THE FUNCTION OF TIME AND RHYTHM IN INSTRUMENTAL MUSIC READING COMPETENCY

by

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THE FUNCTION OF TIME AND RHYTHM IN INSTRUMENTAL MUSIC READING COMPETENCY

CHAPTER I

INTRODUCTION

**Instrumental Music Reading**

Music reading is the process by which, either vocally or instrumentally, a musical score is reproduced and interpreted. The factors involved are pitch, time, rhythm and expression. In the actual reading and playing of the instrumental score, the student must be able to produce musical tones and be familiar with the symbols that represent them, he must be conversant with the time indications that set the pulse or beat of the music, he must be able to recognize the rhythm patterns involved, and he must understand the musical terms which indicate the expression that is required. Intelligible performance is possible only when all of these conditions are met.

Music reading skill in instrumental music is also dependent upon the talent, intelligence, attitude, and interest of the individual student, and the teaching ability and musicianship of the teacher. A deficiency in any one or a combination of these factors will impair the competency of instrumental music reading. (25)
Mere knowledge of key signatures, symbols of music notation, the time indications, the rhythm patterns and terms of musical expression has little value until translated into actual performance.

In performance says Mursell (29), it is the application of time and rhythm to the score which vitalizes the music and gives it flow and movement as well as shape and form. Rhythmic organization and shape depend essentially upon an underlying beat which is the organizing influence in music rhythm. Without an awareness of the beat, organized musical effect and organized technical action is impossible.

The Problem of the Study

The area of time and rhythm in the instrumental music reading process was the subject of this study. Specifically, the study examines the hypothesis that an early and constant emphasis on time and rhythm will significantly improve instrumental music reading.

The study tests the hypothesis in this way: the performances of two comparable groups of instrumental music students were compared after one group, the experimental group, had been given early and constant emphasis on time and rhythm in training. The control group was not given this type of training.
**Procedures:**

The experimental group was given instruction in a method that emphasized time and rhythm. The emphasis on time and rhythm was defined as the playing of quarter notes from the beginning of training, accompanied by the tapping of the foot as the bodily movement that represented the physical response. The tonguing of each note on wind instruments, the tapping of the foot and the counting of time mentally, combined to provide the emphasis.

The control group was trained in the conventional published band methods. In these methods, the materials for the training of beginning instrumentalists are based on the initial playing of whole notes and their corresponding rests. From this point, these methods introduce the half notes and then the quarter notes. This sequence in the introduction of notation is the basic format of all the present band methods.

The subjects for the study were selected from elementary schools of four cities in the State of Oregon. The selected schools were divided into two groups, one designated as the experimental group and the other as the control group. Schools were matched and equated in these respects: (1) musical aptitude (2) size of schools (3) general similarity of school population (4) number of schools in each group (5) schools matched in each city (6) subjects all
beginning instrumentalists (7) matched school groups taught by the same teacher.

Because of the limited and varied instrumentation usually found in elementary school instrumental classes, no attempt was made to match or equate the kinds and types of instruments. Therefore, the existing instrumentation of the beginning groups in each school was considered acceptable for the purpose of this study.

**Methods Used in Group Training**

The method used in the training of the experimental groups involved the use of materials especially adapted to the counting of time and recognition of rhythm patterns at the outset of training. As soon as the pitch of a given tone was established on the instrument, that tone was put to immediate use in the counting of time. (45) Teachers were required to follow specific instructional procedures and a prescribed sequence for the presentation of materials and exercises of the method.

The control groups, on the other hand, were trained in methods chosen by the teachers who were not limited or guided in any way by prescribed plans and procedures. These groups were free to use any published method in general use in the cities involved in this study, other than the one used in the training of the experimental groups.
Selection and Sequence of the Tests

The first objective of testing was to find out how nearly alike the experimental and control groups were in respect to musical aptitude. The Drake Musical Aptitude Tests (7) were selected for this purpose because:

1. The ease with which they may be administered by the teachers.

2. They are not as long as the other comprehensive musical aptitude tests. (four forms, thirty minutes each)

3. The four forms may be given separately at times most convenient and practicable.

4. An entire half of the test is devoted to the testing of rhythm.

Only students who had completed all four forms of the Drake Musical Aptitude Tests were included in the final data of the study.

After the two groups had been equated in respect to musical aptitude, some measures for the testing of performance were needed. It was felt that instrumental music reading tests should be used at intervals during the experiment to indicate progress. However, only one such test is in general use, The Watkins-Farnum Performance Scale. As this test was reserved for the final measure of comparing the instrumental music reading achievement of the two groups, the writer composed two similar tests for intermediate use.
The writer constructed the first and second instrumental music reading tests because:

1. Suitable tests were not available to meet the specific needs of the study at the early and intermediate stages of advancement.

2. The tests had to be short but comprehensive enough to measure the factors they purported to measure.

3. The difficulty and the content of these tests had to be governed by the materials learned and experienced in the training of the two groups, each in a different method of instruction.

4. It was necessary to minimize the technical difficulties of the tests in order that abilities in the area of time and rhythm might be revealed by the test.

5. The one available standardized instrumental music reading test was reserved for the final testing of the two groups at the end of the study.

The Watkins-Farnum Performance Scale, the one available standardized instrumental music reading achievement test, provided the final instrumental music reading scores in the study. In order to maintain a uniformity throughout the study, this test served as a model for the administration, scoring and recording of the two instrumental music reading tests constructed by the writer. Therefore, all the tests were administered, scored, and recorded in exactly the same way.

Should the data indicate that the experimental group had outperformed the control group on the three instrumental music reading
tests, and if this difference should be found statistically significant, such evidence would then seem to support the hypothesis of this study.

This training and testing program provided the basic data in the study.
CHAPTER II

BACKGROUND OF THE STUDY

Early Concepts of Music Reading

The singing school of the early nineteenth century set the pattern for the note reading method that had for its major objective the reading of music and the mastery of the printed page. (23)

In 1842 this methodology was challenged by Mason (26) who advocated a new ideology based on the Pestalozzian theory of learning, which subscribed to the principle of "the thing before the sign," and which came to be known as the rote song method.

The new method did not advocate the abolition or suppression of note reading but placed rote singing before note reading. This was the start of a controversy which persisted well into the twentieth century and in some respects still exists. The note reading method, however, had strong support from school administrators who considered it the "scientific" method, while the rote singing method seemed too closely allied with enjoyment and entertainment to merit serious consideration.

John's (23) findings conclude that the greatest contribution the note reading method of vocal music instruction made at the end of the nineteenth century was its assistance in making music an
accepted and respected subject in the curricula of many schools in the country.

Studies Dealing with Music Reading

From the beginning the note reading method formed the basic concept of instrumental music instruction. That a strong emphasis on the formal mastery of the printed score was an outstanding characteristic of instrumental music instruction in the schools is reported by Cheyette in his survey on the status of music in the public schools. (3)

A study by Nelson (35) attempted to ascertain whether students would improve their vocal music reading skills when exposed to instrumental music instruction at the same time. The experimental and control groups in his study received similar vocal music training with the exception that the experimental groups received instrumental music training on alternate days. Thus the experimental group received half its training in vocal music and the other half in instrumental, while the control groups received all of its training in vocal music. Data on the following six independent variables were collected and equated: two pre-tests in musical achievement, Keston Test, (24) I.Q., grade point average, and reading comprehension. The source of the major portion of the vocal instruction was the American
The instrumental portion of the instruction was devoted mainly to the Boosey and Hawkes Band Method. Nelson found that the fifth-grade experimental class attained significantly higher scores in vocal music reading than the fifth-grade control group. Although the fourth-grade experimental subjects did not do as well as the fifth, the results show the same trend in both the fourth and fifth grades.

Nelson concludes: (35 p. 238)

These findings would seem to suggest that it might not be advisable to introduce a combined vocal-instrumental curriculum until the fifth grade. At least the criterion of achievement in reading and understanding music notation indicates such a conclusion.

Nelson further concludes that the analysis of the data collected strongly indicates that the integration of both vocal and instrumental music instruction would tend to develop within the pupils a broader base of musical comprehension than can be obtained through vocal training alone.

On a basis of experiments and observations associated with practical work in music with children, Pierce (39) has reported some pertinent findings. In the process of trying various methods of teaching music reading, Pierce found that the traditional drill exercises in the teaching of sight reading are not well suited to elementary-school children. She also noted that a child is not likely
to "read" music effectively until he has mastered an instrument. This conclusion, like that of Nelson (35) would indicate that instrumental music training has a significant influence on the development of vocal music reading.

Rea (40) developed a series of twelve films for the purpose of improving the skill of sight reading for instrumental musicians. His study had these specific objectives: (1) force the student at all times to read ahead of where he is playing; (2) develop visual memory, i.e., retention of exposed material until time to play it; (3) prevent eye-regression; (4) give the student practice in sight reading; (5) make use of musical material varied in key, rhythm, and other common technical features. The subjects were players with band experience, divided into experimental and control groups according to types of instruments, and matched as to age, school grades and the mean score based on the initial test of sight reading obtained on the Watkins-Farnum Objective Measurement of Instrumental Performance. (50) While the experimental group was performing the filmed music as it was projected on the screen, the control group was spending an equal amount of time playing the same music from manuscript notation. The variable in the experiment was the training of eye-movements. The author concludes that although both groups made considerable gain in test scores at the end of the
study over those at the beginning, the mean gain of the experimental
group over that of the control group was not enough to be considered
significant. The author states that he had hoped to show in this
experiment that forcing the student always to read ahead of
performance would result in a training of eye-movements which would
prove important in the sight reading of music. This factor, however,
was not found to be statistically significant. Rea (40) further
concludes that his findings would seem to substantiate the contention
of many musicians and educators who feel that skill in music reading
is acquired mainly through extensive reading of music that the
performer will encounter in his normal musical experience.

King (25) attempted to analyze the reading characteristics of
recognized poor music readers. He compared sixty good fifth and
sixth-grade music readers with an equal number of poor music readers,
matching them with respect to age, intelligence, semesters in school,
grades, sex, and outside music study. The investigator expected
to show that auditory and visual differences would be basic factors
in the development of music reading skills. The findings of the
study do not seem to support this hypothesis.

Two aspects of music reading were investigated by Weaver (52):
(1) the extent of the reading span for music and (2) the nature of eye
movements during music reading. In several of his intermediate
experiments he was able to show that it is only during the pauses of the eyes between successive saccadic jerks that material can be seen clearly enough to be read and that only a small amount of reading material can be seen while the eye maintains one fixation position. Therefore, he tried to determine the number and duration of the fixation pauses, the organization of eye movements and the relations of the eyes and hands during music reading which might reveal the nature of the reading process and the difference among individuals in music reading. The subjects of the study were: (1) individuals who had musical training, but who differed widely in the amount of training and skill; (2) amateur musicians; (3) non-musicians, especially lacking in musical training; and (4) expert musicians. It was shown that the ability to reproduce notes in writing from tachistocopically exposed cards varies directly with the amount of musical training. In all other respects, although marked individual differences were found, there were no distinguishing characteristics for any of the four groups.

In a study conducted with students in the seventh and eighth-grade vocal classes, Stokes (45) found that training in the recognition of musical materials during short exposures resulted in improvement in reading these materials but had no effect upon general achievement in reading music.
Jersild (22) points out that the studies that have been made in music education touch upon limited aspects of the broad field.

(22 p. 148)

One finds on the one hand, a monumental accumulation of writings of a general and sometimes of a rather inspirational character; on the other hand, one finds specialized tests and inquiries dealing with some of the elements of musical ability and psychological aspects of music. Very rare are the studies that apply systematic research methods in connection with a practical and practicable educational project.

No studies were found that dealt with instrumental music reading as a specific problem and which settled upon some musical factor as the variable. Most of the cited studies were concerned with vocal music reading, and only two of these selected rhythm as a factor for investigation. The remaining cited studies attempted to show that differences in the development of music reading skills were affected by the visual aspects of the music reading process. None of these findings, however, were considered statistically significant. The only study by Rea (40) that did compare reading abilities of two instrumental groups had for its variable the visual aspects of music reading. The conclusion of this study indicated that the training of eye-movements did not produce a significant difference in the instrumental music reading of the two groups.

The data from the study of Nelson (35) and the report by Pierce (39) indicate that instrumental music reading has a strong influence
on the development of vocal music reading. It appears, therefore, that instrumental music training may provide wider and more comprehensive experiences in music reading that the usual vocal music program provides.

**Psychological Aspects of Time and Rhythm**

There are numerous definitions of rhythm, all attempting to state as concisely and clearly as possible, its fundamental characteristics, how it functions, what its origin is and the role it plays in the reading and performing of music. No matter what the definition, there seems to be complete agreement as to the indispensable role rhythm plays in musical development and understanding.

Ruckmick (41), in compiling bibliographies on rhythm, found it difficult to draw a line between discussions of rhythm proper and the various implications and applications of rhythmical phenomena. He felt that at one extreme one would find the investigations which attempt to discover the mental correlates of rhythmical phenomena and at the other extreme, the investigations which aim to determine the physical basis for rhythmical occurrences.

Seashore (44) found that musical talent is not a single talent, but a hierarchy of talents, many of which appear to be entirely
independent of each other. He found that certain of these specific talents, such as the sense of pitch and the sense of time, could be isolated for purposes of measurement.

The factors of the musical mind are listed by Seashore as follows: (1) musical sensitivity (2) musical action (3) musical memory (4) musical intellect (5) musical feeling. In the testing of musical talent, time is recognized as a simple impression and rhythm as a complex appreciation in the musical sensitivity factor. The factor of musical sensitivity provides the basis for the Seashore tests of time and rhythm, which are regarded as auditory-perceptual tests.

The factor of musical action also includes time and rhythm. However, in this category, time and rhythm are recognized as natural capacities for skill as applied to the reading and performing of music. This would seem to establish time and rhythm as abilities that transcend the scope of the auditory-perceptual capacities.

The Validity and Reliability of the Drake Rhythm Tests

As evidence that the concept of "musical aptitude" is psychologically valid, Drake (7) presents five types of evidence: (1) the fact that remarkable musical abilities may appear at an early age, in some cases without benefit of musical training; (2) the fact that 70 per cent of the great violinists listed in Leahy's "Famous
Violinists" were prodigies (3) the fact that some individuals have been more highly motivated, have practiced more and have had better instruction than other individuals, and yet have never achieved more than mediocre success while the latter became great artists (4) the fact that some individuals have high learning ability in many fields but low ability in music (5) the fact that the Drake tests show low correlations with general intelligence and other aptitude tests, yet show high correlations with achievement in music.

Drake used teacher ratings of individual students as the means of validating the Drake Musical Aptitude Tests. As expected, the validity coefficients obtained between teacher ratings and test scores vary a great deal. The coefficients range from .31 to .91, with a majority attaining a value greater than .58. Drake claims that these values seem to compare favorably with those of many individually administered intelligence tests using similar methods for establishing validity.

Drake reports ten reliability coefficients for his rhythm tests. The methods employed in securing this data were based on the Kuder-Richardson method, odd-even, column 1 v. column 2, top half v. bottom half, and so forth. The data show the reliability coefficients on the rhythm tests for "non-musical" groups (students with less than five years of musical training) to range from .56 to .89 on form A of
the test, and .69 to .88 on form B. The reliability coefficients for
the "musical" groups (students with five or more years of musical
training) range from .83 to .95 on form A of the test and .75 to .96
on form B.

Drake states that these data indicate that test reliabilities
tend to run higher for homogeneous musical groups than for wide
heterogeneous groups. He feels that the one possible explanation
for this unusual finding may be that answers obtained from the
homogeneous musical groups are less influenced by guessing.

The Seashore and Drake Concepts of Rhythm

Until recently most tests of musical rhythm had assumed that
the perception of sameness and difference between two series of
beats was an adequate measure of rhythm. However, Drake (7)
questioned this assumption. In validating his tests of rhythm, Drake
found that his concept of rhythm differed basically from that of
Seashore, especially when it served as a predictive measure of
musical talent. In correlating the two tests, he found that the
Seashore rhythm test measures the auditory-visual aspects of rhythm,
while his own tests measure the ability to respond physically to
the regularity of beats in time and rhythm. This resulted in Drake's
own theory of the concept of rhythmic ability which supports the
"control of rhythm" factor of Seashore, and which formed the basis for the Drake Rhythm tests. Briefly, the Drake Rhythm Tests are administered as follows: A tempo is established and then faded out. The subject continues with the tempo until he is told to stop. A feeling for rhythm is aroused in the subject, and he is allowed to make a physical response to the rhythm. The test is not measuring perceptual comparison of two auditory patterns of beats (a task that can be performed almost as well by the unrythmical as by the rhythmical person), but rather is measuring a bona fide response of maintaining a pre-determined tempo.

Drake has obtained six validity coefficients for the Seashore Rhythm Test, using similar groups and methods to those employed in the studies of the validity of the Drake Tests. The data indicate that the two tests are not measuring the same ability. In no case has the comparison of the tests yielded a validity coefficient higher than .37. Most of the r's cluster around .17. Drake concludes that the Seashore Rhythm Test appears to be an auditory-perceptual test which does not in any way arouse a feeling of or a reaction to rhythm. The Drake Tests on the other hand require actual participation of the subject taking the test. Therefore, Drake's concept of rhythm seemed more suited to the purpose of this study in determining to what degree rhythm influenced the development of
instrumental music reading.

Time and Rhythm in Music Reading and Music Meaning

To synthesize the various definitions of rhythm might very well result in a definition of music itself. The two elements of music are tone and rhythm. The art of music is made by grouping musical tones in a rhythmic scheme. Tone without rhythm produces only musical sounds without meaning. It is this grouping of sounds into a rhythmic scheme that gives music its meaning. (47) The simplicity of this definition does not include the many other factors that make music an art, such as, tempo, dynamics, expression, and so forth. It does, however, bring out the importance of the role that rhythm plays in music reading for the performer and music meaning as it affects the listener.

Among all the resources of the musical language, none is more important than rhythm, nor more frequently misunderstood. Erskine (9) in emphasizing its importance, has this to say: (9 p. 56)

There not only can be no music without rhythm, but rhythm has and still can at times, stand by itself as an adequate language.

The beat of the tom-toms and other types of drums illustrate this fact in the most obvious way. Melody and harmony which came much later, remain dependent on time and rhythm for adequate
musical expression.

Time and rhythm have a regularity with which liberties may be taken only when musical expression in the performance of music requires it. This can be done only when the player understands and "feels" the rhythmic structure of the music. Erskine describes the physical response and reaction that takes place when this occurs.

(9 p. 57)

No rhythmic pattern is completely fixed, it must have in it such a degree of regularity that we expect it to recur. Whether it does indeed recur is of small importance so long as we expect it.

The most recent thought about the importance of rhythm is expressed by Mursell. (30 p. 254-55)

To say it is important, is a truism . . . It is impossible to over-emphasize the importance of rhythm, as a factor in musical beauty and expressiveness. Unless one grasps the rhythm, one has not grasped the music. Hence rhythm should be explicitly stressed from the very beginning of our program, and it should be featured at all levels throughout it.

Studies and Experiments Dealing with Rhythm

Only a few studies have been found that use rhythm as the variable in studying musical progress and growth, and these are developed in the field of vocal music.

Experimenting with two groups of intermediate grade students,
Auchenbach (1) found little improvement in the abilities of children as a result of training for rhythmic discrimination. A similar study by Giddens (13) reached the same conclusion. She added, however, that rhythmic training was somewhat more effective with the younger, less mature children in the group.

Dalcroze (5) experimented during his entire lifetime with rhythm as the basis of musical performance. No actual studies are recorded but numerous individual cases are, and they form the foundation of his widely accepted theory known as the Dalcroze-Eurhythmics. He taught the different time measures by means of various physical responses, among them, accentuation with the foot, which among the younger children was based on the automatic exercise of marching. Dalcroze considered this the natural model of time measure. Through empirical evidence obtained in his teaching, he concludes that the successful musician is obviously high in rhythmic concept.

Neither of the studies by Auchenbach (1) and Giddens (13) in which rhythm discrimination was a factor for investigation, show a significant difference in the performance of their experimental and control groups. Dalcroze (5) on the other hand, reports that students who develop a feeling for time and rhythm through physical response of some kind, are apt to become good musicians.
It appears, therefore, that the approach to the teaching of instrumental music reading might be better served by training in rhythm that is influenced by the physical response factor than the rhythm discrimination factor which is confined only to auditory-visual experiences.

**Rhythm as a Physical Experience**

Mursell (32) states that by rhythm in music is meant the organization of its stresses, durations and pauses considered in abstraction from its tonal content. Rhythmic and tonal elements, however, function very closely together and affect one another in many ways so that it is difficult to separate them without doing harm to both. Yet in spite of this intimate relationship, the rhythmic structure of music has a genuine independence from its tonal structure. Mursell feels that it is an error to assume that an impression of rhythm is not influenced by perceptual content, even though the rhythmic organization differs from the tonal organization.

These two studies would seem to support Mursell's contention. In a study by Vidor (48), the subjects were given two rhythm tests in one of which they had to give back by tapping, various rhythmic patterns dictated in taps while in the other they had to tap back rhythmic patterns embodied in tone. It was found that the two abilities
were somewhat distinct, although the correlation between them was plus .40. Subjects in a study by Husband (20) were required to stand blindfold and listen to rhythms given tonally in taps. The amount of body sway was always found to increase whenever a rhythm was being heard, but the increase was much greater when the rhythm was given tonally. Therefore, the notion sometimes advocated, that pure or "toneless" rhythm is more effective than rhythm embodied in tone, might be questioned.

Mursell (32) projects the motor theory of rhythm which holds that rhythm seems to be dependent upon the action of the voluntary muscles. These muscles move the levers of the skeleton which are under control of the higher nervous centers and are susceptible to training. According to this theory, the pleasure derived from rhythm is the free bodily movement which is the product of training and discipline. Essentially, its claim is that the experience of rhythm is the feeling of one's own ordered and sequential voluntary muscular activity.

**Summary**

The improvement of music reading, vocal and instrumental, has been a constant objective of music training and instruction. The cited studies indicate the numerous and varied attempts that have been made to find the problems that tend to retard the development of
music reading abilities. These studies have dealt with areas of the music reading process among which are:

1. Improvement of eye-movements in music reading.
2. The use of films to force students always to read ahead of performance.
3. That auditory-visual differences were basic factors in the development of music reading.
4. That the extent of the reading span and the nature of eye-movements affect music reading.
5. That ability to recognize materials during short exposures affects music reading.
6. That training in rhythm discrimination improves music reading.

The data of these studies indicate that the hypotheses are not supported by the findings. One study by Nelson (35) indicates, however, that the sight reading in vocal music is significantly improved among students who also play musical instruments. It should also be noted that the two cited studies used rhythm as the area for investigation reported little improvement in the abilities of children as a result of training for rhythm discrimination.

The data of these studies would further indicate that other areas would hold considerable promise for future experimentation in the improvement of instrumental music reading. In view of the importance placed upon time and rhythm as a basic foundation to musical development and performance, it seems that study and
experimentation in this area is urgently needed.
CHAPTER III

THE STUDY

ORGANIZATION OF THE RESEARCH PROBLEM

Initiating and Locating the Study

During the month of October, 1955, superintendents of schools and directors of music in four Oregon cities were contacted for the purpose of initiating this study. After permission was granted, eleven elementary schools were selected in these Oregon cities: four in Portland, two in Salem, two in Corvallis and three in McMinnville.

The Schools in the Study

Schools were paired, one designated as the experimental group and the other as the control group. The criteria used in equating the two groups of schools were: (1) size (2) training facilities (3) schedules (4) amount of time devoted to instrumental music training and (5) general similarity of school populations. In all instances the supervisors of music and the teachers evaluated the criteria and then selected the schools that in their estimation best met the requirements.

In one city, McMinnville, the instrumental enrollments were not large enough in one school, so two schools were combined and both
designated as the control group and then paired with one other school designated as the experimental group.

**The Subjects in the Study**

Only students on wind and percussion instruments were selected for the study and these groups were equated as follows:

1. musical aptitude
2. size
3. taught by the same teacher.

No attempt was made to equate the two groups as to grade in school; however, after the selection was completed, the two groups were found fairly similar in this respect.

Table I indicates the number of individuals in each grade level for both the experimental and control groups.
### TABLE 1

<table>
<thead>
<tr>
<th>Grade in School</th>
<th>Experimental Number of Students</th>
<th>Control Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>8th</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7th</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6th</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>5th</td>
<td>33</td>
<td>35</td>
</tr>
<tr>
<td>4th</td>
<td>33</td>
<td>20</td>
</tr>
<tr>
<td>Total Participants</td>
<td>77</td>
<td>72</td>
</tr>
</tbody>
</table>

It will be noted that the grade level of the control group was slightly higher than that of the experimental group. It is generally assumed that greater achievement is possible from students of each succeeding grade in school. If the assumption is correct, this might indicate that the advantage for greater achievement in music reading would be with the control group, as there were 33 fourth-grade students in the experimental group as compared with 20 in the control, and 10 sixth-grade students in the experimental group as compared with 16 in the control group. In the fifth grade the number of students in the experimental and control groups was exactly...
the same, with 33 students in each.

Selection of Teachers for the Study

Supervisors of music in two of the four participating cities were asked to select the teachers for the study. No specific criteria were set up for their selection. It was requested, however, that the teachers be selected on a basis of previous teaching experience and that they be evaluated by their supervisors as successful instrumental music teachers.

In the two remaining cities, no selection was necessary because in each instance, just one music teacher was employed to teach instrumental music in the elementary schools.

The Principals of the Participating Schools

The principals of the participating schools were familiarized with the plans, procedures, and objectives of the study and cooperated fully in permitting teachers to make appropriate plans and adjust schedules to meet the requirements of the study. Time for testing was scheduled within school hours and on days convenient to the visits of the writer. No limitations were imposed that might have impaired the sequence, the timing, or the results of the experiment.
Preparation of the Experimental Groups

To insure uniformity of instruction, the writer conducted two orientation rehearsals with the subjects in each school assigned to the experimental group. This was done to familiarize the teachers and the students with the procedures they were required to follow for the duration of the study. These rehearsals were conducted during the month of November, 1955.

Teachers were requested to carry out the plan of training exactly as it was presented to them in the orientation rehearsals by the writer. Teachers were urged to avoid as far as possible any transfer of the experimental teaching methods, procedures, and technics to the training of the control groups. It was assumed that the difference in the content of the training materials and methods used by the two groups would reduce this possibility to a minimum.

Procedures Followed by the Experimental Groups

The initial step taken by the writer in the first orientation rehearsal was to teach each student to play one of the easier tones on his instrument. The student was then asked to hold the tone as long as his breath lasted, and was timed by the writer or the teacher in charge. When he could hold a tone for ten seconds he was
considered ready to put it to use in the counting of time and playing rhythm patterns.

The first counting was done on a simple quarter note pattern of three notes, thus: \( \frac{3}{4} \), continuing for eight measures. The student was taught to tongue each note and was required to tap his foot to emphasize the counting of time. The three quarter notes were required to be played in one breath, and the taking of breath was permitted only during the quarter note rests and indicated by a comma. Students who were inclined to skip the rest were required to say the word "rest" whenever the symbol occurred. This procedure was then repeated whenever new notes were introduced and continued by the teacher in the regular rehearsals that followed.

When students had acquired the ability to play several tones, count time and tap their feet to emphasize the time of the music, it was possible to acquire a larger physical response by marching around the room; at first marching only, and later, playing on the march.

When five tones in the easiest range of the respective instruments had been introduced in this manner, they were then combined in various patterns to form exercises and simple melodies. In the next phase of training the length of the rhythm pattern was extended to two measures of four counts each: \( \frac{3}{4} \).
It was not necessary to play seven quarter notes in one breath, and to take breath on the eighth count of the two-measure phrase.

When it was felt by the teacher that the counting of quarter notes was well understood by the students, the second measure of each two-measure phrase was changed to a dotted half note:

\[ \begin{array}{c|c}
1 & 1 \mid 0.5 \end{array} \]

It was now possible to play a tone of more than one count in length. The tapping of the foot and the rhythm pattern itself, could carry the counting without the aid of the tongue.

**The Procedures used by the Teacher**

The writer in the orientation rehearsals and the teachers in all succeeding rehearsals set the tempi for the students. The students could anticipate the start of each exercise when the director counted two preparatory measures, thus: "1-2-3-4, 1-2-ready-play". The students were required to tap their feet at the same time. The "ready-play" signal was not necessarily given in the second measure; it could be postponed until the teacher felt certain that all feet were tapping precisely on each beat.

In addition to stressing time counting and rhythm patterns, it was necessary for the teacher to be concerned with the other fundamental problems of instrumental playing, such as: position of the instrument, embouchure, tone quality, pitch, breath control, technical facility, articulation, phrasing and expression.
Preparation of the Control Groups

At the beginning of the study, the six control groups began their training in music books already on hand in the respective schools. Although the books differed from school to school, the plans and procedures of the methods were basically the same. The teachers were familiar with these methods of training because they used them with beginning instrumental groups in previous years. Therefore, no instructions were given the teachers by the writer in the training of the control groups, with this one exception; that they not adopt any of the procedures of the experimental groups which they had not used before. The control groups began their training during the month of October and early November, 1955, and after their assignment to the control group for the purpose of this study, went right on without any interruption or special instructions from the writer.

Procedures Followed by the Control Groups

The control groups began their training in the traditional manner, with whole notes and whole rests. This was followed by the introduction of half and quarter notes and rests, in that order. Students were not required to tap their feet while counting time.
and playing, although they were permitted to do so if either they or the teacher wishes.

It will be noted that the order of the introduction of whole, half and quarter notes and rests was exactly reversed in the experimental and control groups. Therefore, the difference in the training of the two groups was found in the sequence of presentation of musical notation which formed the basis for procedures that made emphasis on time and rhythm possible.

It was the intent of these procedures to utilize the quarter note as the initial unit of time to help develop a feeling for steady counting of time resulting in steady movement in the reading of music. It was further intended to determine whether this feeling for time might develop more quickly through the physical action involving the tapping of the foot and the tonguing of each note on the quarter note unit of time. That the combination of all these procedures would place emphasis on time and rhythm and improve the reading of instrumental music was the hypothesis to be tested in this study.

Method of Construction and Content of the First and Second Reading Tests

These tests were constructed to meet the specific reading problems of the study, namely, the ability to keep time and the recognition and proper use of simple rhythm patterns. These tests
were constructed on the assumption that if the technical aspects such as keys, notation, and intervals were kept simple, maximum opportunity would be provided for students to expose their strengths or weaknesses in the area under investigation by this study, namely, time and rhythm. Therefore, the content of the tests was based on the following factors:

1. Although the materials were new to the student, they were based entirely on the musical learnings experienced in training.

2. The materials were written so as to provide ample opportunity for students to reveal their ability to count time.

3. The tonal range was confined to smaller intervals in order that students might concentrate on time and rhythm.

4. Meters most frequently used, 4/4, 3/4 and 2/4, were employed in the tests, thus making it possible for students to recognize the rhythm patterns previously learned.

5. Technical difficulties, such as large intervals or skips and accidentals, were not used.

6. Each specific point at issue was confined to a single line of music in the test.

**Method of Scoring the Tests**

The same method was used in the scoring the first and second reading tests as that used in the Watkins-Farnum Performance Scale, which was the standardized music reading achievement test used as
a final measuring device. Therefore, all the tests used in the experiment were scored in exactly the same way. This made it possible to develop a close relationship between the tests in respect to their administration and the reading scores that resulted. The instructions given students when taking the three tests made it possible to maintain a uniform pattern of testing throughout the study.

Only one error was recorded in any one measure of music played by the subject. An error was recorded when the subject did any one or more of the following: (1) played wrong notes (2) stopped to correct a wrong note (3) failed to observe the rests (4) failed to hold notes their correct number of beats or counts (5) noticeably accelerated or retarded the tempo set by the testor (6) failed to recognize and play the correct rhythm patterns.

It will be noted that any of the errors listed above would alter or disrupt the time and rhythm of the music and result in playing that was not musically intelligible. Each recorded error had a direct relationship to the lack of ability to count time and recognize the rhythm patterns in the music.

The possible score for each line of eight measures was five points. Each error was deducted from the possible points, thus:

one error-four points, two errors-three points, three errors-two points,

four errors-one point and five errors-zero. When the test was completed
the plus scores were totaled to comprise the final score for the test. The same procedure obtained for all three of the tests administered to all the individual subjects in the study.

Although the directions given to students and the method of scoring were the same for the three tests, there was one administrative difference. In the Watkins-Farnum Performance Scale, instead of playing all of the exercises as was required in the first and second instrumental music reading tests, the student was required to play only until the music became too difficult for him. This point was reached when no positive score could be recorded, or when the net result was zero.

Procedures Used in Administering the Tests

All three tests were administered by the writer to students individually. Each student was asked to be seated and then engaged in conversation until put at ease. He was then told that he would be asked to play some music that had been especially written for him and which was similar to the music he had played with his instrumental group during the preceding weeks of training.

Specific directions were given as follows:

1. The time or tempo will be set for you by the tapping of a pencil on the table or desk. You will begin to play after the counting
of two measured of four beats each. When you hear the words
"ready-play", you will commence playing at the exact tempo set
for you.

2. Once you have started playing and counting, you will
play through the entire line without stopping, regardless of any
errors you may make. In any event, don't stop until you have played
to the end of the line. We will stop at the end of each line and start
the next one in exactly the same way.

3. Should you make an error in note reading, and recognize it,
try not to make a correction by going back.

4. Count any way you wish; you may or need not tap your foot
when counting and playing.

5. Try to keep the tempo as steady as possible. Should your
counting get faster or slower than that set for you, it will affect
your score.

6. Observe the key in which each line is written so that you
will know which notes are sharped and which are flatted.

7. An error in any measure, either in notes or in time and
rhythm, will mean that the entire measure is wrong.
**Methods used in the Statistical Treatment of the Data**

Scores on the tests were arranged in frequency distributions and means found for each distribution. The mean is a single measure which represents all the scores made by one group and as such gives a concise description of the performance of a group as a whole, making it possible to compare two groups in terms of typical performance.

Means for the sample populations used having been computed, it was possible to test the data against the null hypothesis. The null hypothesis, as Garrett (11 p. 212) points out, has "been a useful tool in testing the reliability of differences. In its simplest form this hypothesis asserts that there is no true difference between two population means, and the difference found between sample means is, therefore, accidental and inimportant."

One way of testing the null hypothesis is to determine the critical ratio between the performances of two groups. The critical ratio (CR) is the difference of the means of two distributions divided by the standard deviation of the difference. (11 p. 215)

To reject the null hypothesis at the .01 level of significance requires that the critical ratio (CR) be 2.58 or more. Garrett states (11 p. 217) "at this level the null hypothesis is rejected on the grounds that not more than once in 100 trials would a difference of
this size occur if the true difference is zero." Should the critical ratio (CR) be 3.00 or more, the null hypothesis can be rejected at the zero level of significance. Such a difference can not be explained in terms of chance errors and the difference is statistically significant.

The critical ratio was computed for the tests in this study as shown in Tables 2, 3, 4 and 5.

THE TESTING PROGRAM OF THE STUDY

The Administration of the Drake Musical Aptitude Tests

Drake (7) made several studies to determine whether music training influenced the scores of the Drake Musical Aptitude tests. The criterion of training was the number of years a student had taken lessons. Drake classified students as "musical" when they had had five years or more of training, and "non-musical" those with less than five years of training. As Drake's findings indicate that weeks and even months of training do not affect musical aptitude test scores on the Drake tests; the Drake tests in this experiment were administered at such times as school schedules permitted, even though training had already begun.

Following the recommendations in the manual, the four forms of the test, two tests of rhythm and two of musical memory, were given
one at a time, each requiring about thirty minutes for administration.

These tests were given to all students of both the experimental and control groups between November 15, 1955, and February 1, 1956. Table 2, which follows, shows that the difference in musical aptitude scores of the students in the two groups was not statistically significant and therefore for the purpose of this study, the groups were alike in that respect. The computed critical ratio between the means of the two groups was .0242 on the rhythm tests and .0227 on the musical memory tests.
Table 2

COMPARISON OF THE RHYTHM AND MUSICAL MEMORY SCORES OF THE EXPERIMENTAL AND CONTROL GROUPS ON THE DRAKE MUSICAL APTITUDE TESTS

Rhythm Tests

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Scores</th>
<th>Standard Deviation</th>
<th>Standard Error of the Mean</th>
<th>Critical Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>74.627</td>
<td>29.57</td>
<td>3.37</td>
<td>.0242</td>
</tr>
<tr>
<td>(77 Subjects)</td>
<td>N = 77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>74.50</td>
<td>34.04</td>
<td>4.01</td>
<td></td>
</tr>
<tr>
<td>(72 Subjects)</td>
<td>N = 72</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Musical Memory Tests

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Scores</th>
<th>Standard Deviation</th>
<th>Standard Error of the Mean</th>
<th>Critical Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>62.21</td>
<td>14.35</td>
<td>1.60</td>
<td>.0227</td>
</tr>
<tr>
<td>(77 Subjects)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>62.15</td>
<td>15.50</td>
<td>1.82</td>
<td></td>
</tr>
<tr>
<td>(72 Subjects)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The critical ratio of the two means made on the Drake Musical Aptitude Tests by the two groups are: rhythm- .0242 and musical memory- .0227. A difference as reflected by these two critical ratios indicate that they might arise as a sampling fluctuation from zero and are clearly not significant. Therefore, the null hypothesis is retained and there is good reason to believe that these two groups are equal and differ only by sampling errors.

The scores on the Drake Musical Aptitude Tests were obtained after individual school groups had been assigned to either the experimental or control group. No preliminary evaluation of the musical aptitude of these students was made before the assignment was made. Further study of similar groups might provide information as to whether the similarity of the scores in these tests was accidental in this study or whether similar results would be obtained among any groups that selected instrumental music as an extra activity in school.

The First Instrumental Music Reading Test, Administration and Findings

This test, (Appendix A) constructed by the writer, consisted of five lines of music, each eight measures in length. The test was administered to individual students of the experimental and control groups between the latter part of February and early part of March, 1956.
Since the Drake tests revealed no significant difference between
the experimental and control groups in respect to musical aptitude,
this test would indicate whether a difference in reading ability had
developed due to the difference in the methods of instruction used
in the training of the two groups.

Scores in Table 3 range from five points, the lowest score
earned by a subject, to twenty-five points, the highest possible score
on the test. The results of this test reveal a statistically significant
difference in the reading abilities of the two groups.
### TABLE 3

**COMPARISON OF THE READING SCORES OF THE EXPERIMENTAL AND CONTROL GROUPS ON THE FIRST READING TEST**

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Experimental Groups</th>
<th>Control Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Students</td>
<td>Number of Students</td>
</tr>
<tr>
<td>25-26</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>23-24</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>21-22</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>19-20</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>17-18</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>15-16</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>13-14</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>11-12</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>9-10</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>7-8</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5-6</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Participants</strong></td>
<td><strong>77</strong></td>
<td><strong>72</strong></td>
</tr>
</tbody>
</table>

Mean Score: 19.57
Standard Deviation: 3.76
Standard Error of the Mean: 0.432

Computed Critical Ratio between the mean scores of the two groups: 5.0945
Although the Drake Musical Aptitude Tests indicate a close similarity of musical talent among the subjects of both groups, the scores of the first instrumental music reading test show considerable difference in the performance of the two groups. The computed critical ratio between the mean scores of the two groups is 5.09, and large enough to provide a probability that the difference between the two means is not explainable as a chance happening. Although it must be recognized that the evidence is not conclusive proof of causes other than chance, it may be accepted as evidence that is significant. Therefore, the null hypothesis may be rejected at the zero level of significance and the difference accepted as statistically significant.

The frequency distribution of the scores on the first music reading test indicates that 83 per cent (64 subjects) of the experimental group subjects placed above the mid-point of the scale, and that none in this group placed in the three lowest brackets of the scale. On the same music reading test, 58 per cent (42 subjects) of the control group placed above mid-point of the scale and 15 per cent of this group placed in the three lowest brackets on the scale. (Table 3)

The fact that no members of the experimental group scores in the three lowest brackets of the distribution scale, where 15 per cent
of the control group subjects placed, would seem to indicate that the less talented of the experimental group benefited from the training to which they were exposed.

The fact that 83 per cent of the experimental group subjects as compared with 58 per cent of the control group subjects had scores that placed them above the mid-point of the frequency distribution scale would seem to indicate that the more talented subjects of the experimental group also benefited from their early training in the method and procedures that emphasized time and rhythm.

The data of this test seem to indicate that the problems of instrumental music reading might be given special attention through the emphasis on time and rhythm at the outset of training. Failure to do this could result in excessive drop-outs from the instrumental music program. Further study is needed to determine the extent to which early failure in the reading of instrumental music contributes to the present high drop-out rate.

The Second Music Reading Test, Administration and Findings

The second music reading test (see Appendix B) was also constructed by the writer and consisted of six lines of music, each line eight measures in length. The content of this test was more advanced than the first reading test; however, it was based on
materials studies in the classroom in regular rehearsals since the administration of the first reading test and materials similar to those of the first test. This second test was given to individual students of both the experimental and control groups during the latter part of April, 1956.

The second music test provided information about the reading ability of the two groups at the mid-point of the study. Scores on the second music test indicate that the experimental group had maintained the advantage over the control group shown in the first reading test.

Scores in Table 4 range from six points, the lowest score earned by a subject, to thirty points, the highest possible score on the test. Like the first reading test, the results reveal a statistically significant difference in the reading abilities of the two groups.
TABLE 4

COMPARISON OF THE EXPERIMENTAL AND CONTROL GROUP READING SCORES ON THE SECOND READING TEST CONSTRUCTED BY THE WRITER

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Experimental Groups Number of Subjects</th>
<th>Control Groups Number of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-31</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>28-29</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>26-27</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>24-25</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>22-23</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>20-21</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>18-19</td>
<td>10 -</td>
<td>9 -</td>
</tr>
<tr>
<td>16-17</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>14-15</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12-13</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>10-11</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>8-9</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>6-7</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>77</strong></td>
<td><strong>72</strong></td>
</tr>
</tbody>
</table>

Mean Score: 22.64  19.07  
Standard Deviation: 3.97  5.14  
Standard Error of the Mean: .459  .605  

Computed Critical Ratio between mean scores of the two groups: 4.708
It will be noted that the difference in the reading abilities of the two groups shown in the first music reading test was nearly maintained in the second music reading test. The computed critical ratio of this test was 4.708, slightly lower than the critical ratio of 5.09 on the first music reading test, but still large enough to prove a probability that the difference between the two means is not explainable as a chance happening. Therefore, the null hypothesis can also be rejected for the second test at the zero level of significance and the difference accepted as statistically significant.

The procedures followed in training during the period preceding the second music reading test were similar to those followed prior to the first music reading test. The experimental groups continued training in the experimental method which required constant emphasis on time and rhythm. The control groups, although not observed at any time during this period, except in the testing periods, continued their training in the methods selected at the beginning of the study. Therefore, the difference in the training of the two groups that seemed to contribute to the difference in the instrumental music reading scores of the first reading test, seemed to obtain in this test as well.

It will be noted that the difference in the size of the critical ratio on the second music reading test from that of the first reading test is reflected in the 64 per cent (6 per cent higher than in the
first music reading test) of the control group subjects whose scores placed them above the mid-point of the frequency distribution scale.

In the case of the experimental group, the number and percentage (83 per cent) was exactly the same for both tests. It will also be noted that none of the experimental group subjects had scores that would place them in the four lower brackets of the frequency distribution scale whereas 15 per cent of the control group subjects placed in that area.

The higher percentage of the control group subjects (64 per cent) in the upper half of the frequency distribution scale would indicate a trend of improvement in music reading. This may be explained in this way: by the time the second reading test was given, the control group subjects had had considerably more experience with the playing of quarter notes, the single beat of time. This experience with quarter notes could very well have developed a stronger and more sensitive feeling for the beat, an experience that the experimental group had had from the outset of training. On the other hand, it is possible to conjecture that the playing of whole and half notes by the experimental group at the first music reading test was given, could have been a problem similar to the playing of quarter notes by the subjects of the control group. It was felt that both groups had gained about the same amount of experience with
their new notation during the interval between the administration of
the first and second music reading tests, and would seem to justify
the contention that the two conditions were in balance at the time
the second music reading test was given.

The Watkins-Farnum Performance Scale, Administration and Findings

The Watkins-Farnum Performance Scale consists of fourteen
sets of exercises arranged in the order of their difficulty, and each
dealing with a particular level of music reading achievement. Each
exercise is an abstract group of measures that has little if any
relationship to familiar music. Consequently, music reading scores
are the result of the students' ability to read the correct notes in the
right keys and in the designated time and rhythm. The range of
difficulty of the exercises is from easy to professional.

With the exception of the drums, all the instruments played
the same materials. The authors of the test adapted these materials
to each kind and type of instrument in respect to key, clef, range
and pitch, and wrote appropriate materials for the drum.

This test was administered to individual students of the
experimental and control groups during the latter part of May and
early part of June, 1956. This was the last of the sequence of three
tests given to all the subjects in the study, and served as the final
measuring device of instrumental music reading achievement.
<table>
<thead>
<tr>
<th>Score Range</th>
<th>Experimental Groups</th>
<th>Control Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Subjects</td>
<td>Number of Subjects</td>
</tr>
<tr>
<td>55-59</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>50-54</td>
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<td>45-49</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>40-44</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>35-39</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>30-34</td>
<td>8</td>
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<td>25-29</td>
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<td>13</td>
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<td>20-24</td>
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<td>8</td>
</tr>
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<td>15-19</td>
<td>11</td>
<td>12</td>
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<tr>
<td>10-14</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>5-9</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>77</strong></td>
<td><strong>72</strong></td>
</tr>
</tbody>
</table>

Mean Score  
Experimental: 27.34  
Control: 17.64  
Standard Deviation  
Experimental: 11.50  
Control: 10.71  
Standard Error of the Mean  
Experimental: 1.31  
Control: 1.26  
Computation: critical ratio between the mean scores of the two groups.  
Computed: 5.361
Table 5 shows the final instrumental music reading achievement scores made by both groups on the Watkins-Farnum Performance Scale. The computed critical ratio between the mean scores of the two groups is 5.36, and large enough to provide a probability that the difference between the two means is not explainable as a chance happening. It must be recognized that the evidence is not conclusive proof of causes other than chance; however, it may be accepted as evidence that is significant. Therefore, the null hypothesis may be rejected at the zero level of significance and the difference accepted as statistically significant.

The gain in music reading ability shown by the experimental group in the final instrumental music reading achievement test, might be interpreted as an indication of a trend toward even wider differences in music reading abilities. A continuation of this study for another year with the same subjects, the same type of instruction for each group and appropriate tests, could provide additional and valuable information about the nature of the music reading process as it is affected by the emphasis on time and rhythm.
Summary of the Results of the Three Instrumental Music Reading Tests

Table 6 shows the means and the computed critical ratio of those means for the three instrumental music reading tests taken during the 1955-56 school year by 149 students of the experimental and control groups of the study.

It should be noted that the similarity of the test scores and the differences they represent was maintained throughout the year. The constant and persistent difference in music reading abilities of the two groups would seem to reflect the difference in the methods used in the training of the two groups. Students who learned to count time in a steady tempo and who expressed this counting of time through the physical response, tapping the foot, and who recognized and correctly played the simple rhythm patterns in the initial weeks of training, seemed to develop an early advantage in the reading of music that they retained throughout the experiment. The critical ratio of the means on each of three tests was large enough so that the null hypothesis could be rejected at the zero level of significance and the results considered statistically significant.
<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Score Test 1</th>
<th>Critical Ratio</th>
<th>Mean Score Test 2</th>
<th>Critical Ratio</th>
<th>Mean Score Test 3</th>
<th>Critical Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>19.47</td>
<td>5.09</td>
<td>22.64</td>
<td>4.70</td>
<td>27.34</td>
<td>5.36</td>
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<tr>
<td>N = 77</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>15.90</td>
<td></td>
<td>19.07</td>
<td></td>
<td>17.64</td>
<td></td>
</tr>
<tr>
<td>N = 72</td>
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<td></td>
</tr>
</tbody>
</table>
CHAPTER IV

SUMMARY AND CONCLUSIONS

SUMMARY

The Hypothesis of the Study

The hypothesis of the study was that beginning instrumental music students when exposed to a method of instruction that placed emphasis on time and rhythm would develop instrumental music reading competency superior to that of students exposed to any other methods of instruction.

Emphasis on time and rhythm was defined as the playing of quarter notes from the beginning of training, accompanied by the tapping of the foot as the bodily movement that represented the physical response to time and rhythm. The tonguing of the notes, the tapping of the foot and the counting of time mentally, combined to provide the emphasis.

Organization of the study

1. The study was carried on in eleven elementary schools of these Oregon cities: Portland, Salem, Corvallis and McMinnville.

2. Schools were selected and paired by the music supervisors
of the participating cities, one of each pair designated as the experimental group and the other as the control group. In one city where the instrumental enrollments were not large enough in a single school, two schools were combined and designated as a control group.

3. Schools were equated in respect to size and similarity of school populations. Each pair of schools was located in one city and the subjects of each pair of schools taught by the same teacher.

4. The subjects in the study were beginning instrumental music students from the fourth grade through the eighth.

**Training Methods and Materials**

1. Training materials of the method used by the experimental groups were especially adapted to the counting of time and recognition of rhythm patterns, and provided the procedures the teachers were required to follow the duration of the study. The procedures in this method were specifically concerned with the playing of quarter notes and quarter rests as a single beat unit of time, and played in a predetermined tempo set by the teacher.

2. The writer visited each of the five experimental groups twice at the beginning of the study. On each occasion he conducted the rehearsals to orient the teachers and students with the method of instruction.
3. The training materials used by the control groups were chosen by the teachers from any of the conventional methods of instruction other than the one used by the experimental groups. Procedures followed in the training of the control groups were left to the choices and devises of the teachers.

EQUATING THE EXPERIMENTAL AND CONTROL GROUPS

The Drake Musical Aptitude Tests were used to equate the experimental and control groups in respect to musical aptitude or talent. The computed critical ratio between the difference of the means was .0242 on the rhythm tests and .0227 on the musical memory tests. This data indicated that the differences were not statistically significant, and therefore, there was good reason to believe that these groups were equal.

Further study of similar groups might provide information as to whether the similarity of the scores in these tests was accidental in this study or whether similar results would be obtained among any groups of beginning instrumental music students.
Administration of the Three Instrumental Music Reading Tests

The first and second instrumental music reading tests were composed by the writer and given to individual students of both groups at the early and intermediate stages of training respectively. The third test, the Watkins-Farnum Performance Scale, a standardized test of instrumental music reading achievement, was given at the end of the experiment. This test also served as a model for the administration, scoring and recording of the first and second music reading tests constructed by the writer. Therefore, all three tests were administered, scored, and recorded in exactly the same way.

The Findings of the Three Music Reading Tests

The findings of the three music reading tests revealed differences between the music reading abilities of the two groups that were highly significant. The critical ratio on each of the three tests was 5.09, 4.70 and 5.36. These data would indicate that the large difference in the music reading abilities of the two groups found in the first test, was maintained throughout the study. (Table 6)

The high critical ratios on all three tests indicate that the differences are not explainable as a chance happening, therefore, they are considered statistically significant.
CONCLUSIONS

The data of this study would seem to indicate that:

1. The method of instruction that emphasized time and rhythm in early training of beginning instrumental music students developed more competent music reading than methods that did not provide this emphasis.

2. Emphasis on time and rhythm in this study which combined the tonguing and playing of quarter notes and rests as the initial units of time and the tapping of the foot and playing on the march as the physical response to the beat, developed a stronger feeling for the beat and produced more competent instrumental music reading than methods that did not include these procedures in training.

3. The initial and subsequent differences in the music reading abilities of the experimental and control groups in the study were due to the difference in the methods of training.
BIBLIOGRAPHY


APPENDIX B
Reading Test #2

Cornet-Trumpet-Helophone-Baritone

Trombone-Baritone

Reading Test #2