13-10	2-33	2-39	1-59
18	f	6-7	"	x		x	2-14	3-50	14-26	2-52	3-03	--
19	m	7-0	"	x			3-38	4-34	16-46	3-32	4-14	1-48
20	f	7-3	"				2-08	3-21	13-01	2-27	2-27	1-50
21	m	7-0	"	x			2-44	3-36	12-19	2-51	3-05	1-45
22	m	6-11	"	x			3-37	5-31	+	2-49	3-25	2-05

23	m	7-6	"				2-02	3-06	+	2-17	2-07	1-29
24	m	7-8	"	x	x	x	2-37	--	+	2-48	2-57	2-00
25	m	8-2	"	x			3-09	4-51	--	3-14	3-56	+
26	f	7-11	"				2-04	4-27	15-36	3-52	2-18	2-01
27	f	7-3	"	*	x		2-54	3-45	--	2-53	2-41	+
28	f	6-10	"				2-06	4-52	13-59	3-14	2-31	1-58
29	f	8-10	Grade 3				1-42	3-15	11-35	1-54	2-06	1-19
30	f	8-0	"				2-42	3-40	12-41	2-01	2-11	1-16
31	f	10-1	"				2-13	2-59	12-05	1-42	2-02	1-19
32	m	9-3	"				1-59	2-53	11-15	2-19	2-28	1-32
33	m	9-1	"				3-25	3-25	13-49	3-11	2-46	1-33
34	m	9-7	"				2-20	3-12	12-21	3-29	2-31	1-40
35	m	9-5	"				1-53	3-07	11-20	2-04	2-13	+
36	m	9-11	Grade 4		x	x	1-32	3-09	10-30	1-44	1-54	1-18
37	m	10-2	"				2-40	3-25	12-23	3-11	2-22	--
38	m	10-3	"	x	x	x	--	--	--	2-16	2-15	--
39	m	10-0	"		x	x	3-31	3-37	13-28	2-52	3-39	1-23
40	f	10-7	"				2-32	3-07	11-43	2-11	2-32	1-36
41	f	10-7	"				2-30	3-49	13-41	2-53	3-09	1-57
42	f	10-2	"				1-56	3-06	12-52	2-29	2-16	1-41
		Mean administration time					2-45	3-54	14-24	2-58	3-09	2-23

*Stutterer
+Indicates termination before end of test because of language factor
--Indicates no time available
Test #1 Hejna Developmental Articulation Test
Test #2a Templin-Darley Test of Articulation - 50 screening items
Test #2b Templin-Darley Test of Articulation - screening diagnostic
Test #3 Milisen Articulation Test - teacher made adaptation
Test #4 Pendergast Photo Articulation Test (PAT)
Test #5 McDonald A Deep Test of Articulation

CHAPTER VI

SUMMARY AND CONCLUSIONS

In summary, the writer found that no one test was perfect for the public school situation.

In some instances the deficiencies appeared in minor items, such as no space for the child's grade in school or inconvenient placing of the date after detailed family information concerning the child. Some left no room for the child's birthdate. This could be important when a child is on the extremes of the monthly continuum or in case of errors in age. It is important to know if a child is six years, one month or six years, 11 months, although the check sheet may ask only the child's age and not the month and year of his birth.

For public school testing the importance of deciding whether to place a child in therapy or to delay doing so is largely determined by just such tests as have been described herein. It is an advantage to have some space available on the check sheet for a report on stimulation of error sounds. This allows for some prediction of therapeutic progress for planning of therapy based on a child's individual abilities. Additional information concerning visable physical defects of the speech mechanisms is also desirable when sorting possible therapy subjects from a stack of several hundred tests. This may be a factor suggesting consultation with the parents and medical

personnel before accepting this child into therapy. Individual abilities would have to be determined very carefully before making very detailed judgements on physical conditions of the speech mechanisms by the speech therapist as described on Test No. 3.

In the opinion of this writer, physical examinations should be designed only to note gross abnormalities. Most schools are not equipped with the facilities for hygienic examinations of the inner mouth. These should be referred to the nurse for further referral to a physician. However, information obtained from the nurse or the physician may be important to the therapist in planning and carrying out a program of therapy.

No one check sheet left prescribed room for each of the items a public school therapist might consider to be of value when evaluating a child. With experience and ingenuity the best test for the purpose can be chosen and a personal check list can be devised to add to proposed information to be elicited from the test.

Some of the items that seem important to include in an articulation test designed for public school use are:

1. Name, date, school, grade, age, birthdate, parent's name, address, examiner's name, and source of referral.
2. Evaluation of conversational speech as to intelligibility, vocabulary, language, voice, and rhythm.

3. Key for recording evaluations.
4. Materials designed to make it possible to test all consonants in all word positions, the most important blends, and vowels and diphthongs. Make-up should simplify the use of the test for screening or more complete testing.
5. Space for results of stimulability testing.
6. Space for analysis of misarticulations.
7. Space for recording physical condition of the articulators.
8. Norms of articulation development and a method for relating the child's articulation to the norm's.
9. A section for recommendations and probable prognosis, and other relevant material.

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DEVELOPMENTAL ARTICULATION TEST---SCORING BLANK

Name_____ Age___ Grade___ School_____ Date_____

(Score as per the following examples. Substitutions: b/p; Omission: -/p; Distortion: Dist/p. *Note: Except where otherwise noted. Developmental Age Level signifies the chronological age by which approximately 90% or more children are using the sound correctly.

Card	Dev. Age Level	Sound Tested	Teacher: Check Words	1	2	3	Iso.	Comments
1	3	m	monkey, hammer, broom					
2	3	n	nails, penny, lion					
3	3	p	pig, puppy, cup					
4	3	h	house, dog-house, ----					
5	3	w	window, spider-web, ---					
6	4	b	boat, baby, (bib: 75%)					
7	4	k	cat, chicken, book					
8	4	g	girl, wagon, (pig: 75%)					
9	4	f	fork, telephone, knife					
10	5	y	yellow, onion, (thank-you; Alt.),--					
11	5	ng	----, fingers, ring					
12	5	d	dog, ladder, bed					
13	6	l	lamp, balloon, ball					
14	6	r	rabbit, barn, car					
15	6	t	table, potatoes, coat					
16	6	sh	shoe, dishes, fish					
17	6	ch	chair, matches, watch					
18	6	Blends	drum, clock, blocks, glasses, crayons					
19	7	v	vacuum, television, stove					
20	7	th	thumb, toothbrush, teeth					
21	7	j	jump-rope, orange-juice, orange					
22	7	s	sun, pencil, bus					
23	7	z	zebra, scissors, (rubbers: 75%)					
24	7	Blends	train, star, slide, swing, spoon					
25	8	~~th~~	this or that, feathers, ----					
26	8	Blends	scooter, snowman, desk, nest					

TEMPLIN-DARLEY SCREENING AND DIAGNOSTIC TESTS

OF ARTICULATION

ARTICULATION TEST FORM

Name _____

Date _____ Age _____ Sex _____

Examiner _____

Bureau of Educational Research and Service

Extension Division

State University of Iowa

Iowa City, Iowa

RECORD SHEET

Key: Mark correct sound (√); substitutions with sound substituted; omitted sounds (-); distorted sounds (x); no response (nr).

1. i___
2. ɪ___
3. ɛ___
4. æ___
5. ʌ___
6. ə___
7. ɝ___
8. e___
9. ɑ___
10. ɔ___
11. ʊ___
12. u___
13. ju___
14. oʊ___
15. aʊ___
16. eɪ___
17. ɑɪ___
18. ɔɪ___

	I	M	F
19. m	___	___	___
20. n	___	___	___
21. ŋ		___	___
22. p	___	___	___
23. b	___	___	___
24. t	___	___	___
25. d	___	___	___
26. k	___	___	___
27. g	___	___	___
28. r	___	___	
29. l	___	___	___
30. f	___	___	___
31. v	___	___	___
32. θ	___	___	___
33. ð	___	___	___
34. s	___	___	___
35. z	___	___	___
36. ʃ	___	___	___
37. ʒ		___	___
38. h	___	___	
39. ʍ	___	___	
40. w	___	___	
41. j	___	___	
42. tʃ	___	___	___
43. dʒ	___	___	___

r-blends

44. pr-___
45. br-___
46. tr-___
47. dr-___
48. kr-___
49. gr-___
50. fr-___
51. θr-___
52. ʃr-___

l-blends

76. pl-___
77. bl-___
78. kl-___
79. gl-___
80. fl-___

s-blends

95. sm-___ -sm___
96. sn-___
97. sp-___ -sp___
98. st-___ -st___
99. sk-___ -sk___ -ks___
100. sl-___
101. sw-___

Syllabic

53. -mə___
54. -nə___
55. -pə___
56. -bə___
57. -tə___
58. -də___
59. -kə___
60. -gə___
61. -fə___
62. -ðə___
63. -ʃə___

Non-Syllabic ə

64. -əm___
65. -ən___
66. -əp___
67. -əb___
68. -ət___
69. -əd___
70. -ək___
71. -əg___
72. -əf___
73. -əθ___
74. -ətʃ___
75. -ədʒ___

Vowel l

81. -pl̩___
82. -bl̩___
83. -tl̩___
84. -kl̩___
85. -gl̩___
86. -fl̩___
87. -sl̩___
88. -lp___
89. -lb___
90. -lt___
91. -lk___
92. -lf___
93. -lθ___
94. -lz___

ə, ɝ, and vowel l with blends

102. -stə___
103. -skə___
104. -mbə___
105. -ɝst___

Other 2-element Blends

109. tw-___
110. kw-___
111. -zm___
112. -ŋk___
113. -dʒd___
114. -mp___
115. -nt___
116. -nd___
117. -kt___
118. -pt___
119. -ft___

3-element blends

120. spl-___
121. spr-___
122. str-___
123. skr-___
124. skw-___
125. -kst___
126. -mpt___
127. -mps___
128. -ntθ___

106. -ŋkl̩___
107. -ŋgl̩___
108. -lfθ___

Note: The items followed by double lines constitute the 50-item Screening Test.

ANALYSIS SHEET

1. Comparison with norms:
   a. Of the 50 Screening Test items, how many did subject produce correctly? _____
   b. According to the table of norms for the Screening Test, what is the mean number of items correctly produced by children of this age and sex? _____
   c. According to Screening Test norms, what cut-off score separates adequate from inadequate performance at the age of this subject? _____
   d. Of the 176 Diagnostic Test items, how many did subject produce correctly? _____
   e. According to the table of norms for the Diagnostic Test, what is the mean number of items correctly produced by children of this age and sex? _____
   f. How many singles (numbers 1-43) were defective in any position? _____

2. Analysis of misarticulations: analyze the subject's production of the phonemes listed as singles (numbers 1-43).
   a. List all error sounds, indicating position of error (I, M, F).

Omissions	Substitutions	Distortions

   b. Which of these phonemes (1-43), incorrectly articulated as singles in the positions indicated above, were correctly articulated as singles in at least one position?

   _____

   c. Which of these phonemes (1-43), incorrectly articulated as singles in any position, were correctly produced in any of the blends in which they were further tested?

   _____

   d. Which phonemes (1-43), not correctly produced as singles in any position or subsequently in blends, were correctly produced following stimulation as described below?

	As a Single			In a blend
In isolation	In a syllable	In a word		in a word

   e. The following phonemes were never articulated correctly anywhere in the test or following any type of stimulation:

   _____

3. Factors possibly related to patterns of misarticulation: _____

   _____

   _____

ADDITIONAL OBSERVATIONS

Description of distortion errors noted on record sheet:

_____

_____

_____

_____

Rating of intelligibility of connected speech:

_____ Readily intelligible

_____ Intelligible if listener knows topic

_____ Words intelligible now and then

_____ Completely unintelligible

Errors noted in connected speech not noted on articulation test:

_____

_____

_____

_____

_____

Description of testing situation:

_____

_____

_____

_____

CENTRAL WASHINGTON SPEECH AND HEARING CLINIC

Central Washington State College
Ellensburg, Washington

Name _____ Age ___ Birthdate _____ File _____

Address _____ City _____ State _____ Phone _____

If Child:
Parent's Name _____ Referred By: _____

Examiner _____ Date _____ Address: _____

Understanding of spoken language: Good ___ Fair ___ Poor ___ Comments:
Intelligibility of speech: Good ___ Fair ___ Poor ___
Rhythm of speech: Good ___ Fair ___ Poor ___
Voice: Good ___ Fair ___ Poor ___
Estimate of language ability: Good ___ Fair ___ Poor ___

ARTICULATION TEST

Freq.	Sound	ISOLATED WORD TEST Words I	M	F	Sound	STIMULABILITY TEST Words I	M	F	Sound
3	r								r
5	l								l
4	s								s
9	z								z
8	k								k
15	g								g
10	w								w
21	θ								θ
11	ð								ð
19	j								j
16	f								f
17	v								v
18	ŋ								ŋ
20	ʃ								ʃ
24	ʒ								ʒ
23	ʍ								ʍ
21	tʃ								tʃ
22	dʒ								dʒ
1	t								t
6	d								d
14	p								p
13	b								b
7	m								m
2	n								n
12	h								h

HEARING: Right _____
Left _____
Speech _____

LIPS: OK _____
Cleft _____
Repaired _____
Mobility _____

TEETH: OK _____
Malformed _____
Missing _____
False _____

JAW: OK _____
Overbite _____
Underbite _____
Openbite _____

TONGUE: OK _____
Tied _____
Large _____
Small _____
Paralized _____
Reverse Sw. _____
Mobility _____

PALATE: OK _____
Cleft _____
Repaired _____
Speech adequ. _____

LARYNX: OK _____
_____

NASAL CAVITY: OK _____
_____

BRAIN INJURY: _____
_____

PAT RECORDING SHEET

Name _____ Age ____ Grade ____ School _____ Date _____

Key: Omission (-); substitution (write phonetic symbol of sound substituted); severity of distortion (D1) (D2) (D3); ability to imitate (circle sound or error).

Sound	Photograph	1	2	3	Vowels, Diph.			Comments
s	saw, pencil, house				aʊ	house		
s bl	spoon, skates, stars							
z	zipper, scissors, keys							
ʃ	shoe, station, fish				u	shoe		
tʃ	chair, matches, sandwich							
dʒ	jars, angels, orange							
t	table, potatoes, hat				æ	hat		
d	dog, ladder, bed				ɔ	dog		
n	nails, bananas, can				ə	bananas		
l	lamp, balloons, bell				ɛ	bell		
l bl	blocks, clock, flag				ɑ	blocks		
θ	thumb, toothbrush, teeth				i	teeth		
r	radio, carrots, car							
r bl	brush, crayons, train				e	train		
k	cat, crackers, cake				ɚ-ə	crackers		
g	gun, wagon, egg				ʌ	gun		
f	fork, elephant, knife							
v	vacuum, TV, stove				ju	vacuum		
p	pipe, apples, cup				aɪ	pipe		
b	book, baby, bathtub				ʊ	book		
m	monkey, hammer, comb				o	comb		
w-hw	witch, flowers, whistle				ɪ	witch		
ð	this, that, feathers, bathe							
h-ŋ	hanger, hanger, swing							
j	yes, thank you							
ʒ	measure, beige				ɔɪ	boy		
	(story)				ɝ-ɜ	bird		

CONNECTED SPEECH AND LANGUAGE
(Elicit by item 70-72 story and conversation.
Note language, intelligibility, voice, fluency.)

ADDITIONAL DIAGNOSTIC INFORMATION
(Hearing loss, motor coordination, perceptual deficiences, emotional factors, attitude toward disorder and treatment.)

THERAPY GOALS AND PROGRESS

Instructions: Within the brackets write the phonetic symbol for the sound deep tested, e.g.,[s]. Use the symbols you prefer to indicate whether the sound was articulated correctly or the nature of the incorrect articulation (substitution, omission, or distortion) for each of the indicated phonetic contexts. Not all phonetic contexts can be tested. To determine the percent of correct articulations, divide the number of *correct* responses by the number of phonemes tested and multiply the quotient by 100.

INDIVIDUAL RECORD SHEET for a DEEP TEST OF ARTICULATION

Name _____ Age _____ Grade _____ Date _____

Address or School _____

Tester _____ Test used: _____ Picture _____ Sentence _____

[ ] *	[ ]	[ ]	[ ]
p — 1 — p	p — 1 — p	p — 1 — p	p — 1 — p
b — 2 — b	b — 2 — b	b — 2 — b	b — 2 — b
t — 3 — t	t — 3 — t	t — 3 — t	t — 3 — t
d — 4 — d	d — 4 — d	d — 4 — d	d — 4 — d
k — 5 — k	k — 5 — k	k — 5 — k	k — 5 — k
g — 6 — g	g — 6 — g	g — 6 — g	g — 6 — g
m — 7 — m	m — 7 — m	m — 7 — m	m — 7 — m
n — 8 — n	n — 8 — n	n — 8 — n	n — 8 — n
f — 9 — f	f — 9 — f	f — 9 — f	f — 9 — f
v — 10 — v	v — 10 — v	v — 10 — v	v — 10 — v
θ — 11 — θ	θ — 11 — θ	θ — 11 — θ	θ — 11 — θ
ð — 12 — ð	ð — 12 — ð	ð — 12 — ð	ð — 12 — ð
s — 13 — s	s — 13 — s	s — 13 — s	s — 13 — s
z — 14 — z	z — 14 — z	z — 14 — z	z — 14 — z
ʃ — 15 — ʃ	ʃ — 15 — ʃ	ʃ — 15 — ʃ	ʃ — 15 — ʃ
tʃ — 16 — tʃ	tʃ — 16 — tʃ	tʃ — 16 — tʃ	tʃ — 16 — tʃ
dʒ — 17 — dʒ	dʒ — 17 — dʒ	dʒ — 17 — dʒ	dʒ — 17 — dʒ
l — 18 — l	l — 18 — l	l — 18 — l	l — 18 — l
r — 19 — r	r — 19 — r	r — 19 — r	r — 19 — r
j — 20 — j	j — 20 — j	j — 20 — j	j — 20 — j
w — 21 — w	w — 21 — w	w — 21 — w	w — 21 — w
h — 22 — h	h — 22 — h	h — 22 — h	h — 22 — h
ŋ — 23 — ŋ	ŋ — 23 — ŋ	ŋ — 23 — ŋ	ŋ — 23 — ŋ
i — 24 — i	i — 24 — i	i — 24 — i	i — 24 — i
ɪ — 25 — ɪ	ɪ — 25 — ɪ	ɪ — 25 — ɪ	ɪ — 25 — ɪ
ɛ — 26 — ɛ	ɛ — 26 — ɛ	ɛ — 26 — ɛ	ɛ — 26 — ɛ
æ — 27 — æ	æ — 27 — æ	æ — 27 — æ	æ — 27 — æ
ʌ — 28 — ʌ	ʌ — 28 — ʌ	ʌ — 28 — ʌ	ʌ — 28 — ʌ
u — 29 — u	u — 29 — u	u — 29 — u	u — 29 — u
ɔ — 30 — ɔ	ɔ — 30 — ɔ	ɔ — 30 — ɔ	ɔ — 30 — ɔ
%Correct _____	%Correct _____	%Correct _____	%Correct _____
Date Tested _____	Date Tested _____	Date Tested _____	Date Tested _____

*The numbers correspond to the sentence number or picture number in The Deep Test of Articulation