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Correlation of Auditory Feedback and the Kottmeyer Diagnostic Spelling Test

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CORRELATION OF AUDITORY FEEDBACK AND
THE KOTTMAYER DIAGNOSTIC SPELLING TEST

A Thesis

Presented to
the Graduate Faculty
Central Washington State College

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by

Jerd Vance Tuman

July, 1971

APPROVED FOR THE GRADUATE FACULTY

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

As educators one of our most important assignments is to teach children to read and write. The relationship between reading and writing is such that you can not really separate the two as reading is a decoding process and writing is an encoding process. Educators have been involved in the process of trying to find the best method to teach reading and spelling to children for years and at this time there still is not any consensus as to which is the best method to teach children to read and spell. One trend seems to be appearing and that is the realization that not all children learn to read or spell in the same manner. Tests have been developed which indicate that some children learn to read visually, some auditorially, and some with a kinesthetic approach. The particular area that this research explored was auditory feedback and its possible relationship to spelling.

I. THE PROBLEM

Statement of the Problem. The problem is to determine if there is a significant correlation between the Kottmeyer Diagnostic Spelling Test and the Auditory Feedback Test administered to fourth grade students, referred to the study

skills room, in the intermediate elementary school, in Selah, Washington. The Kottmeyer Diagnostic Spelling Test is given to all fourth, fifth, and sixth grades during the first month of school in the Fall.

Importance of the Study. Those children who are referred to the study skills room by their home room teachers are given a battery of diagnostic tests which includes the auditory tap feedback test. The auditory tap feedback test determines if a child can hear a series of taps given in a rhythmic pattern and then tap the same pattern back to the individual administering the test. The ability to hear sounds and retain them in the mind is a developmental part of language development.

Essential to the development of auditory discrimination is the ability to retain individual sounds in mind to serve as models for later speech and as part of the phonic act necessary for reading (16:326).

The child goes through three distinct stages of language development as he evolves from the cradle to the school situation. In the first stage of development the child is receiving a bombardment of noise, in the second stage the child is fitting meaning to the spoken sounds and learns to manipulate the sounds into an oral language, in the third stage the child is learning to fit the sounds to a visual symbol (10:1).

Some children have difficulty fitting meaning to the spoken sounds.

Hearing a word during listening is different from seeing a word in reading, during which all parts of a word impinge on the retina in the same instant. In contrast, the listener accumulates sounds bit by bit, identifies short sound sequences as words, and then translates larger word sequences into meaning (14:4).

This requires the child to retain the sounds in their proper sequence in order to interpret the sounds meaningfully.

There is evidence of a maturational factor in the emergence of auditory conceptualization, but not for all students. A significant number of students do not develop this facility spontaneously, and dysfunction can persist into fourth grade and beyond (9:8).

The study skills teachers in Selah have related that they have not conducted a study on the relatedness of children's inability to spell with their inability to hear the auditory pattern and give the correct feedback. However, they think there must be some connection. The teachers have indicated that they are continually diagnosing and that one of their problems is to keep the diagnostic test as simple as possible and yet to be able to test as many areas as are important in diagnosing the particular problems of the child. If this study indicates that there is a significant positive correlation between the two tests of the child's ability then the auditory feedback test should be of great value and significance for primary children to diagnose their problem at a much earlier age. Diagnosing the problem would allow the teachers to develop a curriculum to overcome the deficiency before the child has a chance to be a failure as a speller.

Hypothesis. There is no significant correlation between the scores of the Kottmeyer Diagnostic Spelling Test and the Auditory Feedback Test.

Limitations of the Study. The study used only the scores of students in the Selah school who had taken the Kottmeyer Diagnostic Spelling Test and the Auditory Feedback Test during their fourth grade year of school from 1968 through 1970.

II. DEFINITIONS OF TERMS USED

Auditory discrimination. The ability to distinguish between phonemes, or individual sounds used in speech (16:325).

Perception. The combining of identified sensory input data with meaning or concepts which the individual already has in his repertoire (1:24).

Phonemes. The smallest sound or speech elements are phonemes.

Phonic. When each letter is assigned a phonemic value we refer to this as teaching a phonics system.

Auditory Tap Feedback Test. This is a test with three auditory patterns: a. tap, tap, tap; b. tap, tap; and c. tap. Ten different combinations of the rhythmic patterns are tapped out for the student by the instructor and the student taps the patterns back to the instructor.

Auditory System. The auditory system does merely provide us with the ability to hear, it discerns the direction of the event, provides an orientation to it, indicates the type of event and provides the individual with the ability to identify the event.

Auding refers to the process by which the continuous flow of words is translated into meaning. Auding involves one or more avenues of thought-indexing, making comparisons, noting sequence, forming sensory impressions, and appreciating (14:6).

CHAPTER II

REVIEW OF RELATED RESEARCH

To research the area of perceptual problems and spelling one must of necessity research the problems of perception and reading as they are related in their structure. When a child learns to read he is actually learning to decode the written symbols and when he spells he is encoding the auditory sounds into written symbols.

When spelling we internally sequence the phonemes and transpose them into graphemes. If (a) the phonemes are distorted, (b) phoneme-grapheme correspondence is inherently irregular and (c) the phonemes are auditorially unseparated in an 'outburst' of sound, then the grapheme (and hence letter) sequencing output on paper will be equally chaotic (1:18).

At the present time children in the Selah Schools are being taught to read in the first grade without a diagnostic test to determine how they might best learn to read. Some children are learning to read without any difficulty but there are too many children who are reading and spelling failures.

By the time a child comes to learn to read he has usually acquired a fully working auditory-vocal language and so all he has to do is associate a visual code with this auditory-vocal code (1:2-3).

But there are children who have not developed the auditory vocal language as they should have and these children are handicapped when they begin a reading and spelling program.

The capacity of the individual to assimilate and organize multimodal information underlies man's ability to exhibit behavioral plasticity and to modify his behavior. Any disruption in the multimodal integrative processes will diminish assimilation of information and hence limit this ability (5:28).

Educators have recognized the need to individualize the program for students but have not really delved into the program in depth in terms of implementation. This is probably due to lack of training in assessing the needs of the individual child and his maturational level.

At the age of six, children are supposed to have mastered oral symbols. We expect them to have organized an enormous number of arbitrary phonetic signs into the pattern of language, a formidable achievement which by no means all children have accomplished at this age, as evidence by the numerous youngsters who still show infantile speech patterns (3:2).

Educators need to be cognizant of the child and his particular maturational level before they begin to teach the child to read and write.

If the level of a subject's auditory perception.... his ability to discriminate the phonemes of English and his ability to code phonemic sequences in both non-syllabic and syllabic units....can be determined, it can be estimated how much developmental work is going to be needed before the writing and reading task will become comprehensible to him (8:1).

This then is the task that educators are going to have to address themselves to.

Montessori addressed herself to the problem of determining the period in life when a child might best learn different skills.

The development of the senses indeed precedes that of superior intellectual activity and the child between three and seven years is in the period of formation (11:213).

Of all the senses the auditory sense is employed the most in the life of the young child and takes the lead. At no time in life also is the demand upon this sense greater (13:63).

Birch and Belmont noted the need for the development of the senses before a skill such as reading could be taught.

At a practical level, the development of integrative organization between the auditory and visual systems appears to be essential for the acquisition of such a primary educational skill as reading in which visually presented and, therefore, spatially distributed stimulation comes to be treated as equivalent to auditorially presented and temporally distributed stimulus patterns (2:295).

The authorities agree on the need for a well developed language system prior to a child learning to master a skill such as reading or spelling. The ability to be an acute auditory discriminator appears to be basically a maturational factor.

When a child enters school and begins receiving instructions the assumption is made that he has developed acute auditory discrimination.

Verbally we manipulate conceptual items and deal in intricate, logical sequences. Underlying such presentations is a fundamental assumption: that the child has established an adequate orientation to the basic realities of the universe-space and time (6:201).

A child lacking the ability to organize the auditorial input will have trouble comprehending meaning and sound symbol relationships.

Sequencing is the ordering of events in time. It is obvious that such ordering is difficult or impossible unless there is a temporal scale upon which to superimpose this order. Unless the child can appreciate temporal intervals it is difficult to organize events in terms of their temporal relationships (6:205).

The ability to distinguish between speech sounds is clearly an age-related variable. In the few standardization studies available, errors drop regularly with age and approach a ceiling at about nine years of age (Templin, 1943; 1957; Wepman, 1958) (15:23).

In 1960 Wepman presented an auditory discrimination theory which seems to support these statements.

First, there is evidence that the more nearly alike two phonemes are in phonetic structure, the more likely they are to be misinterpreted. Second, individuals differ in their ability to discriminate among sounds. Third, the ability to discriminate frequently matures as late as the end of the child's eighth year. Fourth, there is a strong positive relation between slow development of auditory discrimination and inaccurate pronunciation. Fifth, there is a positive relation between poor discrimination and poor reading. Sixth, while poor discrimination may be at the root of both speech and reading difficulties, it often affects only reading or speaking. Seventh, there is little if any relation between the development of auditory discrimination and intelligence as measured by most intelligence tests (16:325).

Russell indicated in his studies that a relationship between auditory abilities and spelling was more significant in young children than in older children (12:315).

In 1965 Birch and Belmont did a study with two hundred twenty elementary children to determine the affects of auditory-visual discrimination of children and how it related to their reading ability. They found that the integration of the modalities was age related also, and the greatest growth was

during the years from kindergarten through the second grade (2:298-299).

One of the tests given to the students in Selah referred to the study skills room is the test of auditory-visual integration developed by Birch and Belmont. In addition to this test the teachers felt that they needed to test for auditory feedback. The teachers adapted the third column of rhythmic patterns from the test developed by Birch and Belmont for their auditory feedback test. The teacher stands behind the student and taps the rhythmic pattern with an eraserless pencil on a clipboard. The taps are sounded with a one-half second pause between short intervals and a one-second pause between long intervals. The teacher has the student practice tapping patterns back with an eraserless pencil on the table. When the teacher is sure the student understands the procedure the ten test patterns are given.

The second test this study is concerned with is a diagnostic spelling test developed by William Kottmeyer. The test was designed to give a grade approximation and diagnostic information about phonetic power in spelling.

Percentile norms were established after administering the test to some 20,000 pupils in grades 1-6 in the schools of the metropolitan St. Louis area. Two lists of 32 words each were selected from typical second-grade and third grade spelling vocabularies. The words in each list are examples of phonetic elements which appear commonly in such vocabularies (7:87).

CHAPTER III

PROCEDURES AND COLLECTION OF DATA

The test results used for this study were gathered from the test scores of students in the intermediate school in Selah, Washington.

The Kottmeyer Diagnostic Spelling Test is given to all the students in the intermediate school in the fall of the year. The scores used for the correlation study were scores obtained from fourth grade students from 1968 through 1970 fourth grade classes.

The home room teachers administer the Kottmeyer Diagnostic Spelling Test to the students in their room. Each teacher is provided with a list of the 32 words to pronounce for the students. In addition to the list of words there is a sentence. The teacher pronounces the word and then reads the sentence while the students write the word. The tests are graded by the home room teacher, scored and filed in the student's folder in the study skills room.

The children who score two grades below their grade level on the spelling test or are having difficulty with reading or a particular skill are referred by the home room teacher to the study skills room. The study skills teachers give the students referred to study skills a battery of tests to diagnose their deficiency. The tests and the scores from

the tests are placed in the student's folder. All of the scores obtained for the study came from the study skills files.

Fifty-nine students had taken both the Kottmeyer Diagnostic Spelling Test and the Auditory Feedback Test during their fourth grade of school during the period of time from 1968 through 1970. These fifty-nine students' scores provide the material for this study.

CHAPTER IV

ANALYSIS OF THE DATA

This chapter presents the test scores of the subjects used for the study and the correlation formula used to correlate the scores.

The table indicates the subject by number, the number of correctly spelled words out of a possible thirty-two words on the Kottmeyer Diagnostic Spelling Test, and the number of correctly tapped rhythmic patterns out of a possible ten patterns.

Fifty-nine subjects had taken both the Kottmeyer Diagnostic Test and the Auditory Feedback Test. The first column under the head Kottmeyer I indicated the number of words the subject spelled correctly. The column under the heading Auditory indicates the number of correct responses on the Auditory Feedback Test.

SUBJECT	KOTTMAYER I	AUDITORY
1	16	6
2	14	8
3	20	5
4	22	7
5	20	5
6	14	3
7	20	9
8	25	6
9	27	6
10	23	4
11	9	6
12	24	1
13	26	6
14	22	6
15	15	8
16	18	10
17	26	3
18	6	8
19	15	6
20	3	5
21	15	8
22	21	5
23	21	6
24	16	7

SUBJECT	KOTTMAYER I	AUDITORY
25	22	5
26	22	6
27	28	8
28	24	8
29	23	5
30	13	6
31	29	7
32	23	10
33	11	6
34	12	7
35	9	7
36	25	6
37	13	5
38	26	5
39	16	8
40	32	5
41	15	3
42	8	8
43	20	10
44	0	5
45	8	6
46	23	6
47	24	10
48	6	5

SUBJECT	KOTTMAYER I	AUDITORY
49	15	2
50	10	3
51	10	5
52	6	5
53	23	10
54	26	5
55	19	5
56	11	8
57	16	7
58	12	6
59	23	9

PEARSON PRODUCT-MOMENT

$$r = \frac{E \cdot X \cdot Y}{\sqrt{EX \cdot EY}}$$

$$r = \frac{-1.2400 + 128.4160 - 29.6160}{\sqrt{(1050.7792 + 1050.7792 + 109.1680) (+99.6800 + 13.2000 + 120.6800)}}$$

$$r = \frac{-1.2400 + 128.4160 - 29.6160}{\sqrt{(2210.7264) (233.5600)}}$$

$$r = \frac{97.5660}{\sqrt{516,337.25798400 \text{ or } 516,337.3}}$$

$$r = \frac{97.5660}{718.566}$$

$$r = .135 \quad \text{correlation} = +.14^*$$

*Table VI on page 362 of Experimental Design in Psychological Research shows a desired $r = .231$ (.05 level) for 50 subjects and $r = .211$ (.05 level) for 60 subjects. Correlation of Auditory Feedback and Kottmeyer Diagnostic Spelling Tests give 57 as the degrees of freedom ($N-2=59-2=57$), which is between the table values of $df=50$ and $df=60$. Using degrees of freedom of either 50 or 60 indicates that the correlation of .135 is not significant at the .05 level. To insure that the .05 level of significance was reached the experimenter chose $df=50$ ($r=.231$) as the r necessary for correlation of .05 level of significance (4:362).

CHAPTER V

RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

Results. The purpose of the study was to determine the relationship between the scores of fourth grade students in the Selah School on the Kottmeyer Diagnostic Spelling Test and the Auditory Feedback Test.

A Pearson Product-Moment coefficient was used to determine the relationship existing on the sample of the two tests. A Correlation of $+0.14$ was obtained which indicates that there is not a significant positive correlations between the two tests.

Conclusions. This study indicates the correlation between the Kottmeyer Test and the Auditory Test were not high enough to be significant. There were a sufficient number of students who scored low on both the spelling test and the auditory test to convince the investigator that there are children who lack auditory discrimination.

Recommendations. The researcher would like to have another study conducted in the Selah School District at the earliest possible date. This study would involve the use of a spelling list with more two and three syllable words. This would require the speller to be more dependent on auditory discrimination to spell the word.

Another suggestion would be to test the correlation of spelling and auditory discrimination of children in the primary grades to determine if auditory discrimination is an age related ability.

If another study indicates that auditory discrimination is a skill many primary children are missing a test to determine each child's auditory discrimination ability should be administered. The curriculum for a child diagnosed as being deficient in auditory discrimination should encompass the teaching of this skill to enhance the child's opportunity to learn to read and write.

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CORRELATION OF AUDITORY FEEDBACK AND
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by

Jerd Vance Tuman

July, 1971

This paper is a correlation study of fourth grade students' scores on the Kottmeyer Diagnostic Spelling Test and the Auditory Feedback Test. The purpose of the paper is to determine if students who are poor spellers have poor auditory discrimination.

Recommendations included the use of a spelling test which requires greater auditory discrimination than the Kottmeyer Spelling Test. Also recommended is a correlation study using primary students as the population.

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1967

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