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Does systematic instruction in rhythmic movement influence the speech of the deaf

Mary-Kate Waters

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WASHINGTON UNIVERSITY

Central Institute for the Deaf

DOES SYSTEMATIC INSTRUCTION IN RHYTHMIC MOVEMENT
INFLUENCE THE SPEECH OF THE DEAF?

by

Mary-Kate Waters

A dissertation presented to the Board
of Graduate Studies of Washington
University in partial fulfilment
of the requirements for the
degree of Master of Science
in Education

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CHAPTER 1

INTRODUCTION OF THE PROBLEM

One of the important subjects in the curriculum of the schools for the deaf is rhythm, which includes such things as dancing, playing in nursery school and elementary school percussion bands, marching, calisthenics, and rhythmic recitation. Although most teachers of rhythm for the deaf say that rhythmic instruction does have a definite and beneficial influence on the speech of the deaf child, no studies have been made which would show the amount of influence rhythmic instruction has on speech improvement. Instruction in rhythmic movement is based on the assumption that the speech of the deaf child will become more intelligible with training and through this means will approximate normalcy. But to date, there have been only subjective estimates to confirm this assumption. Therefore the problem of this investigation becomes one of studying scientifically the influence of the rhythm program on a group of congenitally deaf children.

There have been many definitions of rhythm. Diderot says that

Rhythm is the very image of the sound reproduced in the inflections of the voice, the successive variations of the passage of speech, accelerations, deliberations, sparkles, gulps, punctuated in

in a hundred different ways.¹

²Dalcroze says it is movement, that it is essentially physical, and that it gives meaning and form to sounds,³ Morlet's definition is that rhythm is the order given to material data of movement, it is the onward flow of ordered succession.⁴ H'Doubler says that rhythm is measured energy. It is action and rest--control and release.⁵ Burns gives this definition--rhythm is the expression of order and symmetry. For the purposes of this thesis, the writer prefers to define rhythm as ordered repetition and rhythmic movement as ordered repeated movement groups.

If rhythm groups are made up of two, three, four, six, eight, sometimes twelve and sixteen, there is reason to believe that such groupings are inherited. The reason being that if the numbers counted are restricted, this restriction must be hereditary, because counting is not a restriction process.

¹Dalcroze, Emile Jaques-, Rhythm, Music and Education, New York: Macmillan Co., 1921, p. 51.

²Dalcroze, op.cit., pp. 83-84.

³Morlet, P., "Essai sur le rythme musical", Rev. Phil., 31: 523-547, 1931.

⁴H'Doubler, Margaret N., "An interpretation of Rhythm", The Journal of Health and Physical Education, III: 16-17, 1932.

⁵Burns, C. L., "Movements and Types in "Children", Psyche, II: 63-66, 1930.

But on the other hand there is a plausible argument for the acquisition of rhythm groups. Meyer says that learned rhythms, no matter what number of strokes or muscles used, can be transferred to other muscles which had nothing to do with the acquisition of the learned rhythms. If this is true, then there is adequate evidence for the usual rhythm groups of two, three, four, six, and eight. Walking is the chief opportunity for the acquisition of the two stroke rhythm. Manual labor involving both hands means further establishment of the two stroke rhythm. There is a tentative action followed by a tentative rebound, which is followed by the strong accented action and its rebound. For establishing the three stroke rhythm there, also, are occupation situations.

Meyer says that

When the nervous system is once in possession of this peculiar capacity and tendency (referring to the nervous system's being able to conduct a particular succession of weak and strong waves), we say that the Other-One has "rhythm" or, more correctly, that he has a particular rhythm, which may "crop out" at any time in any muscles of his body.

He goes on to say that there is a transfer of rhythm to the speech organs, the result being poetry, the resulting combination of rhythm and speech is most enjoyable.

6

Meyer, Max P., The Psychology of the Other One, Columbia, Mo.: The Missouri Book Company, 1922, pp. 334-353.

7

Meyer, op.cit., p. 350.

Rhythm may be perceived in a number of ways, 1) by the tactile sensation which may be said to constitute a very crude primitive type of hearing, 2) by the kinaesthetic sense, which is the ability to sense, even if the eyes are closed, the position of the body, or to be conscious of any body movement, 3) by auditory sensation, and 4) by visual sensation. Dalcroze says that

The sense of touch may, to a certain degree, and in particular cases, replace that of hearing.⁸

The same idea is stated by Goldstein, who says

....it is difficult to say where the zone of audition ends and where the area of tactile impression begins.

The whole body should be educated to rhythm. The child should be conscious of bodily rhythm, because the muscular system receives rhythm. The deaf may perceive rhythm tactilly, kinaesthetically, and visually.

Speech comes to the deaf with tremendous effort. To the hearing person it is often not intelligible because of the halting, breathy quality. The writer believes that this is due, in part at least, to the very noticeable lack of rhythmic speech patterns necessary to clarify speech, which in turn should very probably be due, in part, to the faulty¹⁰ coordination of speech muscles. Hudgens found a high

⁸
Dalcroze, op.cit., p. 3.

⁹
Goldstein, Max A., Problems of the Deaf, St. Louis; The Laryngoscope Press, 1933, p. 572.

¹⁰
Hudgens, C. V., "A Comparative Study of the Speech Coordination of Deaf and Normal Subjects", Journal of Genetic Psychology, 44:3-48, 1934.

correlation between the degree of abnormality of coordination and the degree of the hearing loss. Is there less improvement in the rhythmic nature of the speech of the profoundly deaf child than of the congenitally deaf child who has a small remnant of hearing? And what of the child who shows rhythmic ability before instruction to the extent that it might be called an innate sense of rhythm? Does he remain superior in rhythmic ability to the child to whom rhythm must be taught until it approximates that of the child with the so-called innate sense of rhythm? It was noted by the writer that one child in her class far surpassed the remainder of the class in her ability to perform the rhythmic exercises when first presented. Will she continue to excel throughout her rhythmic instruction in the school curriculum?

It is only natural to suppose that those who have never heard the rhythmic patterns of speech would not have those same patterns. The writer worked on the theory that improved coordination of the gross muscles would transfer to the finer muscles, particularly those used in speech; and also on the supposition that the practice of Eurhythmics as applied to the deaf (meaning speech plus rhythmic movement) will bring about smoother speech.

11

Dalroze has said that an education in rhythm is

II

Dalroze, Emile Jaques-, Eurhythmics, Art and Education, New York: A. S. Barnes & Co., 1931, pp. 5-30.

capable of arousing the artistic sense. This statement is borne out by the work done at Central Institute for the Deaf. The art department has found that to help the pre-school child draw his first lines with a rhythmic sweep aids in self expression.

There are two theories of transfer of training--that of identical elements, offered by Thorndike¹² and that of generalization offered by Judd.¹³ The theory of identical elements emphasizes that one experience can be transferred to similar situations where some of the elements of the first situation are applicable to the second situation. The theory of generalization emphasizes the transferring of experience in many similar situations until there is ability to understand how it applies to all such situations. For this experiment both theories are applicable to the problem in that rhythmic training of the gross muscles will have an identical element in the rhythm of the speech muscles. In the theory of generalization, it is hoped that by combining speech with rhythmic movement in many similar situations that the children will gradually come to know that it applies to other speech efforts.

Improved coordination should cause those muscles to function more rhythmically which would mean more fluent speech. Individuals have the tendency to make all repeated

¹²

Skinner, Chas. E., Educational Psychology, New York: Prentice-Hall, Inc., 1936, pp. 328-355.

¹³

Skinner, Chas. E., op.cit.

work rhythmic, which means maximum ease and facility of performance. Does this apply to the speech of the deaf?

The writer hopes to show whether or not systematic instruction in rhythm will improve the speech of the deaf in intelligibility, rhythm, and fluency which, in turn will bring better understanding of their speech by the hearing world. Should this research show that rhythmic instruction does not have a marked influence on the speech of the deaf, a great deal of valuable time can be saved, which may be better spent on other approaches to better speech habits and to more valuable speech drills which may reach the goal for which teachers of the deaf strive.

CHAPTER II
HISTORY OF THE PROBLEM

When asked to define rhythm, the average person will probably say, "Rhythm is the swing and sway of music." To him it is the pulsation in his body in response to music, and with this definition he is satisfied. He does not analyze and consequently come to realize that the undisputed characteristic of rhythm is regularity, and that regularity is found in all forms of life. Rhythm has biological importance in contributing to satisfaction and efficiency; for example--the regularity of the heart beat, respiration, muscle contraction, reproduction, growth and nutrition habits. One finds rhythm in art in the repetition of designs, in the sweep of lines and color effects. And there is rhythm in the universe in the seasons, ocean tides, solar and lunar phenomena, comets, and meteor showers. Dalcroze says

Rhythm is the basis of all vital,
scientific, and artistic phenomena.¹⁴

It may be said that rhythm rules the universe.

In 1877, Currier, the superintendent of the New York Institution for the Deaf, noticed a small boy beating a

¹⁴

Dalcroze, Emile J., Rhythm, Music and Education, New York; Macmillan Co., 1921, p. 171.

stick against a wall. He asked the boy why he was beating with the stick and he found out that the action gave a certain sense of pleasure to the boy. The incident resulted in the origin of musical vibratory training for the deaf. Currier then had drum accompaniment for the military training given the pupils of the institution. With its introduction he found a definite improvement in the marching.

The first attempt to classify and discuss rhythm in its broadest sense was made by Bolton ¹⁵ in 1894. His classic, "Rhythm", described the problem of rhythm as viewed from its many aspects--in art and natural phenomena. Language, according to one theory described, began during celebrations of victory, when there was great feasting and dancing. And because dancing preceded language, it probably was instrumental in giving rhythm to speech. Aside from shouts of joy or pain, all vocal utterances are essentially rhythmical, because of the regular recurrence of strongly accented sounds in a series, and also by sounds succeeded by pauses. Organic groups are formed by the weaker or less stressed sounds run together.

Squire made a genetic study of spoken rhythms of German and American children in 1900-01. He found that the

¹⁵

Bolton, Thaddeus L., "Rhythm", The American Journal of Psychology, V: 145-238, 1894.

pleasure children find in rhythm

.....is due to the efficacy on rhythm to set up vibrations in other organs of the body, and the consequent harmonious activity of the several bodily organs.¹⁶

The same rhythm becomes unpleasant if the rate of succession exceeds the individual natural rate, or if the rhythm is too complex. The reasons given for these facts is that rhythm differs from any other perception of successive stimuli.

17

Dunlap , in 1911, found that pitch differences produced neither uniform nor significant changes in rhythm.

In 1912 a group of pupils of the New York Institution were demonstrated for the first time grouped around a piano while speaking a song in unison. The group was under the direction of Bjorles. Up until this time, there had been sporadic efforts in music training for the deaf; but this was the first time that group training for rhythm was attempted.

18

Ruckmich , in 1913, studied kinaesthesia in rhythm perception, and concluded that there may be perception of rhythm without accompanying kinaesthesia in terms of visual

16

Squire, C. R., "A Genetic Study of Rhythm", The American Journal of Psychology, XII: 492-539, 1901.

17

Dunlap, Knight, "Rhythm and Time", Psychological Bulletin, VIII: 239-243, 1911.

18

Ruckmich, Christian A., "The Role of Kinaesthesia in the Perception of Rhythm", The American Journal of Psychology, XXIV: 306-369, 1913.

imagery, or auditory imagery, or sensation, but that it is necessary for the establishment of rhythmical perception.

One of the secrets of Greek education was rediscovered¹⁹ by Dalcroze, whose book describes the methods used. Dalcroze, a professor of music, discovered that musical sensations of a rhythmic nature called for muscular response of the whole organism. He said that muscles were made for movement, and rhythm is movement; therefore all muscles should be trained in rhythmic movement. For this reason he began to train his pupils to react physically to the perception of musical rhythms. He concluded that the motive and dynamic element of music depended not only on hearing but another sense--touch. The training which he gave his pupils he called Eurythmics. Dalcroze's whole theory of rhythmic education depends upon these statements.

Isaacs, in 1920, defined rhythm as

The experience arising from the periodic, pendular, reflex response of characteristic organs to objective stimulation.²⁰

He concluded that there are four elements in the impression of rhythm which are 1) perception, 2) experience of periodic reflex response, 3) accentuation and grouping resulting from

¹⁹

Dalcroze, E. J., The Eurythmics of Jaques-Dalcroze, Boston: Small, Maynard & Co., 1918, pp. 10-40.

²⁰

Isaacs, Eleanor, "The Nature of the Rhythm Experience", Psychological Review, XXVII: 296, 1920.

attention, and 4) affective tone from repetition of movement.

The conclusion reached by Sonnenscheien in 1925 was that

Rhythm is that property of a sequence of events in time which produces on the mind of the observer the impression of proportion between the durations of several events or groups of events of which the sequence is composed.²¹

That rhythm is a muscular response to an auditory stimulus²² is the definition given by Redfield in 1928. He said that jazz is rhythmic because the rhythm is pounded continuously²³ until the whole muscular system responds. In 1934 Husband conducted an experiment in which he measured bodily sway. All types of music produced more sway than when the subject stood in silence; jazz music caused the greatest amount of sway.

Rhythm is perceived by the average person as a pulsation in his body in response to music; it is an emotional thing which results in the whole organ responding to its pulsation. That the whole organ should respond and be educated to music is one of the Dalcroze²⁴ principles of teaching eurhythmics. The muscular system receives rhythms;

²¹

Sonnenscheien, E. A., What is Rhythm?, Oxford: Oxford U Press, 1925, p. 16.

²²

Redfield, J., Music a Science and an Art, New York; Alfred A. Knopf, 1928, pp. 10-200.

²³

Husband, R. W., "The Effects of Musical Rhythm and Pure Rhythms on Bodily Sway", Journal of Genetic Psychology, XI; 328-336, 1934.

²⁴

Dalcroze, E. J., Rhythm, Music and Education, New York: Macmillan Co., 1921, pp. v-3.

rhythm is essentially a physical movement which involves time and space which may only be perfected by exercises in rhythmic movement.

Rhythm is the first aspect of music that appeals to children. Rhythmic movement is the most complete and simplest experience in rhythm for the child. It is both social and individual. The child by reproducing an impression with his whole body, projects the picture which he has stored in his mind. By doing so repeatedly his mind gains a clearer and clearer inner picture and his limbs become more coordinated. The practice of physical movement develops the sense of muscular rhythm. New motor habits created in the child teach him to think more clearly which means that he will be better able to respond to commands given by his brain. The facility of response should give him a consciousness of power and control. Rhythmic gymnastics help children in other lessons, too. The powers of observation and memory develop, which make the child more orderly and precise. All of which help to realize the goal of education, which is an integrated personality.

Rhythm bands offer an integrating and socialising experience to the young child. Such rhythmic activity is alluring to him because it appeals to his creative and manipulative tendencies. DeRussett²⁵ thinks that the per-

²⁵

Meyer, Max F., "Does a Percussion Band Educate?", American Annals of the Deaf, LXXVII: 108, 1932.

ussion or rhythm band arouses an interest in melody in the young child; but at the age of seven, real musical training should begin. Meyer found from a questionnaire study made in 1932 that many of the schools for the deaf use the rhythm band more for "show" than for any special training that the children might derive from it. And he seems not to see any advantage in such training except that it is a socializing factor, which, in itself, is important. He says that

Rhythm is essentially an habitual grouping, in time, of elementary actions, muscle contractions, usually with repetition of the group.²⁷

He believes that such a grouping can be acquired by the deaf through dancing, swimming, or gymnastics quicker than through percussion band practice. If the rhythm band is a socializing factor, then it should be a good thing. The practice should be even more necessary in a school for the deaf because parents of deaf children are inclined to restrict and inhibit their children's contacts with other children, which adds greatly to their inability to cope with the social situation. But this does not mean that the rhythm band should comprise the whole rhythmic training of the child.

26

Meyer, op.cit., pp. 106-114.

27

Meyer, op.cit., p. 113

Bird says that

The sum total of a child's personality may be said to be his rhythm.²⁸

Bad movement is always abrupt, it has no coordination and is always meaningless and mechanical; and so is the rhythm band likely to become--mechanical, which certainly would not influence coordination. Nor does it directly influence rhythm which is so sadly lacking in the speech of the deaf. To be rhythmical, vocal utterances must occur at regular intervals of time. The aim in rhythm for the deaf is better speech.

Rhythm has progressed along two distinct lines; rhythm in speech and rhythmic action.²⁹

says Kent. Rhythm in speech was used at first to improve the speech of the child who had already developed speech. Investigators have found that the deaf can receive a perception of sound and tone development by work at the piano. Rhythmic action was an outgrowth of speech rhythm, its purpose being to provide an outlet for the child's activity, to provide program material, and to develop bodily poise.

The speech of the deaf is extremely slow, usually with excessive breath expenditure; it has prolonged vowels and abnormal rhythm, in many cases it is arrhythmic. There-

²⁸

Bird, Maria, "Rhythmic Movement in School", New Era, XV: 141, 1934.

²⁹

Kent, Margaret S., Suggestions for Teaching Rhythm to the Deaf, Frederick: Maryland School Press, 1934 p. 6.

fore rhythmic training helps to put swing and speed into
speech. According to Connery ³⁰, 1935, rhythm work at the
piano should be given the deaf child in order to aid in
the correction of the abnormal rhythm already mentioned,
and to improve accent, voice placement, and ultimately,
appreciation for music. Dalcroze's Eurhythmics, as
applied to the deaf, means the combination of speech and
rhythmic movement; this combination was used at the Lexing-
ton Avenue School for the Deaf by Van Nest ³¹ in 1937. There
it was found that the children became so interested in
action that they forgot their voices. The quality of their
voices became more natural.

Different methods for presenting rhythm to children
have been suggested by many experimenters. Most agree that
the teacher should give exercises which will free the
children's bodies and give freedom of movement without
thought of themselves. To control rhythmic experience for
the child is to rob him of joy and satisfaction. For the
small child, there must be unrestricted movement of the
body. All movements should follow the laws of rhythm which
are preparation, climax, and repose.

Although Düker ³² studied the effect of tempo and rhythm

³⁰

Connery, Julia M. and Young, Irene B., Voice Building,
Washington: Volta Bureau, 1935, pp. 40-60.

³¹

Van Nest, Mary R., "Eurhythmics", The Volta Review,
XXXVII: 337, 1937.

³²

Düker, H., "Experimentelle Untersuchung über den Einfluss
des Taktes auf fortlaufende Arbeit bei kurzer Arbeitszeit",
Psychotechn. Zsch., 5:82-86, 1930.

on the amount of work in adding simple figures and in doing a simple task on adults, his conclusions are applicable to children. Rhythm assists in obtaining the best results with the least effort and without waste of energy. Rhythm is beneficial only if it is adjusted to the individual's own rhythm. Too fast or too slow tempo is detrimental.

³³
The Martenots , in 1934, found that a slow tempo makes the child receptive; whereas a fast tempo will tend to make him give out energy. A well adjusted tempo gives an individual a pleasant feeling which is akin to one of relaxation, which is necessary in the rhythmic training of the young child. More complicated rhythm may be given the older child.

There are seven basic principles in teaching rhythmic activity as listed by Farnsworth in his book, Education through Music.

1) Experience is to precede formal instruction, 2) where experience is lacking the teacher will supply it, 3) the teacher will organize this experience, 4) the motive or impulse in music is found in the desire of the individual to express himself, 5) the purpose of education through music is to quicken perception, clarify feeling, and stimulate appreciation of the beautiful, 6) the aim of music in the public schools is to give out only technical knowledge to the gifted few, but cultural experience to the many, 7) the teaching will consist of experiences that will widen and intensify the

33

Martenot, M. and G., "Influence of Rhythm and Tempo on the Child", New Era, XV:133-136, 1934.

ideas of musical structure and interpretation, and thus lead to comprehension and enjoyment.³⁴

Rhythmic training should aid the child in reproducing images of things already known, or seen, which will mean the development of imagination which seems to be lacking in the deaf. It also helps the child to be more susceptible to musical impressions; and because the whole body is becoming educated to receive music, the sense of touch, to a certain degree, may replace that of hearing. Although Jersild and Bienstock³⁵, in 1935, found no significantly high correlation between intelligence and rhythm, as measured by Kuhlman-Binet, Merrill-Palmer, and the Minnesota Preschool Scales, Dalcroze says that rhythmic bodily movements influence the intellectual development of abnormal children. And he, therefore believes that the normal child can be helped. Physical rhythm through co-ordination should certainly bring about nervous stability.

The subject of rhythm has been studied in many fields-- art, music, the dance, and speech. Most investigators believe that all muscles should be trained in rhythmic move-

34

Hyman, Beatrice, "Primary Rhythm Bands and Eurhythmics", National Education Association of the United States, 73:375, 1935.

35

Jersild, A. F., and Bienstock, S. F., Development of Rhythm in Young Children, Columbia: Teacher's College Press, 1935, pp. vi-20.

36

Dalcroze, E. J., "Rhythm in Terms of Progressive Education", Progressive Education, VII:348-349, 1930.

ment. Educators of the deaf have incorporated rhythm in the curriculum to improve accent, voice placement and ultimately, appreciation of music. Recent studies on the normal child even indicate that instruction in rhythm will develop imagination, influence intelligence, and produce emotional stability.

This brief survey of studies related to rhythm and speech seems to indicate that eurhythmics would be a valuable addition to the curriculum of schools for the deaf.

CHAPTER III
PROCEDURE USED

The investigation of the present problem upon the influence of instruction in rhythmic movement on the speech of the deaf was done at Central Institute for the Deaf, Saint Louis, Missouri. The subjects of this experiment were six girls, whose ages ranged from eight to eleven and whose intelligence quotients ranged from 96 to 119. Five of the girls who were in the same school grade were approximately at the same level in educational achievement. The sixth child was of the same chronological age, but not of the same educational age due to a late start in school.

Those who attended the Nursery School at Central Institute received somewhat the same instruction in rhythm. The first approach to rhythm is much like the hearing child's first approach--rhythmic movement and piano work, which in the Nursery School consists of feeling rhythms, keeping time in various ways, pitch differentiation and rhythm band practice. This instruction is given each day for a half hour period, which means, therefore, that the child experiences rhythm formally for two and one-half hours per week. The following paragraphs contain more

detailed descriptions of the children.

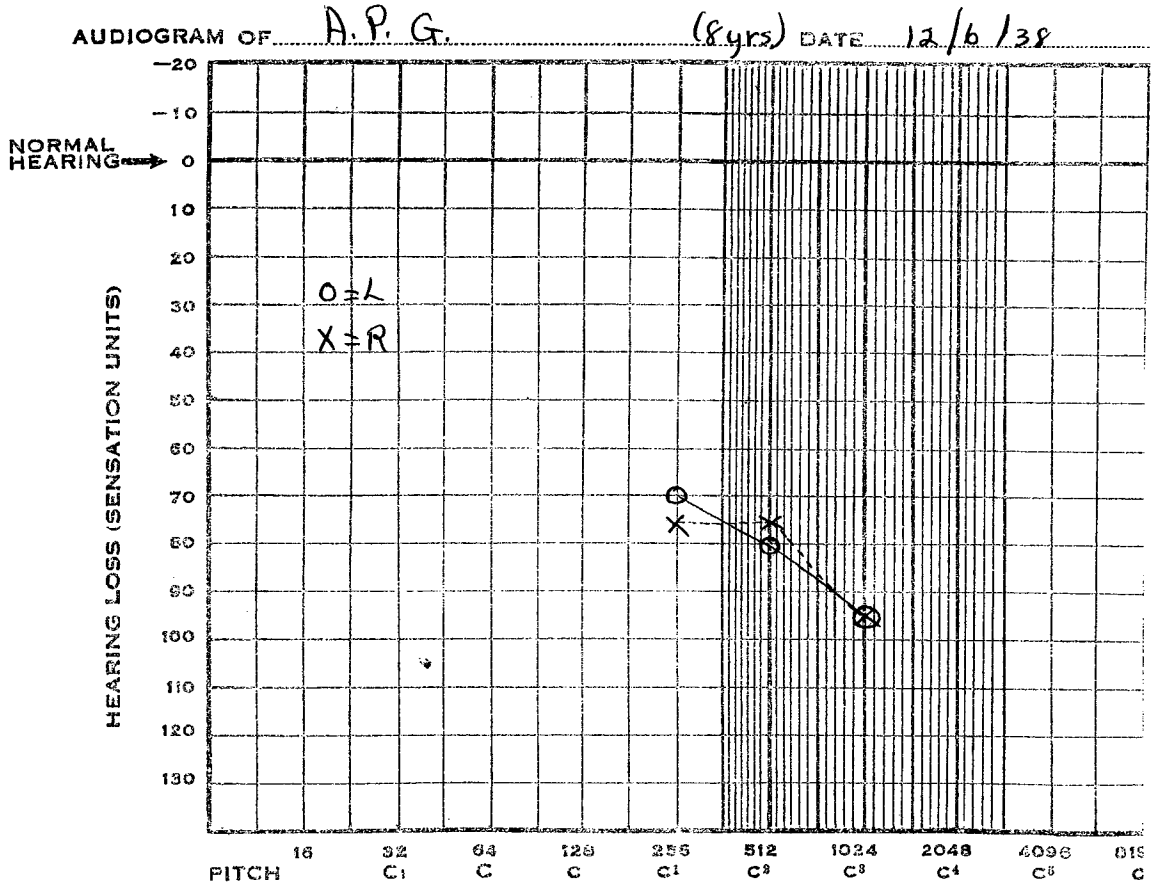
M.A.C., eight years of age, entered Central Institute at the age of five. In her case history on file at the school, her parents state that she lost her hearing at the age of ten or eleven months; as a result, she developed no speech and has been taught as a congenitally deaf child since her entrance into Central Institute where her education was first begun. She has had three years of rhythm previously. She gives no response whatever to the audiometer, although the quality of her voice would seem to indicate some hearing. Her I.Q., as measured by the Randall's Island Performance Series, is 104.

A.P.G., eight years old, is a congenitally deaf child. She entered Central Institute when she was five years old. Previously she attended a day school for the deaf in Ohio for one and a half years. As far as the author has been able to determine, she has had instruction in rhythm for at least three and one-half years. Her I.Q., as measured by the Performance Series, is 119. She has a small residuum of hearing, which is often found in a congenitally deaf child, but which is not enough for her to hear speech close to her ear. The following audiogram (figure 1) indicates the extent of her response to a 2A audiometer test.

V.Z., ten years old, entered Central Institute at the age of eight. Her parents are not sure whether she was born deaf or not. But she gives no response to the audiometer. She attended day school in Michigan for three years

before she entered Central Institute. She has had rhythm for one and a half years. This experimental program in rhythm is V.Z.'s first experience with rhythmic movement instruction. Her I.Q. is 113.

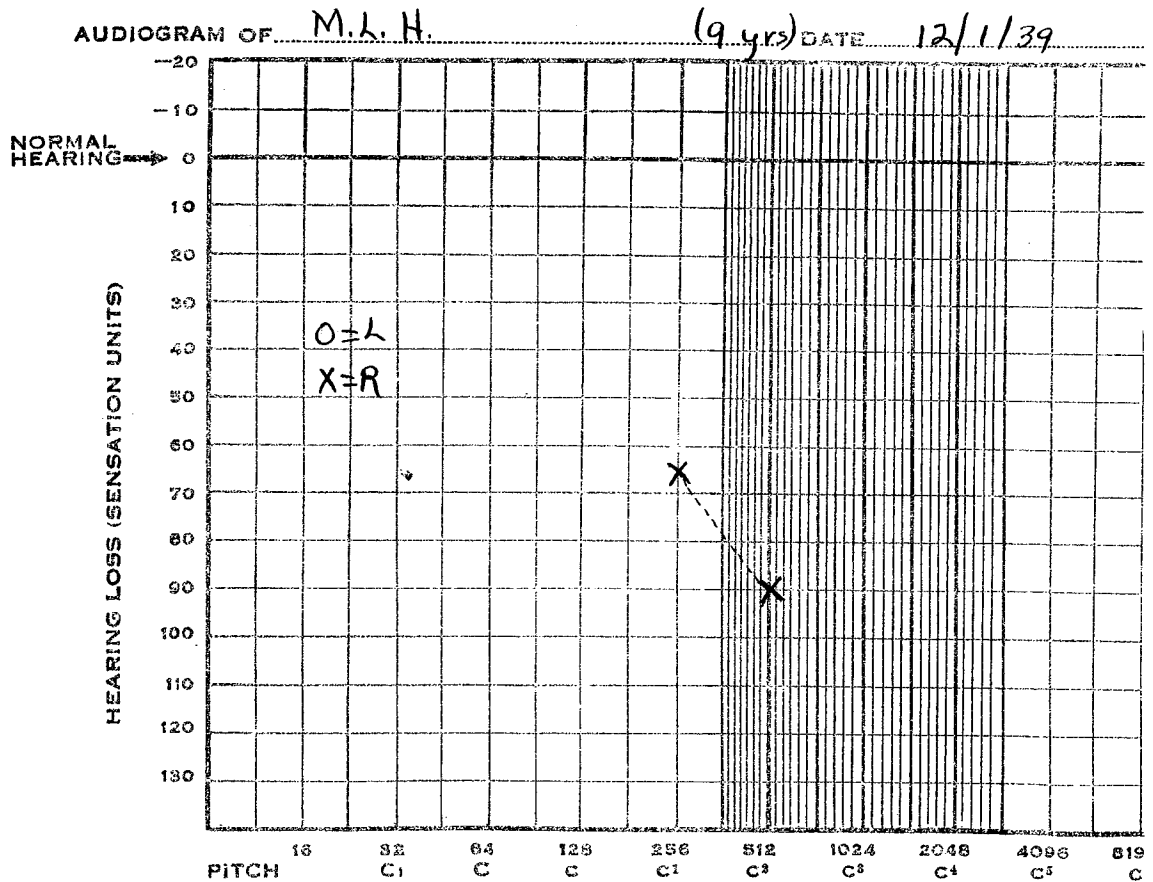
Figure 1



M.L.H., age nine, is a congenitally deaf child; she entered Central Institute at the age of seven and one-half years of age. Previously she attended a day school in California for two and one-half years. M.L.H. has had no previous rhythmic instruction as have the other girls. Her first experience in rhythm was with the author. Her

I.Q. is 96. She had the additional handicap of being a premature child and was unable to hold her head in an erect position until she was three years old. Since then her coordinations have improved until she moves almost as well as other children, although there is still evidence of early incoordination. Her audiogram (figure 2) shows a very slight residuum of hearing in the right ear.

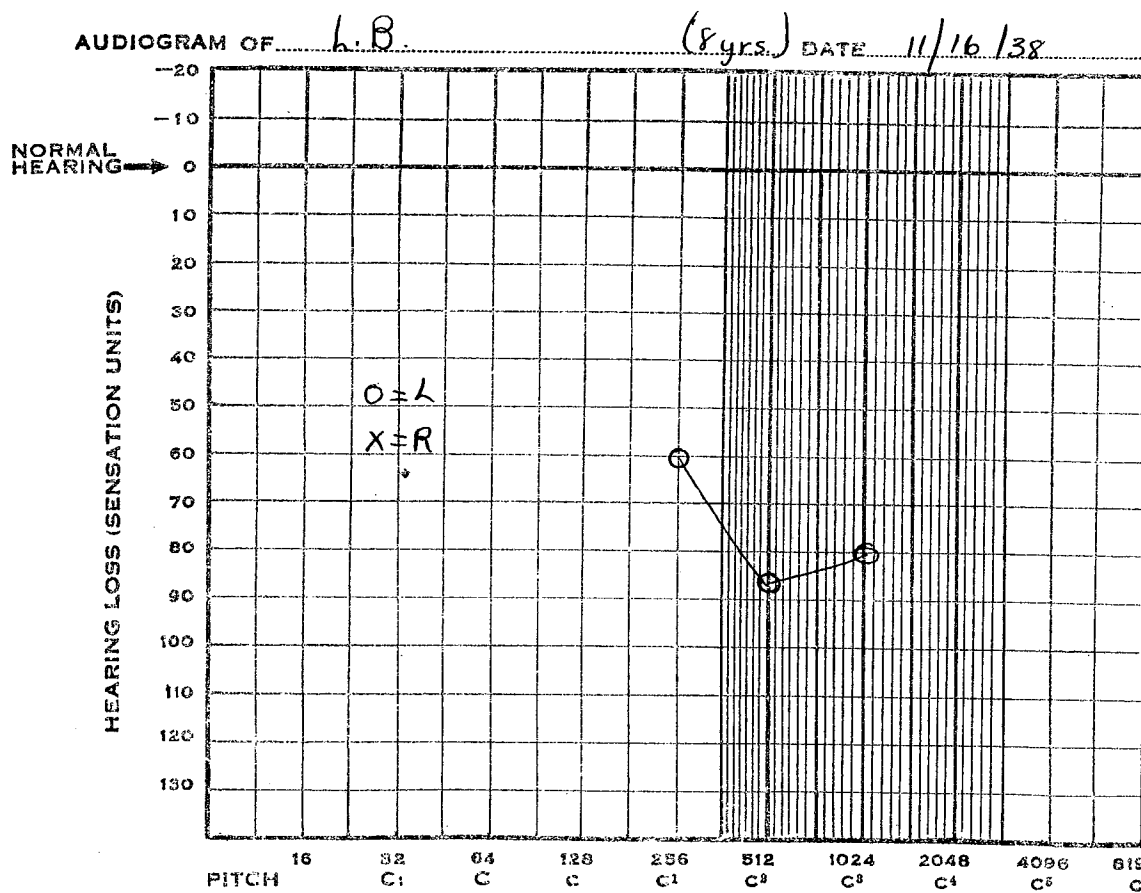
Figure 2



L.B., eight years old, was not born deaf, but became so between twelve and eighteen months of age from an unknown cause. She had a few baby words, but because she lost her

hearing at such an early date has been taught as a congenitally deaf child. She, too, has a very small residuum of hearing. L.B. has had rhythmic instruction of the kind offered in the Preschool of Central Institute. She has had approximately five years of rhythm. Her I.Q. is 116. L.B. responds to only three tones on the audiometer with her left ear. (see figure 3)

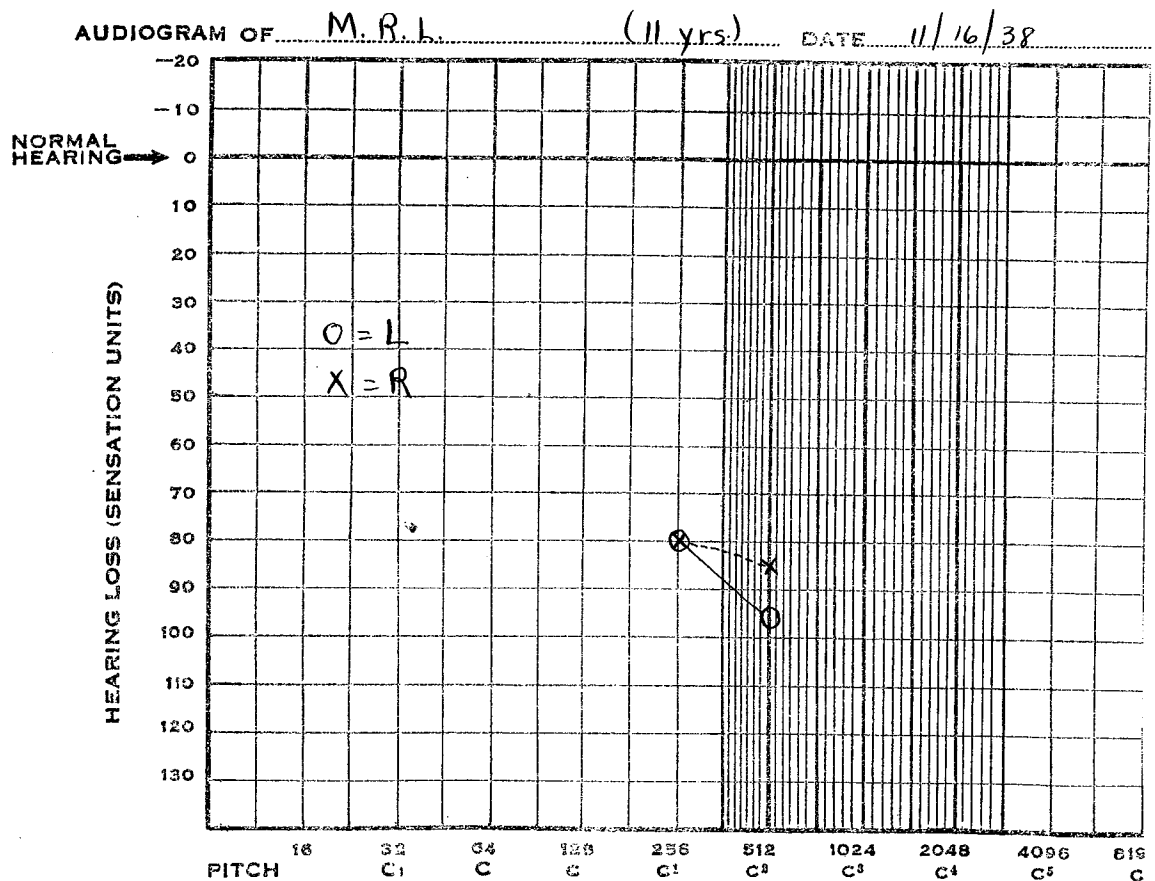
Figure 3



M.R.L., eleven years old, was born deaf. She entered Central Institute at the age of nine. She attended a day school for the deaf in Illinois and lived with a private

tutor for three years. She has had one-half year of rhythm in addition to the instruction in rhythmic movement given by the writer. She is a large child, and is poorly coordinated. M.R.L. has a slight residuum of hearing as is indicated on the audiogram (figure 4). Her I.Q. is 97.

Figure 4



To sum up the abilities and education of the children used in this experiment, L.B. has had the most rhythm instruction, M.L.H., the least. L.B. is the best coordinated, M.L.H. shows the poorest coordination. A.P.G. has the most

residual hearing, and M.A.C. and V.Z. do not respond to an audiometer test. M.R.L. has spent the most years in school, L.B., the fewest.

Instruction in rhythmic movement was given two times a week, on Wednesday and Saturday for periods of forty minutes each, the total number of periods being thirty. Instruction included rhythmic bodily exercises, games, and rhymes which require rhythmic movements. Approximately one-half of the rhythm period, or twenty minutes, was devoted entirely to rhythmic exercises which will be described. These exercises were selected by the author from a course in Ballet taken in preparation for this research. They were chosen not only because they provided training for all parts of the body, but because they are of varied rhythms. An attempt has been made to introduce the two, three, four, five, six, and seven rhythms and to make them habitual. The second half of the period was spent in games, rhymes, and jumping rope, which will be described.

Exercises used per period

1. Arm circles--The arms are held relaxed and crossed in front, palms together. Each arm circumscribes an arc of about 270 degrees, at which time the palms of the hands are up, they are turned over and the arms complete the circle and return to the starting position. This circling movement was repeated ten to fifteen times.
2. Wrist circles--One arm is held at a 135 degree angle to the body axis. At the count of one, the palm of the hand turns in toward the median line, the wrist is relaxed. The hand then circumscribes an arc of 180 degrees, at which point the fingers are slightly spread, the wrist

firm. At the count of two, the hand is turned toward the median line, the palm towards the head. Wrist circles were given fifteen to twenty times for each hand separately. Part two of the exercises uses both hands, at first on the right side, then the left. The exercise was given ten times on each side. During this exercise each child was required to count as each circle was completed--one, two, three, four. For the count of four, a slight pause was allowed.

3. Pushing exercise--Both arms are raised above the head and to the right of the median line, the palms turned to the left. The pushing movement is from the far left to the far right, at which time the position of the hands is reversed and the movement proceeds in the opposite direction. During the passage from left to right, the children say, "push." The same is repeated from right to left. The exercise is varied by pushing high above the head and low below the knees. This exercise is repeated ten times on each side, both high and low, or forty movements in all.
4. Foot circles--The children place their hands on their hips, or hold onto the back of a chair. One foot is placed in front of the other, the toe pointed. A circle is described with the foot. This exercise was repeated rhythmically with each foot ten times per period.
5. Walking exercise--The beginning of the exercise is the natural standing position. The children walk four steps forward, counting one, two, three, four, five on each step stretching the whole body, arms up-stretched, until the maximum height is reached on five. At the count of one following, a completely relaxed position is taken--each part of the body is relaxed to the maximum, arms, back, legs--for five steps backward. The exercise was repeated ten times each period.
6. Hopping-over exercise--The toes are pointed outward, heels together. At the count of one, the right foot steps to the right, at two, the left slides to meet the right, at three, the right foot steps to the right and at four, hop to the left on the left foot, as though the child were hopping over an obstacle about

one foot high. This exercise is repeated in the opposite direction. The complete movement to the right and left was given about five to eight times. For variety, the exercise is sometimes given in line formation.

7. Arabesque movement--This movement is the same as given in the Ballet. Starting from a standing position, on the count of one, step to the right on the right foot, on two bring the left foot to the right. On three, step to the right, on the right toe and hop--the left foot raised as high as possible. The arms are outstretched, the left at a forty-five degree angle and the right being at an angle of 135 degrees to the median axis of the body. This was repeated ten times.
8. Turns--The arms are in a relaxed position in front of the median line, the tips of the fingers are touching. At the same time the right foot is stretched out, the toe pointed. At the count of two, the right arm is stretched up straight. Hop on the left foot, the right foot is kicked back and the toe is placed behind and to the left of the left foot. At the count of three, or at the command, "Turn", the whole body turns completely around and returns to the starting position for the following turn. Preliminary practice is given leading up to the turn, after which the turn is given five times to the right and five to the left.
9. Kicks--This was given more as an interest device, although it does provide rhythmic exercise. Both feet are together, at the count of one, jump on both feet, at two, hop on the left and kick the right, and vice versa. Preliminary practice constituted about fifteen kicks on each foot. Group practice was about ten kicks on each foot.

These exercises completed the first part of the rhythm period; games, rhymes and jumping rope followed. The first game introduced was The Shoe Game, which is played by many hearing children and even adults. The

verse requires action which means a combining of rhythmic movement with speech. Articulation of this game, as well as of the other activities requiring language, was presented in the classroom during the week, so that the language and articulation presented no problems during the rhythm period. Most of the children had good enough memories to remember the verses without the aid of the written form, so that no time was wasted during the period. The Shoe Game requires each child to pass a shoe from one to another, the verse is

Please pass this shoe from me to you, to you,
Please pass this shoe and do just as I do.

Until the clause, "and do just as I do", is reached, the movement is one of simple passing; but at this clause, each child moves his shoe to the right for the first word, to the left for the second, and so on, to the end of the clause when he passes the shoe to his neighbor, while he, himself, receives another shoe.

The next activity to be introduced was hopping as an accompaniment to a verse from The Gateway of Speech by

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Parsons. For identification the author decided to name this, "Hop! Hop! Hop!"

Hop!
 Hop!
 Hop!
Up in the air we hop!
Up in the air-----
Up in the air-----
Hop!
 Hop!
 Hop! 38

37

Parsons, Freda, The Gateway to Speech, London: Ginn and
38 Co., pp. 1-11.
op.cit., p. 11.

The children hop on the right leg for the first line, on the left for the second, and so on.

After the fourth week of instruction, the author decided to introduce jumping rope--because to jump, say a verse, and perform the action required by the verse necessitated rather complex muscular coordination. Working on the thesis that improved coordination of the gross muscles of the body will transfer to the finer muscles of speech, the writer believed that to jump rope would improve the coordination of both.

The first stanza to be given with rope jumping was the favorite of most children, "Teddy Bear." The language is simple and presents no articulation difficulty and it is descriptive enough to allow a number of movements.

Teddy Bear, Teddy Bear, turn around.
Teddy Bear, Teddy Bear, touch the ground.
Teddy Bear, Teddy Bear, show your shoe.
Teddy Bear, Teddy Bear, twenty-three skidoo.

Soon after this, another verse was presented which did not have definite action but which gave added coordination.

All in together.
How is the weather?
Rain, snow, sunshine, sleet, rain, snow, sunshine,
sleet, etc. until the
child misses.

The abilities of the children were not such that all could jump together as the verse implies, but the abilities were distributed enough to allow two, and in some instances, three, to jump together. The idea of predicting the weather appealed to them.

Another verse was chosen from The Gateway to Speech. This is very similar to the verse from her book already given, except that this was used as a jumping rope exercise. This was identified as "Jump! Jump! Jump!"

Jump!
 Jump!
 Jump!
Up in the air we jump!
Up in the air-----
Up in the air-----
Jump!
 Jump!
 Jump!³⁹

This little verse and the one mentioned above were most attractive to the children; and they certainly lived up to aim set by Parsons, which was to

.....instill the joy of movement, gradually awakening the joy of speech movement..... 40

The well-known game of O'Leary was presented last. Of all the exercises and games, this required the most complicated coordination.

One, two, three, O'Leary
Four, five, six, O'Leary
Seven, eight, nine, O'Leary
Ten, O'Leary postman.

During the counting, the ball is consecutively bounced; but on the word, O'Leary, the child kicks over the ball and then continues bouncing the ball. On the last line, he kicks over the ball for each of the two last words. Although the articulation was no problem to the children, they soon found that to bounce the ball, perform the

³⁹
loc.cit.

⁴⁰
op.cit., p. 2.

necessary action, and say the verse were exceedingly difficult.

A simplified lesson plan which was varied each period, but which included all exercises, is given below.

- | | |
|--------------------------|-------------------------|
| I. Exercises | II. Games, Rhymes, etc. |
| 1. Arm circles | 1. Shoe game |
| 2. Wrist circles | 2. Hop! Hop! Hop! |
| 3. Pushing exercise | 3. Teddy Bear |
| 4. Foot circles | 4. Jump! Jump! Jump! |
| 5. Walking exercise | 5. All in together |
| 6. Hopping-over exercise | 6. O'Leary |
| 7. Arabesque | |
| 8. Turns | |
| 9. Kicks | |

At the beginning of instruction, a test sentence was chosen which was recorded in the Technisonic Laboratory of Central Institute. Each child said the unrehearsed sentence, which was: "Sometimes when I wake up at night, I see a great, big bear." The same sentence was recorded at the end of the training period. Those speech records served as objective evidence of the influence of the instruction in rhythm on the speech of the deaf child. The comparison was made by measurement of time relationships of phrases of the test sentence recorded before and after rhythmic instruction. Judgments of fluency, rhythm, and intelligibility on a five-point scale were made. Each judge was given a rating sheet on which the scales for intelligibility and for rhythm and fluency were included. The subjects used in the experiment were numbered consecutively from I to VI for the first recording. The order of voices in the second recording was varied so that no one knew which was talking. The voices were numbered consecu-

tively from VII to XII. The scale for intelligibility was

1. Understood all words
2. Understood almost all words
3. Understood about one-half of sentence
4. Understood a few words
5. Understood none of speech

The scale for rhythm and fluency was

1. Excellent
2. Good
3. Fair
4. Poor
5. Very poor

A sample rating sheet is included in the Appendix.

The group of judges was selected to include those familiar with the speech of the deaf and those less familiar with their speech, namely, the teaching faculty and the classes in training in Central Institute for the Deaf. Those who were familiar with the speech of the deaf were instructed to mark the rating sheet as directed; they were not made familiar with the test sentence before the playing of the speech recording. Those who were not so familiar with the speech of the deaf were given the same instructions for marking the rating sheet; but the test sentence was made known to them by the author. Neither group was told which recording was made before or after instruction. Each of the recordings was played through twice, the judges were instructed to listen and to mark for intelligibility during the first playing, and for rhythm and fluency during the second.

The results obtained were handled in the following manner. The percentage of judgments for each subject

according to the scales marked was obtained. These results were compared to determine the amount of improvement. Graphs were drawn to further clarify the results and to more graphically compare the subject's progress during the experimental period.

Time relationships were obtained by measuring the period of time taken for each child to say the test sentence. An ordinary stop watch which measured fifths of a second was used in obtaining the results. These tempo measurements were also used as a method of comparing the recordings of the children's speech following rhythmic training with their speech before this training.

CHAPTER IV

RESULTS

The results obtained and recorded on a record made in the Technisonic Laboratory of Central Institute for the Deaf indicate that rhythmic movement does improve the speech of the deaf child in intelligibility, rhythm and fluency. Noted improvement has been observed in the speech of the six girls who have received special training in rhythmic movement. Some of the improvement is undoubtedly due to maturation and to work carried on in the classroom, but as there seems to be a marked improvement for the group as a whole, the writer believes that the instruction in rhythmic movement has exerted a beneficial influence. Evidence for these findings consists only of subjective judgments of those hearing the speech record and of observations of the author made throughout the study. Table 1 indicates the percent of judgments made on intelligibility of speech for each child as rated according to the five point scales already mentioned. From this, improvement of the children is readily seen. Judgments of the speech of each child and of the group as a whole are shown in this table.

Table 1

Comparison of Judges' Ratings of Speech Intelligibility

Subject	Before Rhythmic Training					After Rhythmic Training				
	% of Ratings					% of Ratings				
	1	2	3	4	5	1	2	3	4	5
M.A.C.	5	18	23	32	23	30	34	29	7	
M.R.L.		31	22	27	20	27	52	7	10	5
A.P.G.	37	25	20	8	10	25	44	20	7	5
V.Z.	10	40	22	19	9	10	28	30	15	17
L.B.	28	35	16	11	11	67	25	5	3	
M.L.H.	3	3	17	56	20		7	20	53	20
Average	14	25	20	25	15	26	32	18	16	8

In the case of M.A.C., improvement is shown by an increase of twenty-five percent more indicating understanding of all of the speech judgments on the second recording and by no judgments indicating failure to understand any of the speech compared with twenty-three percent of such judgments made before rhythmic instruction.

M.R.L. showed twenty-seven percent of the judges marking in column one after instruction, whereas no judges understood all of her speech on the first recording; twenty-one percent more judges understood almost all of her speech on the second playing and fifteen percent fewer reported

that they understood none of her speech. While A.P.G. showed no improvement at first glance, she had made nine percent improvement if judgments of complete and almost complete understanding of her speech are added together and compared on the two recordings. Fewer judgments were made of lack of intelligibility of any words.

V.Z. showed no improvement in intelligibility. L.B. showed a marked improvement of thirty-nine percent in judgments made in column one for those who understood all of her speech. Improvement is also shown by fewer judgments made in columns indicating poor intelligibility of speech and by no judgments indicating failure to understand any words on the second recording. M.L.H. made some improvement but it was not spectacular. There were more judgments made indicating improved intelligibility for the second recording.

Comparing the group as a whole, there were twelve percent more judgments of perfect understanding after rhythmic instruction, seven percent more judgments made indicating intelligibility of almost all of the speech, and seven percent fewer judgments made indicating that none of the speech was intelligible.

Table 2 is a tabulation of subjective judgments of the rhythm and fluency of each child's speech. Improvement is shown by M.A.C., V.Z., L.B., and M.L.H., marked improvement is shown by M.R.L., V.Z., and L.B. A.P.G. shows no improvement according to the judgments made; but in the author's opinion, her general coordinations

improved as the result of the rhythmic training. The group as a whole made improvement as demonstrated by six percent more judgments of excellent rhythm and fluency for recording two, and ten percent more judgments of good rhythm and fluency. Fewer judgments were tabulated in columns four and five for the second recording, made after rhythmic instruction, which would indicate poor rhythm and fluency of speech.

Table 2

Comparison of Judges' Ratings of Rhythm and Fluency

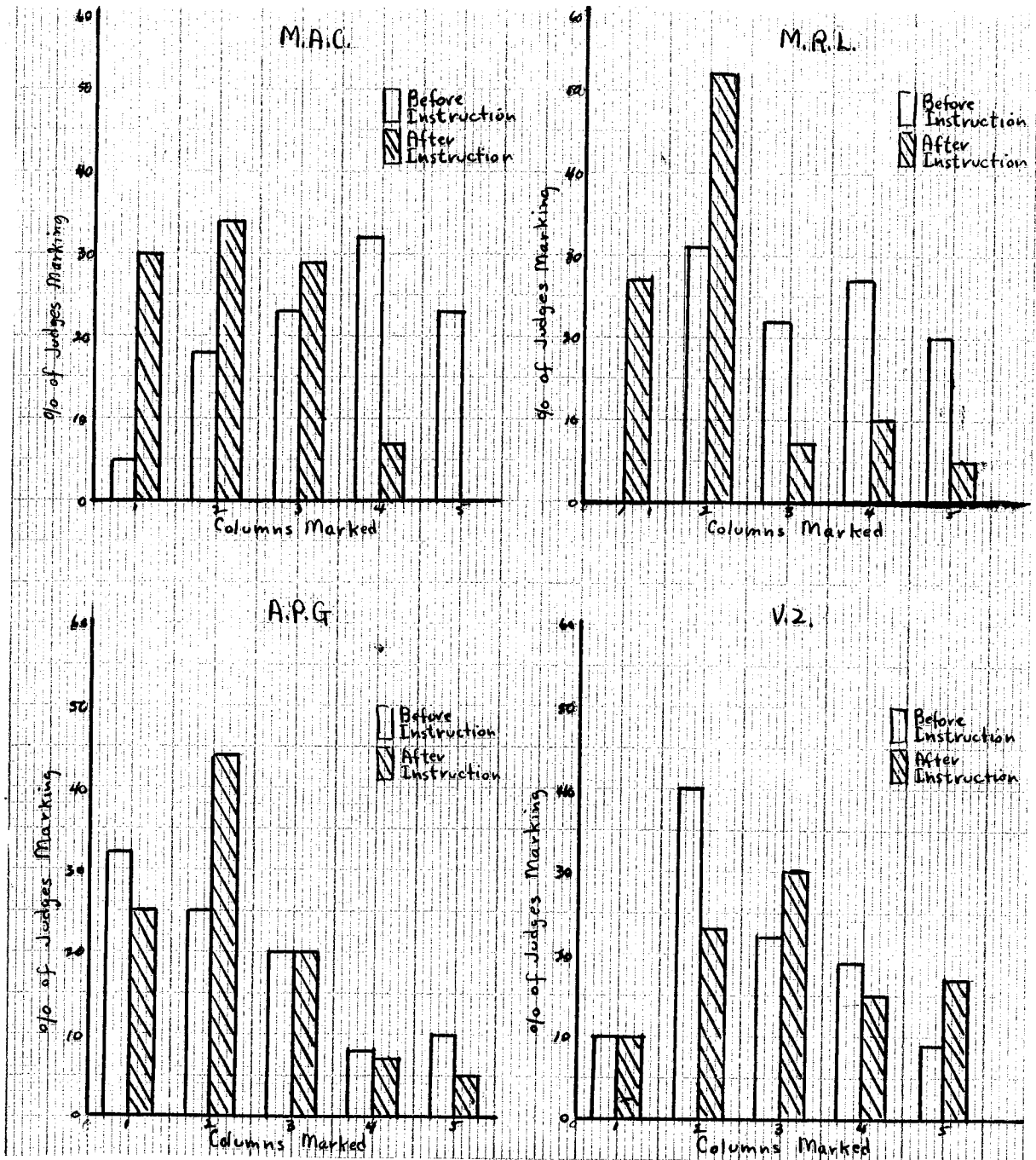
Subject	Before Rhythmic Training					After Rhythmic Training				
	% of Ratings					% of Ratings				
	1	2	3	4	5	1	2	3	4	5
M.A.C.	5	41	48	6		13	45	34	6	3
M.R.L.	1	7	38	45	10	17	44	30	9	
A.P.G.	10	43	33	14			24	56	18	2
V.Z.	3	21	44	22	10	15	15	27	36	7
L.B.		13	48	27	15	10	52	32	6	
M.L.H.			19	40	41		8	10	46	37
Average	3	21	39	24	13	9	31	31	22	8

To further clarify the results obtained, the following figures are submitted. The first group of figures indicates ratings of intelligibility of each child's speech as made by sixty-three judges. The ordinates represent the

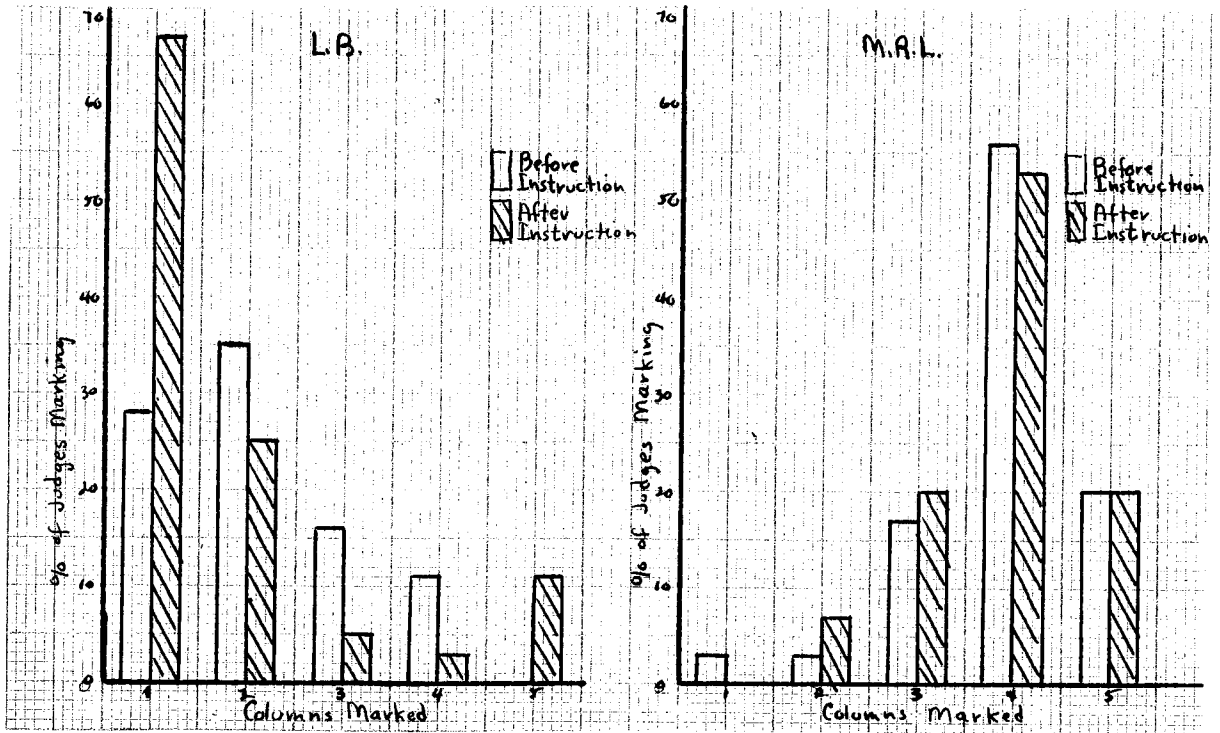
percent of the judges marking; the abscissae represent the columns marked.

Figures 5-8

Judgments of Intelligibility of Speech

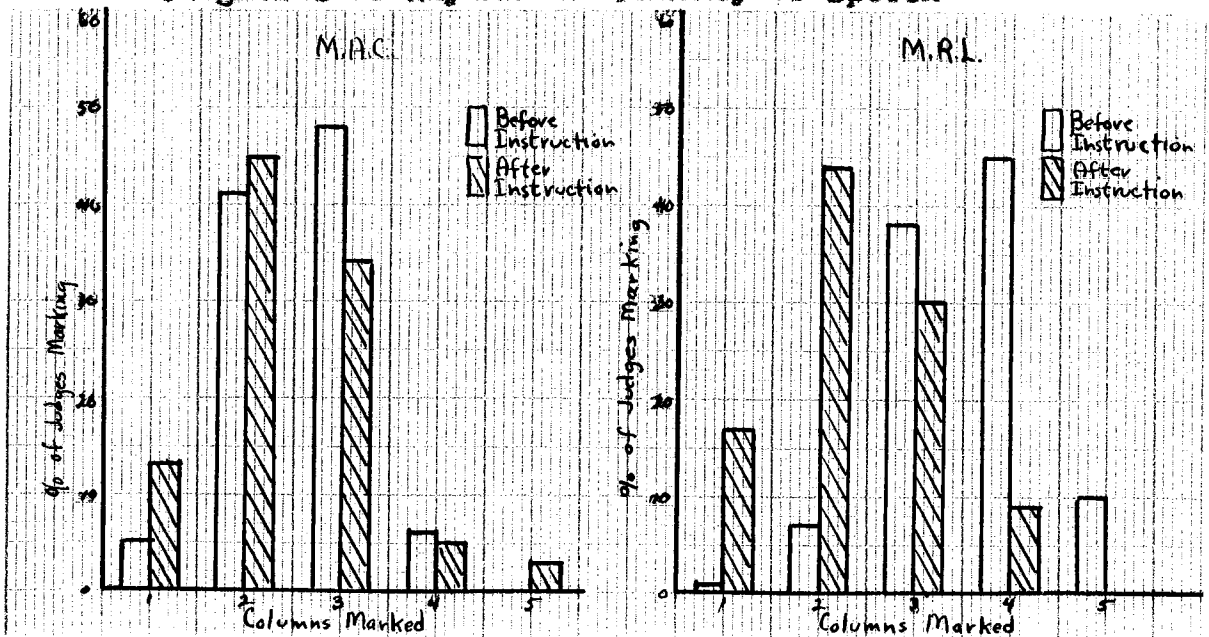


Figures 9 and 10
Judgments of Intelligibility of Speech



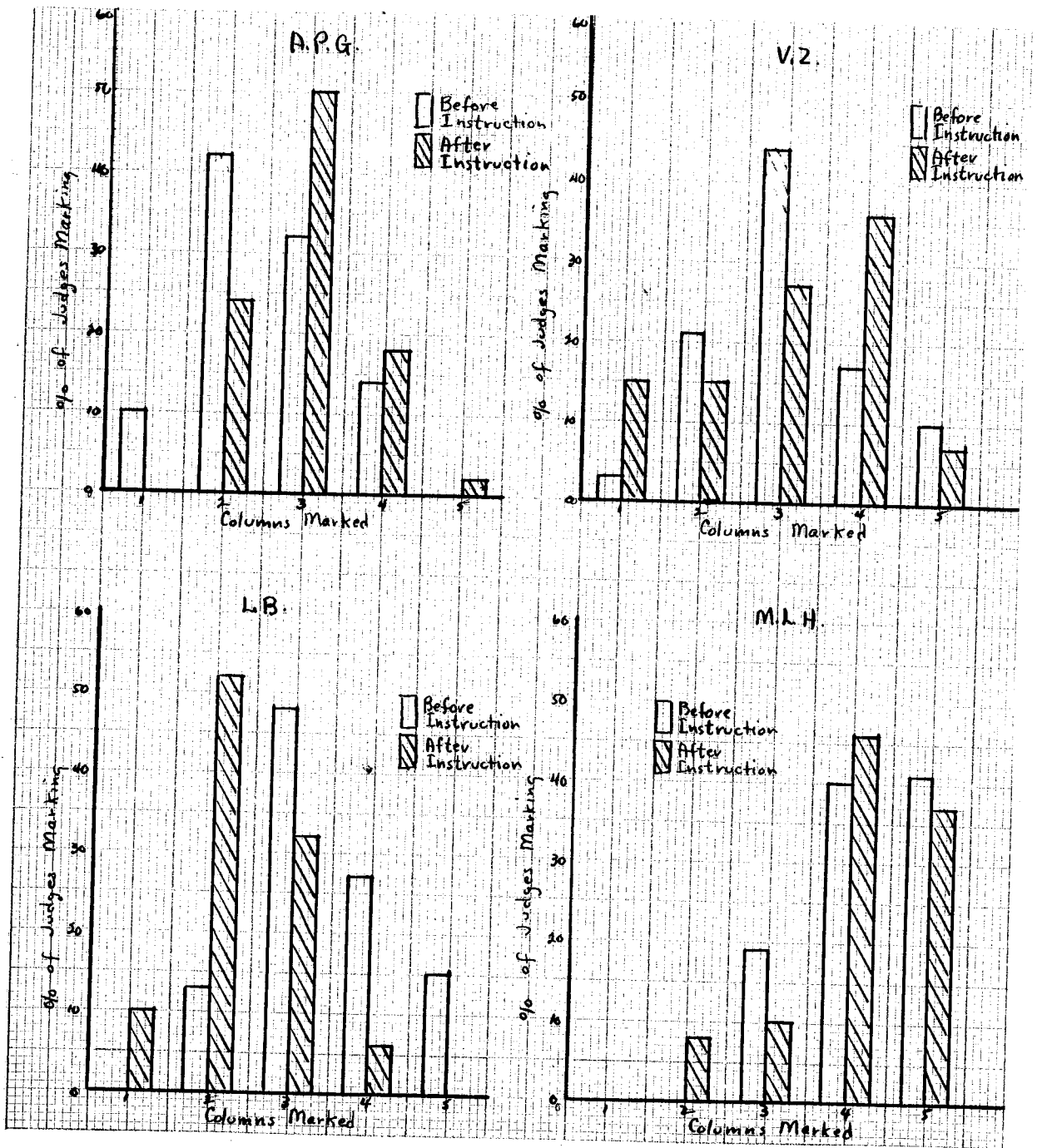
It is to be expected that the actual understanding of the speech would be improved over a period of five months; but there seems to be a rather significantly marked improvement. The second group of figures show the ratings on rhythm and fluency.

Figures 11 and 12
Judgments of Rhythm and Fluency of Speech



Figures 13-16

Judgments of Rhythm and Fluency of Speech

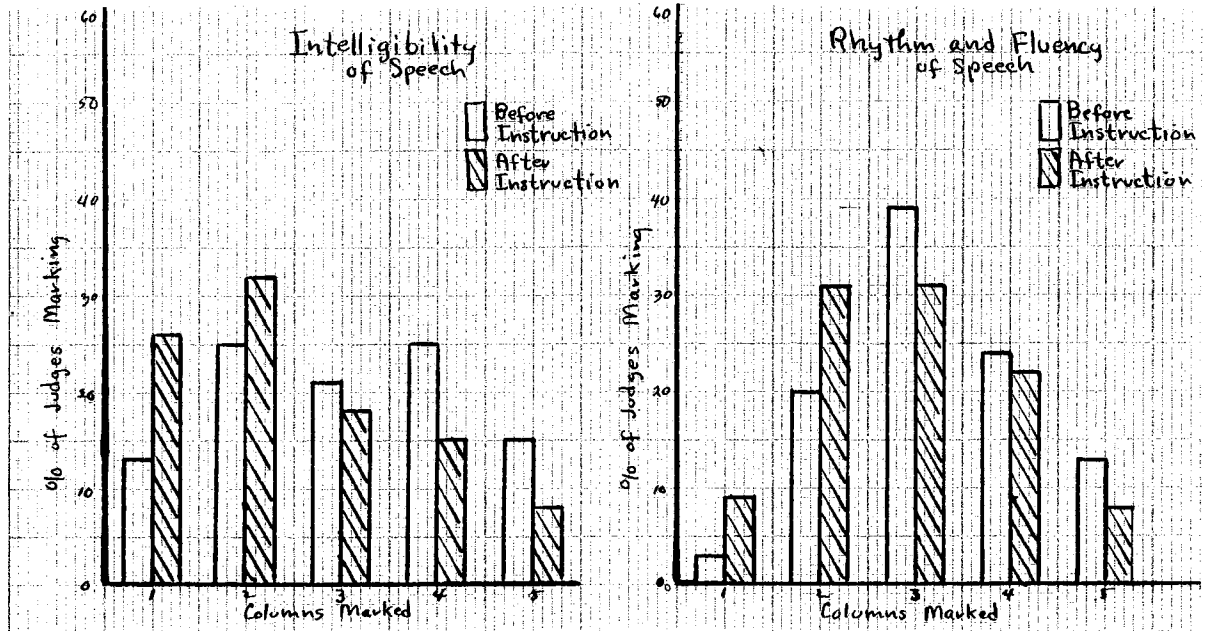


Here, also is improvement which the writer believes to be significant, although marked improvement is shown only by two children.

The following graphs demonstrate improvement in intelligibility, rhythm and fluency when the group is considered as a whole.

Figures 17-18

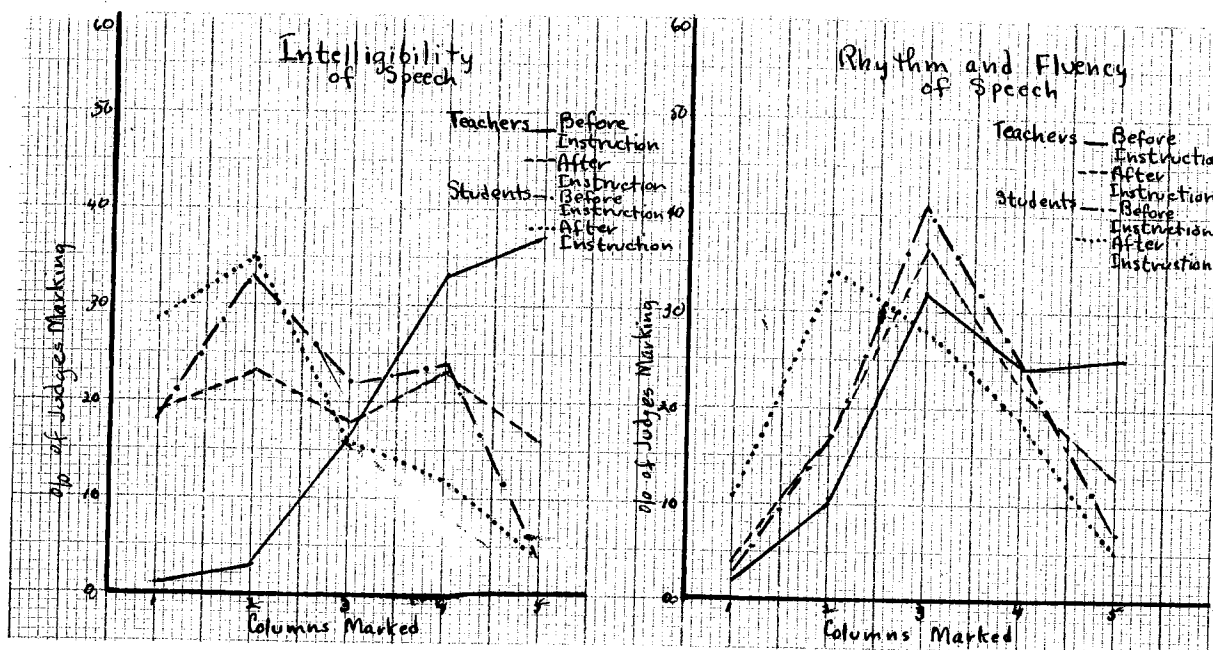
Teachers'-Students' Ratings



In order to make the results more complete, a comparison was made between the ratings of judges, who have had experience teaching the deaf child, and the ratings of judges whose teaching experience has been limited to practice teaching. It is significant that both groups noted improvement, although the teachers' group were asked to rate the children without advanced information as to the content of the sentence.

Figures 19-20

Comparison of Students' and Teachers' Ratings on Intelligibility and Rhythm and Fluency



Certain subjective judgments were offered by several experienced educators of the deaf. The comments, in brief, were that in the recording made after the experimental period, 1) the children's voices were more free from artificiality of accent and inflection, 2) the speech was not so jerky, 3) there seemed to be better breath control which was noticed in increased smoothness of speech and in more words spoken on one breath, 4) there was better phrasing, and 5) there was improvement in both intelligibility and rhythm in the second recording.

The objective measurement of time relationships of the test phrase made by the author helps to substantiate, in most cases, the results already shown. This would seem to show a correlation between the judges' ratings and the time measurements.

Table 3

Subject	Recording 1--	Recording 2--	Time Difference
M.A.C.	8 seconds	8 seconds	0 seconds
H.R.L.	9 seconds	8 seconds	1 second
A.P.O.	9 seconds	10 seconds	-1 second
V.Z.	12 seconds	11 seconds	1 second
L.B.	11 seconds	9 seconds	2 seconds
M.L.H.	12 seconds	13 seconds	-1 second

M.A.C. repeated one word in the second recording and had this not been, her time would have been shorter.

The speech of those children, whose improvement is marked, shows a faster tempo; and it follows that where there is little or no improvement shown, the time for the total sentence was longer on the second recording. The speech of the deaf is so labored that the time taken to say something is longer than that of the average normal speaker. In most of these children there is a speeding up of the speech which seems to indicate that instruction in rhythmic movement has an effect on the rhythm and fluency of the speech of the deaf.

The question of the amount of improvement in the rhythmic nature of the speech of the profoundly deaf child and in the speech of the congenitally deaf child with a residuum of hearing may be answered if a comparison is made of the relative improvement of the children in this group who had a residuum of hearing with the improvement of those who did not respond to an audiometer test. A larger amount of improvement was shown by L.B.

and M.R.L. who are congenitally deaf children with a residuum of hearing, and a small amount of improvement was shown by V.Z. and M.A.C. However, there is not enough residual hearing in the group to warrant any definite conclusion. If the group is taken as a whole, it may be said that the amount of hearing does not necessarily influence the improvement in speech rhythm.

The children of this group showed great individual differences in ability in rhythmic performance at the beginning of the experiment. All of them showed progress in learning to perform the rhythmic exercises and games and individual differences were reduced with practice. This seems to indicate that rhythm is acquired rather than innate. However, L.B. showed superior rhythmic ability before rhythmic instruction began and continued to be superior throughout the experimental period. This improvement made by L.B. was a continuous process during the experimental period. Not at any time during instruction or practice was she inferior. This may be explained partly by her ability to learn quickly and to retain all that is taught her. This ability to learn, together with her natural rhythmic ability, helped her materially to excel. L.B. continued to improve but not at the same speed throughout the experimental period.

The rhythmic ability of L.B. may be innate but it should be noted that she had more previous instruction in rhythm before the experiment was begun. After training V.Z. approximated the rhythmic ability of L.B., which may

be additional evidence that rhythm is acquired.

It was also noted that practice brings ease in the speech of the deaf. By combining speech and rhythmic movement in practice and then repeating the selection without the rhythmic movement, there seemed to be a memory of the movement; for the selection was repeated in the same manner as with movement. This would indicate the advisability of combining the speech period with a period of rhythmic movement as there seems to be definite memory of the movement which accompanied the speech. The author did not find an improvement of the children's voices during the periods when speech and rhythmic movement were combined. It is true that they were not conscious of their voices, but without constant reminders of their best voice placement, the quality of their voices was not always acceptable. Poor voice quality was due many times to excitement.

In addition to the results already mentioned, the following observations were made by the author; 1) that there was a marked improvement of M.R.L.'s speech as compared with the other children. This observation was also made by the child's classroom teacher. 2) There was a noticeable improvement in M.L.H.'s general coordinations, regardless of whether an improvement in intelligibility and rhythm and fluency of speech was pronounced. 3) L.B.'s ability to perform rhythmically was excellent, but V.Z. came to approximate that ability.

While there is still room for improvement in all the children, this study would seem to indicate a transfer of

rhythmic movement from the gross muscles of the body to
the finer muscles of speech.

CHAPTER V
CONCLUSIONS

A group of six congenitally deaf girls ranging in age from eight to eleven years were given instruction in rhythmic movement for two periods weekly from November to April.

This study was made to determine whether or not systematic instruction in rhythmic movement influences the speech of the deaf. In order to have an objective record of the speech of the children, a recording was made of the voice of each child saying, "Sometimes when I wake up at night, I see a great, big bear." The test phrase was recorded before rhythmic instruction was begun and then recorded again at the end of the experimental period.

The rhythmic program consisted of rhythmic exercises, rhymes and games, which were selected to include activities giving maximum practice in rhythmic movement combined with speech. At the end of the experimental period the record was played before two groups of sixty-three judges who were asked to rate the children on speech intelligibility and on rhythm and fluency of speech. Tempo of speech was checked by means of a stop watch.

From this study the following conclusions can be made:

1. According to judgments of the children's speech as recorded before and after the experimental period, there was a marked improvement of the group as a whole in intelligibility, rhythm, and fluency.
2. There were individual differences in rhythmic ability at the beginning of the period, which training seemed to decrease. The rhythmic performance of the children of inferior rhythmic ability at the start of rhythmic training seemed to approximate that of the children of superior ability when a comparison was made at the close of the experimental period.
3. The child who had superior rhythmic ability at the beginning of the period continued to progress and be superior to the others; however, her progress, compared with her ability before the instruction, was slower than that of the other children.
4. It may be said from the results shown that the congenitally deaf child who has a small residuum of hearing has no advantage over the totally deaf child in improvement in rhythmic ability.
5. There seems to be a transfer of rhythmic movement from the gross muscles of the body to the finer muscles of speech which is observable in the improvement in speech made by the group.

6. The improvement in the intelligibility of the children's speech was almost doubled in percent of ratings indicating that the judges understood all or almost all of the speech. There were seven percent fewer judgments made indicating failure to understand any thing the children said after the experimental procedure.
7. A similar improvement may be noted in rhythm and fluency of speech. The number of judgments made of excellent rhythm and fluency was tripled in comparing the speech after rhythmic instruction with the speech before the experimental period. This increase of judgments indicates a very definite improvement.
8. Judgments of teachers and students in teacher training seem to be in agreement with the measurement of speech tempo made by the author, which was faster on the second recording than on the first. There is a direct relationship between judgments of improved intelligibility, rhythm and fluency of speech and measurements indicating faster speech tempo.

The following recommendations may be made:

1. That further research be carried on in which two groups of children are equally matched

for educational achievement, intelligence, and rhythmic experience; one group should be used as the control group, the other the experimental group. This will give a more accurate estimate of the influence of rhythmic instruction of the speech of the deaf children as both groups would receive the same classroom practice in speech.

2. That instruction in rhythmic movement be continued since marked improvement was shown by this group.
3. That instruction be given outside of school hours, as it is easily adapted to any period of the day. It is of interest and benefit to the children and would serve not only as educational training, but also as recreation. This would leave additional school periods for other forms of speech work and vocabulary building. The subsequent addition of the rhythm procedure and the extra speech period would bring about speech of better quality--more intelligible, rhythmic, and fluent.

RATING SHEET

SUBJECT	INTELLIGIBILITY					RHYTHM AND FLUENCY				
	1	2	3	4	5	1	2	3	4	5
I.										
II.										
III.										
IV.										
V.										
VI.										
VII.										
VIII.										
IX.										
X.										
XI.										
XII.										

INSTRUCTIONS:

Check the intelligibility of speech of each child following this scale:

1. Understood all words
2. Understood almost all words
3. Understand about one-half of sentence
4. Understood a few words
5. Understood none of speech

Check the rhythm and fluency of speech of each child following this scale:

1. Excellent
2. Good
3. Fair
4. Poor
5. Very poor

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