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A STANDARDIZATION OF THE "CHILDREN'S SPEECHREADING
TEST" ON NORMAL CHILDREN

by

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A paper submitted in partial fulfillment of
the requirements for the degree of

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with an emphasis in
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APPROVED BY:

(Advisor for the Extended Paper)

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CHAPTER I

INTRODUCTION

This study is a limited standardization of the "Children's Speechreading Test" designed by Dr. Dolores S. Butt of the University of New Mexico. After studying the development of language skills in young acoustically handicapped children, she randomly selected subjects from 10 nursery schools and primary departments of schools for the deaf and administered her test to these children (Butt, 1968). The mean score for girls on this test was not significantly superior to the boys' score. Dr. Butt felt that her test could be useful in the following ways:

1. Placement of deaf children beginning their education at a new school or clinic.
2. Evaluation of progress in the early years of a deaf child's training.
3. Gathering information on the early development of speechreading skills.

Little is known about how speechreading ability develops in an individual and as a survey of lip reading will show, few tests have been developed to assess children's lip reading ability. Since relatively few children's lip reading tests have been developed, and since Dr. Butt standardized her test on hearing handicapped children, it was felt that a pilot study on normal children in the primary grades might be useful both for comparison and future implication for a more complete standardization of the "Children's Speechreading Test".

The Purpose of the Study

The purpose of the present study is to provide a limited standardization of the "Children's Speechreading Test" on normal hearing children. Although Dr. Butt indicates

some relation of her test to intelligence, no attempt was made in this pilot study to correlate mental ability with speechreading ability.

The "Children's Speechreading Test" reproduced in complete form in Appendix A, was administered to 20 normal hearing children, all of whom were in the first grade. Information in the form of raw scores was then to be utilized in calculating the standard deviation and percentile scores. Information gained from administering the test was also to be utilized to predict further investigation regarding the usefulness of this test. In addition a further purpose of this pilot project was to compile the materials necessary for administration of the test for future use in the Portland State University Speech and Hearing Clinic.

A Historical Survey of Lip-Reading

In 1871, A.M. Bell originated Visible Speech Symbols. This was the first real consideration given to lipreading in America. Edward Nitchie worked with lipreading instruction in New York (Nitchie, 1912). His method involved three principles; physical, mental, and spiritual. The physical was involved with seeing and knowing the movements, homophones, and variations of movement. The mental aspect related to synthesis, visual and mental integration, and concentration. The spiritual involved motivational attitudes. Nitchie believed lip reading training should never begin before the age of four years (Nitchie, 1912). During the course of his lifetime Nitchie shifted from an analytical to a synthetic approach. The synthetic approach involved concepts, whereas the analytical approach involved speech as movement, instantaneous understanding, and observation.

Martha Bruhn founded a school based upon the Mueller-Walle method of lipreading. This was an analytic technique involving rapid rhythmic syllable drill (O'Neill, 1961). She believed that speech was movement, and transitions from movement to movement. Lipreading ability, then, was augmented by

close observation of the movements of the lips from one sound position to another (O'Neill, 1961). Bruhn considered lipreading an art, which was influenced by two factors, practice and innate talent. Some of the goals for the student were:

1. Ability to feel sound sensations.
2. Ability to observe sound visually.
3. Maximum help from alertness and quickness.
4. Stress on movements and comparison of movements.
5. Help from the teacher with syllables and phrases.

Sounds were classified by Bruhn as easily seen, often obscure, and obscure. Here technique demanded entire concentration of the lipreader on visual cues. Drill was an important part of Bruhn's teaching method, with practice sessions lasting 30 minutes at a time. Bruhn also used group techniques.

Cora and Rose Kinzie opened a school known as the Kinzie School of Speech Reading (O'Neill, 1961). Cora had been a medical student who gradually lost her hearing. As a result she took the Bruhn course in lipreading and then turned from medicine to the teaching of lipreading. The Kinzie technique was a combination of those of Nitchie and Bruhn. It included sentences such as those employed by Nitchie and Bruhn. The sisters wrote a book called "Lip Reading for the Deafened Adult", and Rose Kinzie wrote a series of lessons for children. These lessons were graded: Grade 1 - vocabulary building, objects, pictures, and actions; Grade 2 - imitation of actions; and Grade 3 - formal lesson plans using drama.

Another method started in Michigan around 1927 by Anna Dunger was the Jena method derived from Karl Brauckmann of Jena, German (O'Neill, 1961). Her technique was somewhat more scientific than the others and involved kinesthetic as well as visual cues. In this technique there were five forms of speech communication: 1) Movement or physical

placement of the articulators; 2) Audible sounds associated with the movements; 3) Visibility; 4) Muscles of facial expression; and 5) Gesture.

In 1944 Ewing found it advantageous to use the hearing aid in conjunction with speech reading. He found that /p,f,o,u/ were the most audible (O'Neill, 1961).

Stowall, Samuelson, and Lehman (1928) wrote a book directed to the needs of slightly deafened and hard of hearing children. High frequency sounds were studied first; and these were found to be more difficult and particularly important in sensori-neural losses. A low voice was used with no gestures and repetition was stressed. Informal lessons with increasingly longer time periods for the older grades were utilized. These lessons involved; commands, Mother Goose rhymes, riddles, colloquial questions and stories.

In 1938 Boris Markovin produced the Markovin films, which were training films from life situations (O'Neill, 1961). His was the synthetic system. It involved distinguishing verbal and nonverbal clues. AVKRT or audio-Visual-Kinesthetic-Rhythmic-Tactile perceptions were to be utilized. In conjunction with Marie Moore, Markovin constructed a manual for the teacher of speech reading (Markovin, 1948). Markovin did not feel that drill on syllables, unrelated to life situations, should be used (O'Neill, 1961).

Marie Mason of Ohio State University also made 30 films which utilized the analytic approach. In these films the speech reader was supposed to watch the mouth, write down words, and gain the key thoughts. In the children's films, visual hearing involved the phonetic approach, or the perception and recognition of visual and kinesthetic cues (Mason, 1942). In these films, which were basically teaching films, the sound could be either on or off. Mason called her method "Visual Hearing" (O'Neill, 1961).

Whildin and Scally constructed a set of materials,

"Speech Reading for the Hard of Hearing Child," directed toward children in the intermediate grades (O'Neill, 1961). Whildin's materials included the use of words, sentences, stories, and questions (O'Neill, 1961). Its purpose was not to present theory, but to present lipreading to the child.

Oyer believed that lipreading tests were designed to measure the person's ability to understand what a speaker was saying, by concentration on his lip movements and other facial muscles. Lipreading tests could also be used to measure the effects of lipreading training, and to aid in the proper placement of individuals within a training program (Oyer, 1961).

Utley standardized Mason's children's lipreading test on adults, and on children. She found that the ability to lipread sentences was more reliably predicted from an ability to lipread sentences than stories.

Summary

Speechreading has progressed from the origination of visible speech symbols to the teaching of speechreading. In addition, tests for assessing speechreading ability, both in children and adults have been developed. A review or at least historical overview of lipreading showed that few children's lipreading tests had been developed. For this reason further investigation of Dr. Butt's "Children's Lip-Reading Test", in this case, in the form of a limited standardization, might be of value.

CHAPTER II

METHODS AND TECHNIQUES

Procedures

In this study 20 normal hearing children or children who had tested normally during the school hearing screening program, were administered the "Children's Speechreading Test" developed by Dr. Dolores S. Butt of the University of New Mexico. The full test has been reproduced in Appendix A. The test is intended for clinical examination of any hearing handicapped child. The easiest items can be performed by a one year old child (Butt, 1968). Dr. Butt found that the more difficult items were usually understood by a 3 year old child. These were items such as: "Give me the big ball". Although Dr. Butt tested children up to nine years of age in her standardization on hard of hearing children, she felt that the test should not require reading or writing ability, or oral answers. The vocabulary of the test consists mostly of nouns and verb with words being chosen from the first one thousand words of standard vocabulary lists (Butt, 1968). All the phonemes of speech were included. Both single word and complete sentences are utilized in the questions. Dr. Butt felt that individual testing yielded more information to the examiner.

The criteria for selection of children for the sample utilized in the pilot study were that the children be in the first grade and of normal intelligence as evidenced by their presence in the first grade, not be any formal testing. The children were between the ages of 6 years 5 months and 8 years 7 months. The school personnel, in this case their teacher, were instructed to randomly select the students to be tested. These students were enrolled in classes at Hayhurst and Bridle-mile schools in Portland, Oregon. None of the children had

any special physical, mental, or social problems.

Binaural masking was utilized to mask out the voice of the clinician administering the test. The subject was seated four feet from the clinician in good lighting. No other people were in the classroom in which the test was administered so the room was quiet. The test was administered individually, with the clinician using a quiet voice, but utilizing conversational speech. The items were presented at a conversational rate with no special emphasis on particular words.

Results

Out of a possible total of 70 items that could be performed correctly by the subjects, scores varied 34 to 59 correct. The scores for the entire sample have been listed in Appendix B.

Results approach a normal probability curve in this study. The scores appear to cluster around the center, or the test results showed the scores appeared to cluster closely around the mean. The range of scores was from 59 to 34 and the standard deviation was 6.75. Two measures of variability are included in Appendix C, the percentile scores, and the range of scores divided by the standard deviation.

A t test was run comparing the mean of Dr. Butt's hard of hearing seven year olds to the mean of this study. Her 7 year old group seemed to be most comparable to the group tested in this study with regard to age. The t obtained of 2.17 indicated that the mean score of the normal hearing group tested in this study was significantly greater than the mean of the seven year old group of hard of hearing children tested by Dr. Butt at the .05 level of significance. Calculations can be seen in Appendix B. Since the variability of Dr. Butt's group was not comparable, a t test when variances differ was

computed. These calculations can be seen in Appendix B.

Discussion

A hypothetical reason that the mean of this study may have been higher might be that the socio - economic background of the child was higher than that of the population used in Dr. Butt's study. In addition the normal hearing children are exposed to communication and are exposed to the basic words utilized in Dr. Butt's test with more frequency than the deaf.

CHAPTER III

SUMMARY AND CONCLUSIONS

In summary we have sought to provide a limited standardization of the "Children's Speechreading Test" on normal hearing children. Percentile scores, standard deviation, and t scores were computed. The mean score of the normal hearing group in this study is significantly higher than the mean score of the 7 year old group of hard of hearing children at the .05 level.

Further studies might involve increasing the population since there was a depressed dynamic range. It might be interesting to construct a test that would provide a more discriminative task for good or poor lipreaders, or both. Item analysis and test-retest might be useful.

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APPENDIX A
CHILDREN'S SPEECHREADING TEST

Dolores S. Butt, Ph.D.
Assistant Professor of Speech
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Albuquerque - New Mexico

Name _____ Speechreading Test Score _____
School _____ Test Date _____
Examiner _____ Birthdate _____
Years of Training _____ Age _____ Sex _____
Hearing: Right _____ Left _____ Mental Age _____ IQ _____
Age and Cause of Hearing Loss _____

TEST A: Informal Checklist for Children Under Three Years of Age

Normal Age of
Appearance _____

2 months	1. Does child attend to face?	_____
10 months	2. Does child respond to gesture?
(Pat-a-cake, Bye-bye, etc.)	_____
12 months	3. Does child inhibit on command?
(No-no with gesture)	_____
18 months	4. Does child understand simple questions?
(Where's Daddy?)	_____
21 months	5. Will child follow simple commands?
(Give it to me; Come; Look; etc.)	_____
24 months	6. Can he speechread his own name?	_____
24 months	The names of others?	_____
	Objects? (milk, shoe, etc.)	_____
	Or concepts? (up, hot, good boy, etc.)	_____
(no norms)	7. Can he repeat the words he speechreads?
(Hello, Mama, etc.)	_____
	8. Can he answer questions?
(What is your name? How are you?)	_____

PART I. IDENTIFICATION OF OBJECTS. Place objects in random order on the table. Encourage child to watch your face while you name the object three times, then allow child to indicate the correct object. Replace object after each task. It is helpful to keep each set of objects in a separate box.

Present: fish, shoe, ball, train

___1. Show me the fish. ___2. Show me the ball. ___3. Show me the shoe.

Present: top, airplane, baby, gun.

___4. Show me the airplane. ___5. Show me the top. ___6. Show me the gun.

Present: chair, toothbrush, button, table

___7. Show me the chair. ___8. Show me the button. ___9. Show me the toothbrush.

Present: fork, table, car, bus

___10. Show me the table. ___11. Show me the car. ___12. Show me the bus.

Present: candy, watch, bell, hat

___13. Show me the bell. ___14. Show me the candy. ___15. Show me the watch.

PART II. NUMBERS. Place five blocks on the table. Demonstrate the first task by saying "four" and scooping four blocks toward you. Replace the blocks, repeat the word "four" and indicate for the child to push the correct number toward you.

___16. one ___17. three ___18. two

PART III. PICTURE IDENTIFICATION. Present Test Card (a) and say:

___19. See baby? Where is baby? ___20. Where is the flower?

Present: Test Card (b)

___21. Where is mother? ___22. Where is father?
(or daddy) ___23. Where's the boy?

Present: Test Card (c)

___24. Point to the bird. ___25. Point to the dog. ___26. Point to the
hammer.

Present: Test Card (d)

___27. Point to the T.V.
(or television) ___28. Point to the boat. ___29. Point to the home.
(or house)

TEST B

Directions: Sit about four feet from the child in a well lighted room. Attract the child's attention to your face before presenting each item. Speak to the child naturally but in an inaudible voice. Present the spoken material from the front view the first time, then repeat once or twice with your face slightly turned so the child sees a 3/4 view. If the child tires, allow him to rest.

Each correct answer receives one point. Correct answers are credited even if the child seems to be guessing.

Test Materials: The examiner can obtain these materials from a toy store.

1. Toys, durable and realistically colored, and in correct proportion:

3" baby doll	bell
1" baby doll	cellophane wrapped candy
doll bed, table and chair	toy cup, fork, and spoon
doll shoe	child's toothbrush
car	1" rubber ball
airplane	1/2" rubber ball
bus	cow
train	chicken
gun	pig
top	horse
toy wristwatch	fish
button	

2. Blocks: five 1" counting blocks of uniform color.

3. Color chips: 1" colored paper squares: yellow, blue, black, white, red, and brown.

4. Ten picture cards 8-1/2" x 11" that can be constructed from colored pictures in children's books or magazines. Each picture must be realistic and easily recognized by a child:

- (a) baby, kitten, flower
- (b) mother, father, boy, girl
- (c) bird, dog, hammer, spoon
- (d) television set, motor boat, house, bed
- (e) girl putting on her shoes;
boy eating at the table;
girl or boy swimming.
- (f) child playing with a ball;
child taking a bath;
girl jumping rope.
- (g) child in bed;
child reading a book;
child playing with blocks.
- (h) apple, water faucet and glass of water, pie, butter
- (i) an orange; milk carton and glass of milk;
loaf of bread and a piece of bread; a vegetable.
- (j) banana, cookies, cooked meat, soup.

5. Paper dolls with clothes. Boy and girl dolls should be mounted on separate 8-1/2 x 11" cards, and the clothing should be cut so that it can easily be placed in position: Two dolls with pants, shirt, dress, pajamas, hat, coat, and shoes.

PART IV. COLOR IDENTIFICATION. Place color squares on table, three at a time. Say the name of one color and reach your hand out to receive it. Change color cards for each item.

Present: blue, yellow, and white. ___30. blue

Present: black, white, and brown. ___31. white

Present: yellow, red, and brown. ___32. brown

PART V. ACTIONS.

Present Test Card (e)

___33. Who puts on her shoes?

___34. Who eats her supper? (or dinner)

Present Test Card (f)

___35. Which one plays ball?

___36. Which one takes a bath?

Present Test Card (g)

___37. Who goes to bed? Who sleeps in bed? ___38. Who reads a book?

PART VI. FOODS.

Present Test Card (h) to child. Allow him to examine it and proceed.

___39. Show me the apple.

___40. Where is the water?

___41. Point to the pie.

Continue with Card (i)

___42. Show me the orange.

___43. Where is the milk?

___44. Where is the bread?

Continue with Card (j)

___45. Show me the banana.

___46. Where are the cookies?

___47. Show me the meat.

PART VII. DESCRIPTIVE WORDS. Place on the table a large ball and a small ball, a 3" baby doll and a 1" baby doll.

___48. Give me the big ball. Give me the little ball.

___49. Give me the big baby. Give me the little baby.

(The child must respond with correct object and size each time.)

PART VIII. PARTS OF THE BODY. Put your hand on your face and say, "This is my face. Where is your face? Show me your face." Repeat this demonstration until the child understands what is expected.

- ___50. Where is your mouth? ___51. Where are your eyes? ___52. Where is your nose?
 ___53. Show me your teeth. ___54. Show me your arm. ___55. Where are your feet?

PART IX. ANIMAL NAMES. Place the animals on the table in random order. Include: chicken, pig, sheep, cow, horse. Replace after each item.

- ___56. Give me the cow. ___57. Give me the horse. ___58. Give me the pig.
 ___59. Give me the chicken.

PART X. CLOTHING. Place on the table a paper doll mounted on 8-1/2 x 11" card. Use a boy or a girl doll according to the sex of the child. Place the doll's clothes beside test card. Demonstrate the first item. "Put on his (her) pajamas." Replace each item before proceeding with the next item.

- ___60. Put on his (her) shoes. ___61. Put on his (her) coat.
 ___62. Put on his shirt (her dress). ___63. Put on his (her) hat.

PART XI. SIMPLE DIRECTIONS. Place these objects on the table: chair, bed, baby, cup, table.

- ___64. Put the baby to bed. Put her in bed. Go to bed, baby.
 ___65. Put the spoon in the cup. Put it in the cup.
 ___66. Put the fork on the table. Put it on the table.

PART XII. ACTIVITIES. Stand up and gesture for the child to stand. Say, "Stand up. Do what I do. Can you hop?" Hop and encourage the child to perform this action as a demonstration. Avoid gesturing with the actual test items to follow.

- ___67. Can you jump? Jump.
 ___68. Can you walk? Walk. Walk to the door.
 ___69. Open the door. Go open the door. Open it.
 ___70. Come here. Come.

APPENDIX B

CALCULATIONS - DATA

X	x	x ²	S.D. = $\frac{x^2}{N}$
59	11	121	
57	9	81	
55	7	49	S.D. = 45.6
54	6	36	
54	6	36	S.D. = 6.75
53	5	25	
53	5	25	
52	4	16	
49	1	1	
49	1	1	
49	1	1	
48	0	0	
47	-1	1	
43	-5	25	
43	-5	25	
41	-7	49	
40	-8	64	
35	-12	144	
34	-14	196	
$\Sigma X = 959$	$\Sigma x = 0$	$\Sigma x^2 = 912$	

$$\bar{X} = 48$$

F test of variance in Butt's 7 year group and Newcombe's population.

$$F = \frac{s_1^2}{s_2^2} = \frac{324}{45.56} = 7.11^* \text{ sign. at } .05$$

$$s_1^2 = 324 \quad s_2^2 = 45.56 \quad \text{d.f.} = 14 \quad s_1^2$$

$$\text{d.f.} = 19 \quad s_2^2$$

 Raw Data

Group I

$\bar{X}_1 = 37$

$s_1^2 = 324$

$N_1 = 15$

Group II

$\bar{X}_2 = 48$

$s_2^2 = 45.56$

$N_2 = 20$

F test when variances differ

$$s_{\bar{x}_1}^2 = \frac{324}{14} = 23.14$$

$$s_{\bar{x}_2}^2 = \frac{45.56}{19} = 2.39$$

$$t_1 = 2.145$$

$$t_2 = 2.093$$

$$t = \frac{(23.14)(2.145) + (2.39)(2.093)}{(23.14 + 2.39)}$$

$$t = 2.14$$

t test for samples

$$t = \frac{\bar{x}_2 - \bar{x}_1}{\sqrt{s_{x_2}^2 + s_{x_1}^2}} = \frac{48 - 37}{\sqrt{23.14 + 2.39}} = \frac{11}{\sqrt{25.53}} = \frac{11}{5.05} = 2.17$$

the mean scores of the normal hearing group in this study is significantly higher than the mean score of the 7 year old group of hard of hearing children tested by Butt at the .05 level.

Formulas obtained in Basic Statistical Methods (2nd Edition) Downie, N.M., Heath, R.W., New York: Harper, Row, 1965

APPENDIX C

PERCENTILE SCORES AND RANGE OF SCORES DIVIDED BY S.D.

Percentile Scores

Highest score = 59

Lowest score = 34

Range = 25

Scores	Frequency	Cumulative Frequency	Cum. %
55-59	3	20	100
50-54	5	17	85
45-49	5	12	50
		7	45
40-44	5	2	10
35-39	1	1	5
30-34	1	0	0
	<u>20</u>		

Percentile Equivalents

X-X	%ile	Raw Score
12	5	34
13	10	35
18	15	40
19	20	41
23	25	43
24	35	44
25	40	47
26	45	48
27	50	49
30	65	52
31	70	53
32	80	54
33	90	55
35	95	57
37	100	59

Range of scores for Normal Population

27.75	34.50	41.25	48	54.75	61.50	68.25
-3	-2	-1	0	+1	+2	+3
S.D.	S.D.	S.D.		S.D.	S.D.	S.D.

$\bar{X}=48$ $s = 6.75$