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Speechreading ability in children with functional articulation difficulty and in children with normal articulation

Mary Elizabeth Russell
Portland State University

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SPEECHREADING ABILITY IN CHILDREN
WITH FUNCTIONAL ARTICULATION
DIFFICULTY AND IN CHILDREN
WITH NORMAL ARTICULATION

by

MARY ELIZABETH RUSSELL

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

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in
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APPROVED



(Advisor for the substantial paper)

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*Good but
at what
level - covered
was it done?*

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INTRODUCTION

In administering speech therapy to children with normal hearing and functional articulation difficulties, it was noted that some children made little voluntary use of visual cues; eye contact between therapist and student during direct articulation therapy was infrequent. This observation led the examiner to seek a possible relationship between articulation ability and the ability to use visual cues, specifically in speechreading.

To test the hypothesis of a possible inverse relationship between the speechreading ability of a normal hearing sample of children with articulation problems and a matched sample of children with normal speech, the examiner chose twenty-five children with functional articulation difficulties and twenty-five children with normal articulation.

PROCEDURE

Subjects

An experimental group of twenty-five elementary students ranging in age from five years to nine years, having normal hearing and one or more functional articulation errors, was chosen at random from a speech therapy caseload of one-hundred students, currently enrolled in the Vancouver, Washington public school system.

The control group of twenty-five public school children, having normal hearing and normal articulation, ranging in age from five through nine years, was chosen at random from the same school population of approxi-

mately 3,500 students.

The subjects tested were divided into five groups by age: 5, 6, 7, 8, and 9 years. An attempt was made to keep male to female ratio constant for each age group in both experimental and control groups.

Data Collection

Four tests were administered individually to the members of the experimental and the control groups: a hearing screening test, an articulation screening test, an oral peripheral examination, and a children's speechreading test.

The frequencies 500, 1000, 2000 and 4000 Hz were presented at a level of 10 ^{dB} DB ISO. Those subjects in the experimental and control groups consisted of children who were screened within normal limits on a recently calibrated audiometer.

The articulation screening test, developed by Hejna (1959), was ^{or administered} (comprised) of an oral presentation of isolated words. Each word contained the consonant phoneme being tested in either the initial, medial or final position and each consonant phoneme was tested in each ^(I M F) position in words. The subject was instructed to respond to the verbal stimulus with his best verbal imitation which was then manually recorded, using ^{the} International Phonetic Alphabet symbols.

An articulation problem was determined by comparing misarticulations with projected articulation development norms by age listed in the Appendix. If a child had reached the age at which a particular sound should have developed normally but that sound was either substituted, distorted or omitted, then that child was included in the experimental sample.

A modified version of the Speechreading Test for Young Children

(Butt, p.231), was presented individually to all experimental and control subjects. The modification of the test included an item familiarization exercise designed by the examiner to eliminate the possibility of error due to the lack of vocabulary knowledge. Aural domes were used with each subject to reduce the chance of auditory clues being received during the unvoiced portion of the examination. The test was presented face to face with the subject seated approximately three-and-one-half to four feet from the examiner. The light source consisted of artificial overhead lighting and natural light from windows. The subject was seated so that the outside light was at his back. Wh
on
the

RELIABILITY OF SPEECHREADING TESTS

Speechreading tests were readministered to ten of the subjects chosen at random to find inter-tester reliability correlation. The mean test score obtained by Examiner 1 was 46 and that for Examiner 2 was 45 with a resulting Pearson Product-Moment Correlation Coefficient of .92, Good indicating a high inter-tester reliability.

Ten subjects, other than those retested for inter-tester reliability, were selected at random by each examiner for retesting in order to correlate intra-tester speechreading test results. The mean test score obtained by Examiner 1 on test 1 was 33.5 and test 2 was 34.2 with a correlation of .99. The mean test score obtained by Examiner 2 on test 1 was 35.5 and test 2 was 36.1 with a correlation of .99. The correlation figure indicates a high intra-test reliability for both examiners. Boy

Speechreading test scores obtained on initial tests were those used in the final analysis between the experimental and control groups.

RESULTS

Table I represents the raw speechreading scores of children in the experimental and control groups, according to age level. The mean speechreading test score for each age level within the experimental group was compared by age group to the average score of the control subjects.

The average speechreading test score for experimental subjects was lower at each age level than those for the corresponding age group of control subjects, as shown by Table II. The mean score for all age groups in the control sample was 45, and in the experimental group the average score was 29. There were no significant differences in test scores noted between boys and girls in either experimental or control groups.

The tendency for each succeeding age group to achieve a higher score than the previous age group was apparent in both the experimental and the control population. However, an exception was seen in the 7 year age group of experimental subjects in that they obtained an average score that was 4 points lower than the 6 year group. A similar exception was noted in the control group, where a score nearly 5 points lower than at the 7 year level was observed at the 8 year level. These discrepancies may be attributed to the limited number of subjects in each age group.

The mean speechreading scores for the experimental and control groups, all ages represented, were statistically compared to determine whether the observed differences between these two samples were significant. A *t* test (Thompson, 1965), was used to compare the means of the two groups and the obtained value ($t = 2.98$) was significant at the .01% level of confidence.

TABLE I
RAW SPEECHREADING
TEST SCORES

<u>EXPERIMENTAL GROUP</u>		<u>CONTROL GROUP</u>	
<u>SCORE</u>	<u>AGE</u>	<u>SCORE</u>	<u>AGE</u>
22	5.0	32	5.3
22	5.4	50	5.4
23	5.6	25	5.6
28	5.7	39	5.7
24	5.11	45	5.10
29	6.1	43	6.2
42	6.8	49	6.4
17	6.9	42	6.5
14	6.9	42	6.8
28	6.11	54	6.9
32	7.0	66	7.1
28	7.5	36	7.3
14	7.5	56	7.5
17	7.5	41	7.5
19	7.11	35	7.5
25	8.1	42	8.1
35	8.2	55	8.2
37	8.8	18	8.3
49	8.9	47	8.5
40	8.10	48	8.9
20	9.2	55	9.0
51	9.3	51	9.1
29	9.3	51	9.2
23	9.6	41	9.3
45	9.10	56	9.8

TABLE II
MEAN SPEECHREADING TEST SCORES
BY AGE GROUP

<u>EXPERIMENTAL SUBJECTS</u>			<u>CONTROL SUBJECTS</u>		
<u>AGE</u>	<u>MEAN SCORE</u>	<u>NUMBER</u>	<u>AGE</u>	<u>MEAN SCORE</u>	<u>NUMBER</u>
5	23.8	5	5	38.2	5
6	26	5	6	46	5
7	22	5	7	46.8	5
8	37.2	5	8	42	5
9	33.6	5	9	50.8	5

CONCLUSION

The purpose of this investigation was to determine if a difference in ability to speechread exists between samples of children with functional articulation problems and children with normal speech.

Four tests were administered to twenty-five children with functional articulation problems and twenty-five normal speaking children selected at random from a clinical speech population within the Vancouver, Washington public schools. These tests consisted of an articulation screening test, a hearing screening test, an oral peripheral examination, and a children's speechreading test. Only children with normal hearing were included in the experimental and control groups. The speechreading test scores indicated that for each of the five age groups, including ages 5 through 9, the normal speakers had higher average scores than did the children with articulation problems. A further analysis of the speechreading test scores indicated a tendency for speechreading ability to increase somewhat with age.

→ except at 7 years
at 8 yrs control

Discussion

The findings made in analyzing the speechreading test scores would indicate that stressing visual discrimination of oral movement in articulation therapy is beneficial. This hypothesis supports the research done by Scott and Milisen (pp. 51-56) in which they found that a combined program stressing visual and auditory stimulation in articulation therapy more effective than using auditory discrimination techniques alone. Speechreading training, or more specifically discrimination of visual communication cues, might also be included as a part of therapy planning for preventing and rehabilitating articulation disorders.

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APPENDIX
ORDER OF DEVELOPMENT
OF CONSONANT SOUNDS
BY AGE*

p - $3\frac{1}{2}$ years

b

m

w

h

d - $4\frac{1}{2}$ years

t

n

k

g

j

ʒ

f - $5\frac{1}{2}$ years

v - $6\frac{1}{2}$ years

θ

ʃ

l

z - $7\frac{1}{2}$ years

s

r

ʔ

wh

* Hejna (1959)