A Comparison of Speech Defects Found Among Pupils of the Third to Sixth Grades Inclusive of an Urban with a Rural Area in Cache County Utah

George F. Swenson

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A COMPARISON OF SPEECH DEFECTS
FOUND AMONG PUPILS OF THE THIRD TO SIXTH GRADES INCLUSIVE
OF AN URBAN WITH A RURAL AREA IN CACHE COUNTY UTAH

by

George F. Swenson

A thesis submitted in partial fulfillment
of the requirements for the degree
of
MASTER OF SCIENCE
in
Speech
1948

UTAH STATE AGRICULTURAL COLLEGE
Logan, Utah
I wish to acknowledge the continuous encouragement and valuable assistance extended by Professor E. LeRoi Jones, Director of the U.S.A.C. Speech Clinic.

To Dr. R. W. Roskelley, Dr. David R. Stone, Dr. Rex E. Robinson, and Dr. Chester J. Myers, I wish to express appreciation for helpful criticisms of the manuscript and suggestions for its improvement.

I also acknowledge indebtedness to Lloyd M. Theurer, Superintendent of Cache County Schools, and Grant Vest, Superintendent of Logan City Schools, and to all the principals and teachers under their jurisdiction, for without their fine cooperation and support this study would not have been possible.

George F. Swenson

Logan, Utah
May 1948
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INTRODUCTION
INTRODUCTION

Statement of the Problem

Objective

The objective of this study is to compare the number and types of speech defects in a rural area with those of an urban area in Utah. Cache County was chosen as the rural area and Logan City as the urban. The study includes all students in the third to sixth grades in these two areas.

Limitations

Only those students in the third to sixth grades inclusive were surveyed, because by the time the child reaches the third grade he has matured to the extent that his speech habits are well established, except in the case of mentally or organically abnormal children. (15: 48; 23: 54) Therefore, any defect exhibited at this age would be real and not just a handicap of immaturity.

No attempt was made to diagnose the cause of the defects. The purpose of the survey was only to determine (1) the number of children who have speech defects in each of the two areas, and (2) the general types of defects represented among these students.

Definition of "speech defective"

It is accepted for this study that

1. Numbers in parenthesis refer to bibliography number and page reference.
Speech is defective when it deviates so far from the speech of other people in the group that it calls attention to itself, interferes with communication, or causes its possessor to be maladjusted to his environment. (22: 51)

Background of the Problem

History of the handicapped

In primitive times life was not valued as much as fitness. The welfare of the tribe was the important thing, so those who were handicapped in some way, and therefore unfit to make their expected contribution to society, were simply exterminated.

Weak and sickly children who demanded special care were killed or abandoned on the nearest hilltop. Parents who were old or sickly were drowned or pushed over the nearest cliff. Primitive society had no place for the handicapped. (16: 142)

Some little progress in sympathy was made before the Middle Ages, for by that era handicapped persons were allowed to live—but only for the amusement of those in power. They were made fools and jesters to bolster the ego of those with superior physiques or abilities. They were granted life, but were denied its benefits.

Religious teachings, placing great worth on the immortal soul, finally freed the handicapped from persecution to a great extent. The growing science of education also helped to bring about a new attitude. Since the thirteenth century, a great deal of progress has been made in extending assistance to the deaf, blind, and crippled, but until recent years the defective in speech (numbering over six times as many as all of the aforenamed combined) (22: 5) have been almost completely ignored.
History of speech correction

Attempts at special training of school children with speech defects is said to have started in Potsdam, Germany, in 1886. Denhardt gathered data on 6,206 stutters in Germany as early as 1890. Von Sarbo secured data from 231,000 pupils in the cities and towns of Hungary in 1901. Westergaard made a study of 34,000 Danish school children in 1898, and Lindberg made a study of 85,000 city children and 212,000 country children in Denmark in 1900. Chervin endeavored to secure data concerning the extent of stuttering, particularly among the adult population and the soldiers in various nations. Rouma made a study in 1906 of 14,235 Belgian children. (5: 248-249, 256-257)

Such work was introduced into the schools of some of the large cities of the United States about 1910, and by 1940 over eighty school systems employed special teachers for those defective in speech. At that time the following cities of 100,000 population and over gave special attention to the speech defective child: Los Angeles, Oakland, and San Francisco, California; Denver, Colorado; Washington, D.C.; Chicago, Illinois; New Orleans, Louisiana; Baltimore, Maryland; Boston and Fall River, Massachusetts; Detroit and Grand Rapids, Michigan; Minneapolis and St. Paul, Minnesota; Omaha, Nebraska; Jersey City, Newark, and Patterson, New Jersey; Buffalo, New York City, and Yonkers, New York; Cincinnati, Cleveland, and Columbus, Ohio; Philadelphia and Reading, Pennsylvania; Providence, Rhode Island; Houston, Texas; Seattle and Spokane, Washington; and Milwaukee, Wisconsin. (5: 257) Of course much progress has been made from 1940 to the present time.

Importance of the problem

Studies in the field of speech correction reveal the following important facts:
1. Work with a trained correctionist is often needed to restore normal speech even after a successful operation to overcome structural anomalies (such as cleft-palate) in the speech mechanism has been performed. (16: 145)

2. The term "deaf mute" need not exist in our language. People are not mute--but have never been taught to speak. Through trained teachers they can learn that language is the tool of communication. (16: 145)

3. It has been noted that in play activities and classes in rhythmic drills children with speech defects appeared to have less adequate large muscle co-ordinations than children whose speech was normal. (2: 187)

4. Varying levels of intelligence are found in various kinds of speech defects. Low intelligence is a symptom, rather than a cause, of speech defects. (1: 619)

5. Personality traits are more enlightening than intelligence in the study of speech defects, since they point to emotional difficulties as the source of stuttering and kindred speech defects. Retardation in school in the case of speech defectives is not caused by lack of intelligence but is an emotional maladjustment, which may be remedied by an understanding of the personality of the individual. (2: 187)

6. "... it has been estimated that more than ninety per cent of all children's activities involve speech." (9: 46)

7. It has been estimated that ninety-six per cent of the speech handicapped children of school age go without any retraining, and "far too many of these show a yearly increase both in the severity of the defect and in the abnormalities of personality which are built around it." (22: 6)
8. "Under a capably administered program of remedial work, from 80 to 85% of the school children handicapped by speech deviations can be restored to the educational system as normal speaking children."

(16: 143)

9. "Twenty dollars per year per child will amply cover the excess cost of this type of education." (16: 144)

10. According to the Student Life for April 22, 1948 (a U.S.A.C. student publication), Dr. Martin F. Palmer, president of the American Speech and Hearing Association, estimates that America's colleges and universities must graduate at least 35,000 speech correctionists in the next few years if the nation's 4,000,000 vocally handicapped persons are to receive the training they badly need.

These findings, and others, have brought to light the great possibilities for humanitarian service in this field. The aim of speech correction is not to teach the child to live with his handicap or to substitute other activities for lost powers, but to return him to his educational program and social life as a normal individual. (16: 143)

To aid in bringing this about for more handicapped individuals, a great many workers have been attracted to this field.

Other surveys in the United States

The first step in setting up a speech correction program is to determine the number and types of defectives in the given area. The most complete survey on a national basis has been the White House Conference survey. (24) Questionnaires were issued to cities with populations
of over 10,000, and the incidence of speech defectives was shown to range from 1.0 to 21.4 per cent, with an average from the totals of 6 per cent.

Table 1 gives a brief summary of a few of the other surveys that have been made in the United States.
Table 1. Summary of several speech defective surveys made in the United States
(1: 604-605, 11: 55, 13: 164, 26: 52)

<table>
<thead>
<tr>
<th>Year</th>
<th>Investigator</th>
<th>Place</th>
<th>Number Examined</th>
<th>Percentage of Defectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1904</td>
<td>Conradi</td>
<td>Albany, N. Y.</td>
<td>87,440</td>
<td>2.46%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cleveland, Ohio</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kansas City, Mo.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Louisville, Ky.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Milwaukee, Wis.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Springfield, Mass.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1916</td>
<td>Wallin</td>
<td>St. Louis, Mo.</td>
<td>89,057</td>
<td>2.8%</td>
</tr>
<tr>
<td>1916</td>
<td>Blanton</td>
<td>Madison, Wis.</td>
<td>4,862</td>
<td>5.69%</td>
</tr>
<tr>
<td>1921</td>
<td>Blanton</td>
<td>Univ. of Wis.</td>
<td>1,400</td>
<td>18.3%</td>
</tr>
<tr>
<td>1923-24</td>
<td></td>
<td>Madison, Wis.</td>
<td>5,717</td>
<td>5.4%</td>
</tr>
<tr>
<td>1925</td>
<td>Root</td>
<td>Kenosha, Wisc.</td>
<td>6,051</td>
<td>5%</td>
</tr>
<tr>
<td>1925</td>
<td>Root</td>
<td>Philadelphia, Pa.</td>
<td>70 schools</td>
<td>10-12%</td>
</tr>
<tr>
<td>1925</td>
<td></td>
<td>Reading, Pa.</td>
<td>11,198</td>
<td>5.6%</td>
</tr>
<tr>
<td>1926</td>
<td>Root</td>
<td>South Dakota</td>
<td>14,072</td>
<td>6.3%</td>
</tr>
<tr>
<td>1937</td>
<td>Davis</td>
<td>Akron, Ohio</td>
<td>--</td>
<td>6%</td>
</tr>
<tr>
<td>1940-41</td>
<td>Mills &amp; Streit</td>
<td>Holyoke, Mass.</td>
<td>4,685</td>
<td>10.1%</td>
</tr>
<tr>
<td>1942</td>
<td></td>
<td>Superior, Wis.</td>
<td>1,985</td>
<td>15.5%</td>
</tr>
<tr>
<td>1942</td>
<td></td>
<td>Douglas Ct., Wis.</td>
<td>1,168</td>
<td>10.4%</td>
</tr>
<tr>
<td>1945</td>
<td>Hawk</td>
<td>Fostoria, Ohio</td>
<td>1,200</td>
<td>9.6%</td>
</tr>
<tr>
<td>1946</td>
<td></td>
<td>Cleveland, Ohio</td>
<td>6,000</td>
<td>10%</td>
</tr>
</tbody>
</table>
Other surveys in Utah

It can readily be seen that many states are accepting the responsibility of helping those who have speech handicaps. The state of Utah, however, which boasts of its high educational standards (25: 444-447), has hardly begun to awaken to this important need.

According to information received from the heads of the three speech correction clinics in Utah (one at the Utah State Agricultural College in Logan, one at the University of Utah in Salt Lake City, and one at the Brigham Young University in Provo) the following is a summary of similar Utah studies:

Table 2. Summary of Utah speech defective surveys (7, 12, 17, 20)

<table>
<thead>
<tr>
<th>Year</th>
<th>Investigator</th>
<th>Place</th>
<th>Grades</th>
<th>Number Examined</th>
<th>Percentage of Defectives</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1935</td>
<td>Clark</td>
<td>Salt Lake City (30 schools)</td>
<td>Kind. to 6th</td>
<td>19,201</td>
<td>2.66%</td>
<td>Questionnaire</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.95%</td>
</tr>
<tr>
<td>1935</td>
<td>Snow</td>
<td>Granite School District (23 schools)</td>
<td>Elementary, Jr. High, &amp; Sr. High</td>
<td>8,195</td>
<td>2.8%</td>
<td>Questionnaire &amp; Referral</td>
</tr>
<tr>
<td>1941</td>
<td>Jones</td>
<td>Uintah Basin (16 schools) &amp; Provo City (5 schools)</td>
<td>3rd to 6th</td>
<td>2,860</td>
<td>18.1%</td>
<td>Personal Interview</td>
</tr>
<tr>
<td>1946</td>
<td>Tolhurst</td>
<td>Weber County (9 schools) &amp; Ogden City (5 schools)</td>
<td>3rd to 6th</td>
<td>1,282</td>
<td>15.07%</td>
<td>Personal Interview</td>
</tr>
</tbody>
</table>
Scope of Present Study

As it seemed that no survey of considerable size had ever been completed in the northern part of Utah, Cache County and Logan City were chosen as the areas to be covered by this study.

Schools in the following towns were included in the county survey: Benson, Clarkston, College Ward, Cornish, Hyde Park, Hyrum, Lewiston, Mendon, Millville, Newton, North Logan, Paradise, Providence, Richmond, Smithfield, Trenton, and Wellsville.

The following elementary schools in Logan City were surveyed: Adams, Ellis, Whittier, Wilson, and Woodruff.

Competency of the Investigator

The investigator's reliability as an examiner was established through the following process:

1. The different types of speech defects and ways to identify them were studied in the classroom. This training included demonstrations of the various defects by the professor, after which the investigator was called upon to identify the defects in accordance with standards set up by leaders in the speech correction field.

2. Several different methods of conducting personal interviews were studied, particular emphasis being placed on various ways of establishing rapport with the person being interviewed. For example, the clinician might assume a friendly, informal, jovial attitude or encourage the student to talk about himself.
3. The investigator was instructed in several techniques to be used in identifying speech defects, such as the following: Have the student read sentences loaded with the sounds which are most difficult to produce; use pictures of familiar objects which elicit the production of these sounds, or use the objects themselves as the stimulus; engage him in conversation on a subject in which he is interested, and then listen carefully for sound distortions; et cetera.

4. The investigator participated in several surveys made in the Box Elder County schools which were conducted for the purpose of finding speech defectives. Each speech defective found by the investigator and the other clinicians was rechecked by Professor Jones (head of the college speech clinic) and one other observer. Differences in findings were discussed at the end of each day.

5. After several surveys of the type mentioned above, the investigator and the head of the speech clinic made a special survey of two elementary schools. Sixty students, selected at random, were interviewed and tested by both the investigator and the clinic director. When their findings were compared, only four slight differences were found and they were only in relation to the extent of certain irregularities.

Method of Scientific Research Used in This Study

The normative-survey method was found to be the most applicable to this investigation. Six types of procedures are included under this method: (1) survey-testing, (2) questionnaire, (3) documentary frequency, (4) interview, (5) observational, and (6) survey-appraisal procedures. (10)
A combination of the survey-testing and interview methods was used in this study. That is, the information desired was gained through personally interviewing and testing each pupil included in the sample.

The following steps (normally included in scientific investigations)* were taken in the pursuit of this study:

1. The problem was located and defined.

2. A survey was made of previous investigations and the already available data to get ideas about past and possible future solutions and methods of investigation.

3. As a result of the above survey, the method of investigation was determined, hypotheses were formulated as a guide in the collection of the data, and replaced by new ones when the facts disproved them.

4. The data was retested and then analyzed, classified, and summarized.

5. Generalizations, representing the observed uniformities, were then formulated.

* For a brief discussion of various methods of scientific investigation, see Appendix IV.
METHODS OF PROCEDURE
METHODS OF PROCEDURE

Preparation for Survey

Before beginning the survey of the chosen schools, the investigator contacted the superintendents of the Cache County and Logan City school districts. They gladly gave him permission to make this study, and sent letters to each school principal under their jurisdiction asking them to cooperate to the fullest extent.

Choice of method

The number of children in need of speech training in an area may be found by reference from parents, principals, classroom teachers, or others interested in the work (usually obtained by distributing questionnaires); or by a speech survey in which a trained clinician personally interviews each student in that area. The latter method was chosen; but the classroom teachers were also consulted in regard to their observations, as they see the students every day in many different situations, and are often better judges of their total speech habits. A specialist, though trained to hear smaller variations from the normal, usually can spare only a few minutes to each individual child in a survey and may not touch upon the particular sound which is difficult for him, or this may be the child's good day and he may not stutter. (14: 58) For this reason, the survey and the referral methods were combined.
Choice of test

If a program of therapy were to be planned in this study, each sound used in English would have had to be examined. But to obtain only a satisfactory evaluation of general articulation achievement, it is necessary to examine only those sounds which are associated with significant progress in articulation development.

Vowels, for example, since they are generally uttered correctly by the end of the second year and are usually used correctly in words a short time thereafter, contribute little to the growth of articulation after this early age. A non-diagnostic test of articulation made up only of those sounds most highly related to articulation development would be economical of testing time whenever the use of a non-diagnostic measure is indicated. (19: 392)

Therefore, the Bryngelson-Glaspey cards (5) were chosen as the testing materials. In a survey of methods conducted by Vanetta R. Suydam in the Middle West, 55% of the 130 correctionists in Illinois, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin responding to her questionnaire, used this test. (18: 51-52)

These cards are designed to test the child's articulation of those sounds most frequently difficult for children. The sounds tested are s, z, th, r, l, j, ch, sh, k, g, f, and v in all three (initial, medial, and final) positions; y, h, and wh in the initial position, and ng in the final position.

There are three pictures on each card, each of which is designed to test one sound in a given position (see Appendix I). For example, card No. 3 contains pictures representing a zipper, a pair of scissors, and a nose. As the child names these three pictures, he produces the z sound in three positions: zipper (initial), scissors (medial), and nose (final).
Recheck test

A sentence test containing the same speech sounds as tested by the Bryngelson-Glaspey cards was composed by the investigator to be used in rechecking those students found to be defective in the first survey. (See Appendix III.)

Procedure

At each school the writer obtained a list of probable defectives from the classroom teacher and established rapport with the class as a whole by telling them it would be a picture test and assuring them that it would be fun.

"Sweep" survey

Each student in the class was then interviewed individually, either in the principal's office or in a private room, and given the articulation and voice test. In all but a few cases the student seemed very much at ease--therefore probably giving a natural performance.

Each child spontaneously named the objects pictured on the cards as the examiner recorded any deviation from acceptable speech on the record blank (see Appendix II). (4: 26-27) "Acceptable speech" is understood to be that which is "naturally pleasing, rhythmical, and distinct," (4: 5) and in which the articulation is accurate.
Recheck

Those students found to be defective in speech were given a second examination about fifteen days later. As previously described, this was a sentence test. For children who couldn't read these sentences, the picture test was administered again.

With but five minor exceptions, this second test completely confirmed the results of the first.

Classification of Data

The defects and disorders found were classified in a manner similar to that used by the California Bureau of Correction of Speech Defects and Disorders. They were grouped into five major classifications: (1) stuttering, (2) articulation defects, (3) voice defects, (4) indistinct speech, and (5) other types of defects.

Stuttering

This first group is characterized by blockings or spasms and by repetitions and prolongations of words, syllables, or mouth postures, all of which produce interruptions and breaks in the rhythm of speech.

Articulation defects

The continued substitution of one sound for another, or the constant omission or distortion of a given sound, is evidence of an articulatory defect. The type of speech that is commonly called "baby talk" is also
included in this group. Common errors in pronunciation are frequent among small children, so they were not classed as defects in articulation. If the child produced a given sound correctly in most words, but omitted the sound or substituted another sound in a few words, it was assumed that he was probably making a pronunciation error and he was not classed as a defective. (4: 8)

Voice defects

If the quality, pitch, or volume of the voice made it inadequate for easy, fluent, oral communication, the defect was classed as a voice disorder. These include the following: nasal speech (which may or may not be due to a cleft palate), denasal speech (which sounds like the speech of a person with a head cold), and a voice that is harsh or husky. A voice may have so little pitch variation that it is monotonous, or it may be pitched in such an unnatural key that it cannot be heard or is very unpleasant to hear. If the voice is not well modulated, it may be too soft or too loud for most speaking situations.

Indistinct speech

This classification refers to sluggish or tense action of the whole oral peripheral mechanism. This might well be called "dead pan" speech.

Other type defects

This fifth group is made up of those children with hesitant or too rapid speech (other than stuttering), and other anomalous types not listed in the above classifications.
Combination of defects

Some students were found to have more than one type of defect. These cases were classified under the following subdivisions: (1) articulation-voice, (2) voice-indistinct, and (3) articulation-indistinct speech. There are, therefore, eight classifications in all.
PRESENTATION OF DATA
PRESENTATION OF DATA

In the course of this study, the third to sixth grade pupils in 22 elementary schools were interviewed and examined. Of the total of 2,179 pupils, 377 (17.3%) were found to have speech defects serious enough to warrant remedial assistance. This percentage is 12.3% higher than the figure of the 1930 White House Conference (24), 2.23% higher than the number found in a similar study by Tolhurst (20), and approximately 1% lower than Jones' figure (12).

Of the total number examined, 1,102 were boys and 1,077 were girls. In the urban area, 787 pupils from five schools were examined, 404 boys and 383 girls, making a total of 21 more boys than girls. One thousand three hundred and ninety-two pupils were examined in the seventeen rural schools, 698 boys and 694 girls—four more boys than girls.

Table 3 shows the number interviewed and their distribution in the grades tested. There were 605 more pupils tested in the rural area than the urban.

The greatest number of defectives were found in two groups: articulatory defectives, 152 cases, and those with voice defects, 104 cases. Compilation of the cases found the others ranked in the following order: articulation-voice, 49; indistinct speech, 32; voice-indistinct speech, 17; stuttering, 11; articulation-indistinct speech, 8; and other types of defects, 4.
Table 3. Total number of boys and girls interviewed in the rural and urban areas and their distribution in the grades tested

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Rural and Urban Areas Compared

Total number of defectives

Only a very slight difference was found in the total percentage of defectives in the two areas. In the rural area, 16.95% were found to be defective, and in the urban area, 17.92%.

Reliability of the difference. A statistical analysis of the above percentages showed that the difference is not significant at either the 1% or 5% level; therefore, the Null Hypothesis is accepted.

Boys and girls

Figure 1 illustrates the total percentage difference between boys and girls in the two areas. The rural area had 20.20% boys who were defective, while the urban area had 22.28%. Thirteen and sixty-nine hundredths per cent of the girls in the rural area were classed as defectives, against 13.31% of the girls in the urban area.

Reliability of the difference. A statistical analysis of the percentage difference between boys in the urban and rural areas also indicated that there was no significant difference. The same held true for the comparison of girls in the two areas.
FIGURE 1. PERCENTAGE OF TOTAL NUMBER OF BOYS AND GIRLS EXAMINED IN THE URBAN AND RURAL AREAS HAVING ANY WELL-DEFINED SPEECH DEFECT
Grades

Table 4 shows the total number and percentage of defectives by grades and sex in the urban and rural areas. Figures 2, 3, 4, and 5 show percentage comparisons by grade for each area. The rural area had a slightly higher percentage of defectives in the third, fifth, and sixth grades, while the percentage of defectives in the fourth grade was found to be higher in the urban area.
Table 4. Total number and percentage of boys and girls examined in the urban and rural areas having any well-defined speech defect

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FIGURE 2. PERCENTAGE OF BOYS AND GIRLS IN THE THIRD GRADES OF THE RURAL AND URBAN AREAS HAVING A WELL-DEFINED SPEECH DEFECT
FIGURE 3. PERCENTAGE OF BOYS AND GIRLS IN THE FOURTH GRADES OF THE RURAL AND URBAN AREAS HAVING A WELL-DEFINED SPEECH DEFECT
FIGURE 4. PERCENTAGE OF BOYS AND GIRLS IN THE FIFTH GRADES OF THE RURAL AND URBAN AREAS HAVING A WELL-DEFINED SPEECH DEFECT
FIGURE 5. PERCENTAGE OF BOYS AND GIRLS IN THE SIXTH GRADES OF THE RURAL AND URBAN AREAS HAVING A WELL-DEFINED SPEECH DEFECT
Defects

Figure 6 presents a graphic picture of percentage comparisons of the urban and rural areas by defect.

Stuttering. Eleven stutterers were found in the survey. Five were in the rural schools and six in the urban. Of the total number of pupils examined in the rural district, .36% were found to be stutterers. The percentage of stutterers in the urban area was .76%.

According to L. E. Travis (21: 97), whose information was gained from the results of several surveys, 1% of the population stutters. Though the urban area of this study closely approaches the above percentage, the rural district is considerably below it.

According to Smiley Blanton's report (1: 604), .72% of the pupils he examined were stutterers. In the urban district here, .76% stuttered, and in the rural district, .36%, as mentioned, so these figures do not differ as greatly from Blanton's results as they do from Travis'. But they do differ greatly enough to indicate that the incidence of stuttering might be less in these two areas than in other parts of the nation.

Table 5 illustrates the percentage distribution of stutterers by grade, sex, and area.
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<tr>
<td>Articulation-Indistinct</td>
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**FIGURE 6.** PERCENTAGE DISTRIBUTION OF DEFECTIVES BY CLASSIFICATION AND AREA.
Table 5. Number and percentage of boys and girls in the rural and urban areas having a stuttering defect

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Articulation defects. The greatest number of defectives (152 of 377) were grouped in this category. It has been found by Bryngelson and Glaspey (3: 8) and many other authorities in the field, that by far the largest percentage of speech defects are those which are articulatory in nature. The results of this survey definitely confirm the above conclusion.

Table 6 shows the relationship between the two areas of pupils having articulatory defects.

Voice defects. Of the total number examined, 104 were found to have voice defects, or 27.59%. Sixty-two of these pupils were found in the rural area and 42 in the urban. One reason for this difference might be that the parents in the rural area, not having easy access to medical clinics, sometimes postpone having their children's enlarged tonsils and adenoids removed. Upon consulting one of the county nurses, the investigator found that the percentage of children in need of tonsil and adenoid operations is considerably greater in the rural area. Van Riper suggests that enlarged adenoids or tonsils may have a definite effect on the quality of the voice. (22: 58)

Table 7 indicates the number and percentage of students having voice defects.
Table 6. Number and percentage of boys and girls in the rural and urban areas having an articulation defect

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Table 7. Number and percentage of boys and girls in the rural and urban areas having a voice defect

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**Indistinct speech.** One and sixty-five hundredths per cent of the rural children examined were classified as indistinct speakers, and 1.14% of the urban boys came under this grouping. Table 8 demonstrates the relationship between the two areas as to number of indistinct speakers, the grades they were in, and how many boys there were in comparison with girls.

**Other types of defects.** Only two students in each area were found to have defects that could be classed in this division. This amounts to .07% of the total number examined in the rural area, and .25% in the urban. All four of these students were hesitant in their speech, but not to the point where it was felt that they could be classed as stutterers. Table 9 shows the distribution of these cases.
Table 8. Number and percentage of boys and girls in the rural and urban areas having indistinct speech

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Table 9. Number and percentage of boys and girls in the rural and urban areas having other types of defects

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Articulation-voice defects. Forty-nine of the 377 defectives are grouped under this heading, as they had both an articulatory and a voice disorder. Thirty cases were found in the rural area, 2.15% of those examined; and 19 cases in the urban district, 2.41% of the pupils examined in that district. For the complete breakdown of these cases by area, grade, and sex, see Table 10.

Voice-indistinct speech defects. Those found to have indistinct or "dead pan" speech, as well as a voice defect, totaled 17. Thirteen were found in the rural area; .93% of those examined, and 4 were found in the urban district--.51% of the total examined there. The number and percentage of these cases by area, grade, and sex is shown in Table 11.

Articulation-indistinct speech defects. Table 12 shows the number and percentage of pupils who exhibited indistinct speech as well as an articulatory disorder. The percentages were .21% for the rural (three defectives) and .64% for the urban (five defectives). The breakdown by areas, grades, and sex for these cases is shown on the table.
Table 10. Number and percentage of boys and girls in the rural and urban areas having articulation-voice defects

| GRADE |  | RURAL | |  | URBAN | |  |  |  |
|-------|---|--------|---|---|--------|---|---|---|
|       | No. | Exam- | Defect- | Percentage | | No. | Exam- | Defect- | Percentage | |
|       |      | ined | ive | | |      | ined | ive | | |
| Third |      |      |      | | |      |      |      | | |
| Boys  | 173  | 9    | 5.20 | | | 96   | 3    | 5.12 | | |
| Girls | 141  | 3    | 2.12 | | | 78   | 0    | 0    | | |
| Both  | 314  | 12   | 3.82 | | | 174  | 3    | 1.72 | | |
| Fourth|      |      |      | | |      |      |      | | |
| Boys  | 169  | 3    | 1.73 | | | 110  | 7    | 6.35 | | |
| Girls | 210  | 3    | 1.41 | | | 107  | 2    | 1.87 | | |
| Both  | 379  | 6    | 0.71 | | | 217  | 9    | 4.12 | | |
| Fifth |      |      |      | | |      |      |      | | |
| Boys  | 164  | 2    | 1.22 | | | 94   | 2    | 2.13 | | |
| Girls | 169  | 3    | 1.77 | | | 95   | 1    | 1.05 | | |
| Both  | 333  | 5    | 1.50 | | | 189  | 3    | 1.59 | | |
| Sixth |      |      |      | | |      |      |      | | |
| Boys  | 192  | 3    | 1.51 | | | 104  | 2    | 1.92 | | |
| Girls | 174  | 4    | 2.30 | | | 103  | 2    | 1.94 | | |
| Both  | 366  | 7    | 1.91 | | | 207  | 4    | 1.93 | | |
| Total |      |      |      | | |      |      |      | | |
| Boys  | 698  | 17   | 2.43 | | | 404  | 14   | 3.46 | | |
| Girls | 694  | 13   | 1.87 | | | 383  | 5    | 1.30 | | |
| Both  | 1392 | 30   | 2.15 | | | 787  | 19   | 2.41 | | |
Table 11. Number and percentage of boys and girls in the rural and urban areas having voice-indistinct speech defects

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Table 12. Number and percentage of boys and girls in the rural and urban areas having articulation-indistinct speech defects

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Distribution of Cases

Total cases

Table 13 gives a complete picture of the number and percentage distribution by defect of the total number of defectives in both areas.

Grades

Tables 14, 15, 16, and 17 give this information for each grade.
Table 13. Number and percentage distribution of total cases in each area by sex and defect

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Table 14. Number and percentage distribution of cases in the third grades of each area by sex and defect

<table>
<thead>
<tr>
<th></th>
<th>Stuttering</th>
<th>Articulation</th>
<th>Voice</th>
<th>Indistinct</th>
<th>Others</th>
<th>Artic.- Types</th>
<th>Voice</th>
<th>Indistinct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td><strong>Foys</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
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<td>42.10</td>
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<td>15.16</td>
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<td>16.00</td>
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<td>14.28</td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>0</td>
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<td>14.28</td>
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<td>28.57</td>
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<td>Both</td>
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<td></td>
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<td>46.67</td>
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<td>13.33</td>
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<td></td>
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<tr>
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<td>11.47</td>
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<td>46.88</td>
<td>6</td>
<td>18.75</td>
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<tr>
<td>Both</td>
<td>93</td>
<td></td>
<td>3</td>
<td>3.22</td>
<td>44</td>
<td>47.31</td>
<td>13</td>
<td>13.98</td>
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</table>
Table 15. Number and percentage distribution of cases in the fourth grades of each area by sex and defect

<table>
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<tr>
<th>No. of Defectives</th>
<th>Stuttering</th>
<th>Articulation</th>
<th>Voice Defects</th>
<th>Indistinct Speech</th>
<th>Other Voice Types</th>
<th>Artic. Voice</th>
<th>Artic. Indistinct</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td><strong>Boys</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>28</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>39.28</td>
<td>10</td>
<td>35.71</td>
</tr>
<tr>
<td>Urban</td>
<td>28</td>
<td>2</td>
<td>7.14</td>
<td>9</td>
<td>32.14</td>
<td>7</td>
<td>25.00</td>
</tr>
<tr>
<td>Both</td>
<td>56</td>
<td>2</td>
<td>3.57</td>
<td>20</td>
<td>35.72</td>
<td>17</td>
<td>30.35</td>
</tr>
</tbody>
</table>

| Girls | | | | | | | | | | | | | |
| Rural | 20 | 0 | 0 | 12 | 60.00 | 2 | 10.00 | 2 | 10.00 | 0 | 0 | 3 | 15.00 | 1 | 5.00 | 0 | 0 |
| Urban | 12 | 0 | 0 | 9 | 75.00 | 1 | 8.33 | 0 | 0 | 0 | 0 | 2 | 16.67 | 0 | 0 | 0 | 0 |
| Both | 32 | 0 | 0 | 21 | 65.62 | 3 | 9.37 | 2 | 6.25 | 0 | 0 | 5 | 15.62 | 1 | 3.12 | 0 | 0 |

| **Total** | | | | | | | | | | | | | |
| Rural | 48 | 0 | 0 | 23 | 47.92 | 12 | 25.00 | 4 | 8.33 | 0 | 0 | 6 | 12.50 | 3 | 6.25 | 0 | 0 |
| Urban | 40 | 2 | 5.00 | 18 | 45.00 | 8 | 20.00 | 2 | 5.00 | 1 | 2.50 | 9 | 22.50 | 0 | 0 | 0 | 0 |
| Both | 88 | 2 | 2.27 | 41 | 46.59 | 20 | 22.73 | 6 | 6.82 | 1 | 1.14 | 15 | 17.04 | 3 | 3.41 | 0 | 0 |
Table 16. Number and percentage distribution of cases in the fifth grades of each area by sex and defect

<table>
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<tr>
<th>Defectives</th>
<th>Stuttering</th>
<th>Articulation Defects</th>
<th>Voice Defects</th>
<th>Indistinct Speech</th>
<th>Other Types</th>
<th>Artic.- Voice</th>
<th>Indistinct Indistinct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Boys</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>8.57</td>
<td>9</td>
<td>25.71</td>
<td>12</td>
<td>34.28</td>
<td>5</td>
</tr>
<tr>
<td>Urban</td>
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<td>0</td>
<td>0</td>
<td>6</td>
<td>31.58</td>
<td>7</td>
</tr>
<tr>
<td>Both</td>
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<td>5.55</td>
<td>15</td>
<td>27.78</td>
<td>19</td>
<td>35.18</td>
<td>7</td>
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<tr>
<td><strong>Girls</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
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<td>0</td>
<td>0</td>
<td>7</td>
<td>35.00</td>
<td>8</td>
</tr>
<tr>
<td>Urban</td>
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<td>0</td>
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<td>6</td>
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<td>14</td>
<td>43.75</td>
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<td>5.45</td>
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<td>29.09</td>
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<td>36.36</td>
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<td>0</td>
<td>10</td>
<td>32.26</td>
<td>13</td>
<td>41.95</td>
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<tr>
<td>Both</td>
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<td>5.49</td>
<td>26</td>
<td>30.23</td>
<td>33</td>
<td>38.37</td>
<td>10</td>
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Table 17. Number and percentage distribution of cases in the sixth grades of each area by sex and defect

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<th>%</th>
<th>No.</th>
<th>%</th>
<th>No.</th>
<th>%</th>
<th>No.</th>
<th>%</th>
<th>No.</th>
<th>%</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Foys</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>40</td>
<td>2</td>
<td>5.00</td>
<td>15</td>
<td>37.50</td>
<td>12</td>
<td>30.00</td>
<td>2</td>
<td>5.00</td>
<td>1</td>
<td>2.50</td>
<td>3</td>
</tr>
<tr>
<td>Urban</td>
<td>18</td>
<td>1</td>
<td>5.55</td>
<td>2</td>
<td>11.11</td>
<td>7</td>
<td>38.89</td>
<td>2</td>
<td>11.11</td>
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<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Both</td>
<td>58</td>
<td>3</td>
<td>5.17</td>
<td>17</td>
<td>29.31</td>
<td>19</td>
<td>32.76</td>
<td>4</td>
<td>6.90</td>
<td>1</td>
<td>1.72</td>
<td>5</td>
</tr>
<tr>
<td>Girls</td>
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</tr>
<tr>
<td>Rural</td>
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<td>0</td>
<td>15</td>
<td>46.88</td>
<td>11</td>
<td>34.37</td>
<td>1</td>
<td>3.13</td>
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<td>0</td>
<td>4</td>
</tr>
<tr>
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<td>0</td>
<td>9</td>
<td>45.00</td>
<td>8</td>
<td>40.00</td>
<td>1</td>
<td>5.00</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
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<td>0</td>
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<td>46.15</td>
<td>19</td>
<td>36.54</td>
<td>2</td>
<td>3.85</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
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<td></td>
</tr>
<tr>
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<td>2</td>
<td>2.73</td>
<td>30</td>
<td>41.67</td>
<td>23</td>
<td>31.94</td>
<td>3</td>
<td>4.17</td>
<td>1</td>
<td>1.39</td>
<td>7</td>
</tr>
<tr>
<td>Urban</td>
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<td>1</td>
<td>2.63</td>
<td>11</td>
<td>28.95</td>
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<td>39.47</td>
<td>3</td>
<td>7.89</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Both</td>
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<td>3</td>
<td>2.73</td>
<td>41</td>
<td>37.27</td>
<td>38</td>
<td>34.54</td>
<td>6</td>
<td>5.45</td>
<td>1</td>
<td>0.91</td>
<td>11</td>
</tr>
</tbody>
</table>
Tables 18 and 19 have been compiled to show the number and percentage of defectives by schools in both the rural and urban areas. It will be seen that the percentages range from 10% to 28.26% in the rural schools, and from 13.76% to 22.89% in the urban schools. It is interesting to note that five of the seven highest percentages of defectives are found in towns which are most isolated: Cornish, Mendon, Newton, Trenton, and Clarkston. Possible reasons for this greater number of defectives in these towns may be (1) lack of social opportunities, (2) poor speech standards in the home, and (3) parent's neglect in having their children's diseased or enlarged tonsils and adenoids removed.
Table 18. Number and percentage of students in each of the rural schools having a defect

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>NUMBER EXAMINED</th>
<th>NUMBER DEFECTIVE</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benson</td>
<td>40</td>
<td>7</td>
<td>17.50</td>
</tr>
<tr>
<td>Clarkston</td>
<td>45</td>
<td>10</td>
<td>22.22</td>
</tr>
<tr>
<td>College Ward</td>
<td>43</td>
<td>7</td>
<td>16.28</td>
</tr>
<tr>
<td>Cornish</td>
<td>15</td>
<td>3</td>
<td>20.00</td>
</tr>
<tr>
<td>Hyde Park</td>
<td>37</td>
<td>8</td>
<td>21.62</td>
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<td>Hyrum</td>
<td>141</td>
<td>17</td>
<td>12.06</td>
</tr>
<tr>
<td>Lewiston</td>
<td>158</td>
<td>24</td>
<td>15.19</td>
</tr>
<tr>
<td>Mendon</td>
<td>43</td>
<td>9</td>
<td>20.23</td>
</tr>
<tr>
<td>Millville</td>
<td>66</td>
<td>9</td>
<td>13.64</td>
</tr>
<tr>
<td>Newton</td>
<td>46</td>
<td>13</td>
<td>28.26</td>
</tr>
<tr>
<td>North Logan</td>
<td>49</td>
<td>11</td>
<td>22.45</td>
</tr>
<tr>
<td>Paradise</td>
<td>69</td>
<td>11</td>
<td>15.94</td>
</tr>
<tr>
<td>Providence</td>
<td>152</td>
<td>20</td>
<td>15.15</td>
</tr>
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<td>10</td>
<td>10.00</td>
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<tr>
<td>Smithfield</td>
<td>235</td>
<td>41</td>
<td>17.45</td>
</tr>
<tr>
<td>Trenton</td>
<td>41</td>
<td>11</td>
<td>26.83</td>
</tr>
<tr>
<td>Wellsville</td>
<td>152</td>
<td>25</td>
<td>18.94</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1392</strong></td>
<td><strong>236</strong></td>
<td><strong>16.95</strong></td>
</tr>
</tbody>
</table>
Table 19. Number and percentage of students in each of the urban schools having a defect

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>NUMBER EXAMINED</th>
<th>NUMBER DEFECTIVE</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams</td>
<td>166</td>
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<td>22.89</td>
</tr>
<tr>
<td>Ellis</td>
<td>121</td>
<td>21</td>
<td>17.36</td>
</tr>
<tr>
<td>Whittier</td>
<td>109</td>
<td>15</td>
<td>15.76</td>
</tr>
<tr>
<td>Wilson</td>
<td>130</td>
<td>23</td>
<td>17.69</td>
</tr>
<tr>
<td>Woodruff</td>
<td>261</td>
<td>44</td>
<td>16.86</td>
</tr>
<tr>
<td>TOTAL</td>
<td>787</td>
<td>141</td>
<td>17.92</td>
</tr>
</tbody>
</table>
Comparison with Other Studies

Table 20 shows the relationship between the present study and two similar studies made in Utah by Jones and Tolhurst. (12, 20) This table gives the breakdown of area and grade.

It will be noted that in all three studies the total percentage differences between urban and rural are very slight. This tends to indicate that the personal interview method used in these three studies is a fairly consistent measure.
Table 20. Comparison by grade and area of the number and percentage of defectives found in the studies of E. LeRoi Jones and Gilbert Tolhurst and the present study

<table>
<thead>
<tr>
<th>GRADE</th>
<th>RURAL</th>
<th></th>
<th>URBAN</th>
<th></th>
</tr>
</thead>
<tbody>
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<td></td>
<td>No. Examined</td>
<td>Defective</td>
<td>Percentage</td>
<td>No. Examined</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jones</td>
<td>427</td>
<td>82</td>
<td>19.02</td>
</tr>
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<td>Tolhurst</td>
<td>146</td>
<td>20</td>
<td>13.70</td>
</tr>
<tr>
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<td>Present study</td>
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<td>61</td>
<td>19.43</td>
</tr>
<tr>
<td>Fourth</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jones</td>
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<td>87</td>
<td>23.17</td>
</tr>
<tr>
<td></td>
<td>Tolhurst</td>
<td>126</td>
<td>14</td>
<td>11.11</td>
</tr>
<tr>
<td></td>
<td>Present study</td>
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<td>12.66</td>
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<td>Jones</td>
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<td>92</td>
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<td>28</td>
<td>16.57</td>
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<td>16.52</td>
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<td>412</td>
<td>77</td>
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<td></td>
<td>Tolhurst</td>
<td>158</td>
<td>17</td>
<td>10.76</td>
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<td>72</td>
<td>19.40</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jones</td>
<td>1625</td>
<td>338</td>
<td>20.80</td>
</tr>
<tr>
<td></td>
<td>Tolhurst</td>
<td>599</td>
<td>79</td>
<td>13.19</td>
</tr>
<tr>
<td></td>
<td>Present study</td>
<td>1392</td>
<td>236</td>
<td>16.95</td>
</tr>
</tbody>
</table>
DISCUSSION,

CONCLUSIONS

and

SUMMARY
DISCUSSION

Seventeen and three-tenths per cent of the children surveyed in both areas were found to be defective in speech. This great an incidence of speech irregularities permits the recommendation that a speech correction program is necessary in these two areas.

The number of speech defectives found in the areas covered by this survey suggests a similar condition in other parts of the state. Other surveys might be conducted to support this conclusion, and to further demonstrate the need for remedial speech training.

Suggestions for Surveyors

It is felt that the following minimum steps are necessary in conducting this type of survey:

1. Through personal interviews, the cooperation and support of superintendents, principals, and teachers involved should be gained.

2. A non-diagnostic articulation test that can be used for readers and non-readers alike should be chosen. It is felt that a picture test is the most suitable.

3. Rapport with the students should be established by assuring them that the test will be easy, and fun to take.

4. A friendly, informal attitude toward the person being tested should be maintained so that he will give a reliable performance. Any
fears he might have should be allayed by the investigator being jovial, good natured, and easy to get along with.

5. Sufficient training in identifying speech defects should be gained to become a reliable examiner. (See page 9 for suggestions on how this training might be acquired.)

Suggested Studies

A few of the types of studies that might grow out of this survey are: (1) comparison of the family background of the speech defectives found with that of the normal speaker, (2) comparison of the educational level of the families of these defectives with the educational level of families of normal speakers, (3) the environmental background of just the stutterers found in this survey might be studied in an attempt to determine whether or not it has had any effect on their condition, et cetera.
CONCLUSIONS

1. The percentage of speech defectives in both the rural and urban area of Utah covered by this study is greater by 12.3% than the White House Conference estimate of 5% for the nation (24), but it is likely that this difference is due to the fact that the present survey was conducted by the personal interview method, while the White House Conference surveyors simply mailed questionnaires to selected cities in the 48 states.

2. This study did not reveal a significant difference between the number of defectives in the urban and the rural areas surveyed.

3. The percentage of stutterers in the urban district (.76%) was not significantly greater than the percentage found in the rural district (.36%), but since the sample in this category was so small (five stutterers in the rural district, and six in the urban) it would be unwise to apply this conclusion to urban and rural districts generally.

4. There is no significant difference between the percentage of pupils having articulatory defects in the rural and urban areas covered by this study.

5. There is likewise no significant difference between the number of children with voice defects in the rural and urban areas surveyed.
Objective

1. The objective of this study was to find the number and types of speech defectives in an urban and a rural area in Utah, and make a comparison between the two areas. Cache County and Logan City were chosen as the areas to be surveyed. The survey was completed April 25, 1948.

Procedure

1. Each of the third to sixth grade pupils in the 22 schools surveyed (2,179 pupils in all) was interviewed personally and given a non-diagnostic articulation test, the widely used Bryngelson and Glaspey Speech Improvement Cards. These cards test the sounds most frequently difficult for children to produce.

2. Those found to be defective in speech by this first test were given a second examination about fifteen days later. This was a sentence test containing the same speech sounds as the names of objects pictured on the Bryngelson-Glaspey cards. For children who could not read, the picture test was administered again. With but five minor exceptions, this second test confirmed the results of the first in each case.

SUMMARY
3. The defects found were classified into the following categories: (1) stuttering, (2) articulation defects, (3) voice defects, (4) indistinct speech, (5) other types of defects, and the combination categories of (1) articulation-voice defects, (2) voice-indistinct speech defects, and (3) articulation-indistinct speech defects.

Findings

1. Of the 2,179 pupils examined, 377 (17.3%) were found to have speech defects serious enough to warrant remedial assistance.

2. Of the 1,392 pupils interviewed in the rural district, 236 (16.95%) were found to be defective in speech. In the urban area, 787 pupils were examined, and 141 (17.92%) were classified as speech defectives.

3. The greatest number of defectives were found in the articulation and voice categories. Out of the 377 defectives, 152, or 40.32%, had articulatory defects; and 104, or 27.59%, had voice defects. The others ranked in the following order: articulation-voice, 49, (13.0%); indistinct speech, 32, (8.49%); voice-indistinct speech, 17, (4.51%); stuttering, 11, (2.92%); articulation-indistinct speech, 8, (2.12%); and other types of defects, 4, (1.06%).

4. A statistical analysis showed that the percentage of speech defects found in the urban area was not significantly different from that of the rural area.

5. Likewise, no significant difference was found between urban and rural areas in the percentage of boys having a speech defect. The same held true for the girls.
APPENDIX

and

LITERATURE CITED
APPENDIX I

Following are photographs of the Bryngelson-Glaspey Speech Improvement Cards that were used as the testing material for this survey. Permission to photograph them for this paper has been given by the publisher, Scott, Foresman and Company, Chicago, Illinois.
Be sure to read directions before giving test.

**KEY:** Mark substitutions with sound substituted; omissions (-); indistinct (ind.)

<table>
<thead>
<tr>
<th>CARD</th>
<th>CHECK WORDS</th>
<th>TEST 1</th>
<th>RESULTS</th>
<th>RETEST 1</th>
<th>RETEST 2</th>
<th>RETEST 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sun, bicyc, buS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>SLed, Stairs, Squirrel</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3.</td>
<td>Zipper, sciss, nose</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
<td>Thum, toothbrush, teeth</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5.</td>
<td>ThRead, feaTher, swing</td>
<td></td>
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<tr>
<td>6.</td>
<td>Red, barn, car</td>
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<tr>
<td>7.</td>
<td>Yellow, House, Hite</td>
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<tr>
<td>8.</td>
<td>Tree, ice CReem cone, Drum</td>
<td></td>
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</tr>
<tr>
<td>9.</td>
<td>LAMP, balloon, ball</td>
<td></td>
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<tr>
<td>10.</td>
<td>AirPLine, Clock, Blooks</td>
<td></td>
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<tr>
<td>11.</td>
<td>Jacks, solDIer, orenGE</td>
<td></td>
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</tr>
<tr>
<td>12.</td>
<td>Chair, pitchHer, watCh</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>13.</td>
<td>SHoe, waSHing machine, fish</td>
<td></td>
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<tr>
<td>14.</td>
<td>Cat, chicken, milk</td>
<td></td>
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</tr>
<tr>
<td>15.</td>
<td>Gun, waGon, pig</td>
<td></td>
<td></td>
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<tr>
<td>16.</td>
<td>Fork, telePHone, kniFe</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Valentine, deVenport, stove</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**APPENDIX II**
APPENDIX III

Articulation Test

1. Simple Simon rode his biCyCle past the buS.
3. I like to Squeeze girlS.
4. My scisSors won't cut.
5. This is a Zippy day!
6. If you Think it is easy, it will be.
7. I brush my teeth with tooTH powder.
8. When the weath'er is nice the bi'rd's siNG.
9. Red and Yellow flowers grew by the house.
10. The Black Cat ran up the Tree.
11. When I beat my Drum the baby Cries.
12. Look at the funny table.
13. Play close to the house because dinner is nearly ready.
14. My brother Jack was a soldier.
15. That blue pitch'er has orang'e punch in it.
16. Watch out, there's a tack on that Chair!
17. Just like Shoot ing fish in a barrel.
18. A cow gives milk.
19. Mother has a new washing maChine.
20. Those chickens are good for eating.
21. The dragon is a big monster.
22. The old telePHones look Funny.

23. Shove some coal into the stove.

24. February 14th is Valentine's Day.

25. This knife is not sharp enough.

(Note: The copy given to the students to read did not have the sounds to be tested differentiated in any way.)
APPENDIX IV

SCIENTIFIC METHODS

There are many ways of arriving at a truth or conclusion, some logical and some not so logical. Three widely used methods are the method of tenacity, the method of authority, and the method of intuition.

Prevalent Unscientific Methods (8)

Method of tenacity

Habit or inertia makes it easier to continue to believe a proposition because it has always been believed. Doubt is avoided by closing the mind to all contradictory evidence. This method is generally used in regard to the family, country, race, and religion. The belief is repeated as an act of loyalty and the questioning attitude of another person is considered ignorant, disloyal, and unworthy of attention. The pressure of other's opinions cannot always be so disregarded, however, and soon it must be admitted that not all who hold contrary opinions are fools. When the incidence of other views is felt, the method of tenacity is incapable of deciding between conflicting opinions. Since lack of uniformity in beliefs is a powerful source of doubt concerning them, some other method than that of tenacity is required to achieve stable views.
Method of Authority

Appeal to authority is then sometimes used to "steady the ship" of belief. Instead of doggedly holding to one's belief, appeal is made to some highly respected source to substantiate the views held. No matter how expert and competent the authority, however, his judgement is only relatively final. The right is reserved to others (also competent to judge) or to oneself (finding the time to acquire competence) to modify the present findings of the expert. This method must then be supplemented, if not replaced, by some other method if doubt and uncertainty is to be resolved.

Method of Intuition

An appeal to "self-evident" propositions—those which are so obviously "true" that an understanding of their meaning will carry with it an indubitable conviction of their truth—is a method which very few men in the history of philosophy and science have been able to resist at all times. The lure of intuitively revealed truths is great, but the fact that absolute certainty is felt, or that a given proposition has not previously been questioned, is no guarantee against its being proved false. Our intuitions must be tested.

The Method of Scientific or Reflective Inquiry

None of the methods discussed so far are free from human caprice and willfullness, and as a consequence they are uncertain in the range of their application and accuracy. If clarity and accuracy, order and
consistency, is desired, some method of fixing beliefs whose efficacy in resolving problems is independent of human desires or wills must be found. Such a method, taking advantage of the objective connections in the world as it is known, should be found reasonable not because of its appeal to the idiosyncrasies of a selected few individuals, but because it can be tested repeatedly and by all men.

This method is known as the scientific method. It differs from others in that it provides a method for correcting its own errors—encouraging and developing utmost possible doubt. What is left after such doubt is always supported by the best possible evidence. "Its method, then, makes science progressive because it is never too certain about its results." (8)

Skepticism alone is not effective, but alternative propositions must be figured out. In this process formal logic is an aid in devising ways of formulating propositions explicitly and accurately so that their alternatives become clear. When alternative hypotheses are arrived at, logic develops their conclusions so that when these conclusions are compared with observable phenomena, a means of testing which hypothesis is to be eliminated and which is most in harmony with the facts of observation is available. (8)

The scientific method of research is an inductive-deductive mode of thinking, through which one seeks to discover, establish, and explain the uniformities of nature by appealing to experience. Induction moves forward from the particular to the general. The mind begins with facts and moves in the direction of some interpretative principle, hypothesis, or explanatory concept. Deduction is a backward movement from the general to the particular. It aims at the verification and proof of hypothesis
by bringing their logical implications into line with the facts of the case. Thus scientific thinking starts with facts and continually returns to facts to test and verify its hypothesis. (10)

Distinguishing characteristics

Science is based on facts. The greatest discovery ever made in human thinking was that the way to determine whether a thing is present is to look and see. (Examine the facts.)

Analysis. This is accomplished by resolving the gross total situations into elements in order that the investigator may give each part his separate and undivided attention. The facts are not analyzed as a whole, but each detail of a complex situation is brought within the focus of attention, thus producing a more complete and accurate picture.

Hypothesis. On the basis of the facts analyzed, hypotheses are formulated. These hypotheses give point to the search, making it an intelligent one, directing it toward likely sources of truth. A hypothesis, or several of them, may be formulated when only part of the facts are in, and as more facts are added these hypotheses may be replaced by new ones. If the facts disprove a hypothesis, a new one must replace it.

Freedom from emotional bias. One must be alert, flexible, and open-minded; continually on the watch for new ideas, and always ready to discard or modify old ideas in the light of new evidence. Personal likes and dislikes must never color the facts. The investigation must be objective and impersonal.
Objective measurement. Objective measurement measures, weighs, and tests the facts in a detached, impersonal, unprejudiced manner. Measurement must not be influenced by personal bias.

The quantitative method. Instead of relying on ordinary language, which can so easily be misleading, the scientist employs the new and more exact language of mathematics to make the analysis, classification, and summarization of data more reliable. Taking one aspect of the problem at a time, he assembles the pertinent data into meaningful categories and summarizes the facts into mathematical values; such as, means, medians, modes, probable errors, quartile deviations, standard deviations, and coefficients of correlation, which are less ambiguous than the terms of ordinary language. The careful measurement of phenomena and the mathematical treatment of the data thus collected are indispensable features of the scientific method.

Four general steps

There are four general steps in the scientific method of investigations:

1. A preliminary observation of the facts.
2. The formulation of a hypothesis.
3. The making of deductions or the drawing of conclusions from the hypothesis.
4. The testing of the conclusions (and the hypothesis) by a comparison of them with the results of a careful analysis of the phenomena under consideration. Appeal back to observation and facts.
More detailed steps

More detailed steps in the process of scientific investigation include the following:

1. Location and definition of a problem.

2. Survey of past experiences with the problem, previous investigations of a similar nature, their methods of procedure.

3. Formulation of a hypothesis to be employed as a guide in the collection of your data which may lead to an accepted solution of the problem or to the formulation of new hypotheses that may be employed in the collection of more data.

4. Checking of the hypothesis for agreement with the facts, verifiability, and logical consistency—ending in belief that solution is correct or in formulation of new hypothesis to guide in collection of new data.

5. Collection of additional data (if necessary) through a new appeal to experience by means of measurement, observation, and experimentation. (Which means that available data may be incomplete, or recorded in ambiguous terms which may be subject to misinterpretation making necessary the collection of new data.)

6. Analysis, classification, and summarization of the data collected.

7. The formulation of new generalizations, representing the observed uniformities, explanatory principles, or scientific law. (This last step usually follows only upon the projection and systematic testing of many hypotheses. A single investigation is seldom sufficient.)
Various Methods of Scientific Research

Methods of scientific research include the historical, normative-survey, experimental, and other methods especially adapted to studying complex causal relationships, such as the causal comparative method, correlation method, case study method, and genetic method.

**Historical method**

Three major processes are involved in the historical method:

1. The collection of data, with consideration of documents and relics, or primary and secondary sources, of bibliographical procedure, and of organization of materials.

2. Criticism of data collected, including the processes of external (or lower) criticism.

3. The presentation of the facts in readable form, involving the problem of organization, composition, exposition, and interpretation.

The historian has rarely witnessed the original event, but from documents and remains he attempts to reconstruct the past.

It is obviously impossible for the historian to take advantage of experimentation since he cannot conjure up the figures of the past and cause them to reproduce the famous scenes of history.

In historical research the evidence and experience of the past is examined as an aid in analyzing and interpreting the present situation.
Normative-survey method

This method may utilize a number of tools and procedures, such as questionnaires, tests, check-lists, rating scales, score cards, interviews, etc. For this type of investigation several specialized procedures have been developed: for making comparisons (between periods in history, nations, regions, states, counties, cities, districts, schools, grades, departments, subjects, school enterprises, etc.), for revealing status or central tendencies, for making predictions of future performances, and sometimes for determining causes of present conditions. These procedures, for the most part normative in character, may be classified as established phases of the normative-survey technique. Testing surveys properly belong in this category. (10: 225)

This method was the one chosen for this study. For more specific detail, see pages 10-11.

Experimental method

Experimental research uses the process of controlled observation and measurement. The logical principle of "difference" is employed in this research, since with all factors save one controlled and equated for subjects or groups, differences appearing as a result of the operation of the single variable are noted.

Causal comparative method

This method seeks to establish causal relationships by comparing the circumstances associated with observed effects and by noting the factors present in those instances in which a given effect occurs or does not occur. It seldom goes as far as the correlation method which associates a given amount of change in the contributing factors with a given amount of change in the consequences, however large or small the
effect. The method always starts with observed effects and seeks to
discover the antecedents of these effects. The causal-comparative
method differs from historical research in that it deals with current
situations.

**Correlation method**

This method enables one to attack problems for which only experimental
procedures have heretofore been available, and to deal with these problems
in terms of many variables at once rather than in terms of a single
variable at a time. The correlation method offers certain theoretical
advantages over the experimental technique in addition to the practical
advantages, in that it reflects the simultaneous variation of a single
factor when all the others are held constant (inoperative). This means
that reality can be more nearly approximated in one's data. There is
considerable ground for saying that the correlation method means to
social science what the laboratory method does to physical science.

**Case-study method**

Usually, in the case study method, the history of individuals is
studied in order to locate possible causes for their present reactions
to their environment. However, though the case study usually applies
to individuals, it may be applied to a family, a neighborhood, a commun-
ity, an institution, a nation, a race of people, or an epoch in history.

Desirable characteristics of a satisfactory case study are: completeness
of data, continuity, confidential recording, and scientific synthesis
(which is as much prognostic as diagnostic).
Genetic method

The genetic method is applied principally to long time investigations of biological phenomena where the purpose is primarily that of studying the change, growth, and development in these phenomena. The case-study method tends to be limited to the study of the atypical individual or situation, while the genetic method is more generally concerned with the study of normal life processes. Both methods are used to analyze cause-and-effect relationships, although in some instances the genetic method may be devoted primarily to developmental norms.

(10: 221-227)
LITERATURE CITED


