THE RELATIONSHIP OF SELECTED FACTORS AND MUSIC READING ACHIEVEMENT

Thesis for the Degree of Ph. D.

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HOWELL T. JONES, Jr.

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THESIS

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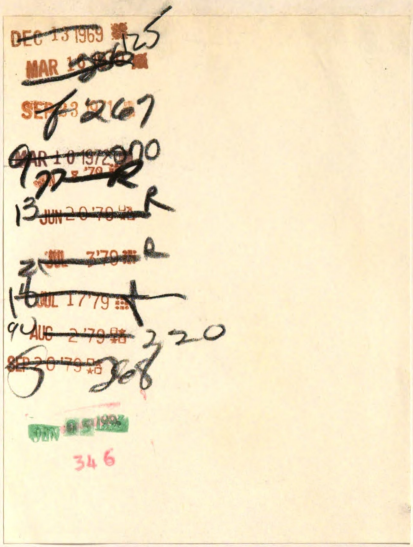
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ABSTRACT

THE RELATIONSHIP OF SELECTED FACTORS
AND MUSIC READING ACHIEVEMENT

by Howell T. Jones, Jr.

This study investigated the relationship that perceptual time span, intelligence, music background and verbal reading have to music reading achievement.

In this study 206 students were selected to view 120 slides containing music and verbal notation. The students were selected from grade school, junior high school, high school, college non-music majors and college music majors. The slides were projected on a screen by an overhead projector with an attached tachistoscope. The speeds used for the projections were one-half second, one-tenth second, one-twenty-fifth second and one-fiftieth of a second. Four tests were devised which included a Notation Copy Test, a Performance Test, a Listening Test and a Verbal Reading Test. The students were also administered a music background questionnaire and a Sight Singing Test. Intelligence scores were obtained for the public school students and college entrance scores were obtained for the college students.

Evidence was found which indicated that only small relationships existed between music background and music reading achievement. The relationship between perceptual time span and music reading achievement was not highly significant as was the case with intelligence and music reading achievement. There was no appreciable relationship found between intelligence and sight singing ability. The study also revealed that verbal reading ability did not relate significantly with music reading achievement.

THE RELATIONSHIP OF SELECTED FACTORS AND MUSIC READING ACHIEVEMENT

By

Howell T. Jones, Jr.

A THESIS

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CHAPTER I

THE PROBLEM

Throughout the history of music education, the ability to read music at sight has been one of the aims of the music teacher. Many music educators have realized that much important ensemble rehearsal time is lost because of poor music reading. They have also realized that many excellent and well paid singers are poor music readers. Many interested in the training of musicians in music reading skills have developed their own methods of teaching music reading. Lowell Mason[1] first introduced the number system to represent the various pitches of the scale. Doris Hutton,[2] in a study of two methods of teaching sight singing, employed musical games and slides. Harry Hammer[3] used a tachistoscope to expose

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[1]Robert E. Nye, and Vernice T. Nye, Music in the Elementary School (Englewood Cliffs, N. J.: Prentice-Hall, 1956).

[2]Doris Hutton, "A Comparative Study of Two Methods of Teaching Sight Singing in the Fourth Grade," Journal of Research in Music Education, I (November, 1953), 119-126.

[3]Harry Hammer, "An Experimental Study of the Use of the Tachistoscope in the Teaching of Melodic Sight Singing," Journal of Research in Music Education, (Spring, 1963), 44-45.

musical phrases to students at different rates of speed. Others have recommended the use of audio-visual devices, such as flash cards, in search of an effective method of teaching music sight reading.

Although many methods of teaching music reading have been developed, little attention has been given to factors which might influence achievement in music reading such as intelligence, music background, perceptual time span, and the correlation between verbal reading ability and music reading ability.

Among the few studies that have been concerned with one or more of the above factors in music reading achievement is that of King.[4] He equated chronological age, semesters in school, school grade, sex, and extra-curricular music study in a study of the relationship between music reading and I. Q. scores. The results obtained indicated that there is a relationship between intelligence and the ability to read music. As a result of the study, King states that: "Poor music readers seemed to test lower on the scale of intelligence than did good music readers."[5]

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[4]Harry King, "A Study of the Relationship of Music Reading and I. Q. Scores," Journal of Research in Music Education, (Spring, 1964), 44-45.

[5]Ibid., p. 45.

King's conclusions are significant for the present research because both studies are concerned with intelligence as a factor which might influence music achievement. The conclusions made by King will be compared with the results of the present study.

Music educators are constantly searching for a more efficient technique to use in teaching music reading. A study of factors thought to influence music reading achievement may help in the development of new approaches for teaching this skill. The present study is concerned with ascertaining the degree to which perceptual time span, intelligence, music background and verbal reading relate to music reading. These factors are thought to have direct significance in the achievement level of music reading.

Statement of the Problem

The problem of this study is to assess the relationship between music reading achievement and perceptual time span, intelligence, music background and verbal reading achievement. Inter-relationship between these variables as well as achievement in music reading is also investigated.

Definition of Terms Used

For the purpose of this study the following terms need defining and are limited as indicated:

Tachistoscope.--A tachistoscope is an instrument for presenting visual images to individuals. The image remains for a controlled period of time, which ranges from one-half second (.5) to one-fiftieth of a second (.02). The tachistoscope used in this study was equipped with a diaphram-type shutter, and was attached to an overhead projector.

Music Reading Ability.--Music reading ability is defined as the ability of a person to read a musical score and to apply his musical knowledge in interpreting the music notation at first sight. Therefore, in music reading, one can recognize and recreate vocally, or instrumentally, at first sight, a series of pitches from music notation.

Perceptual Time Span.--Perceptual time span is the amount of time that a person is allowed to see a specific amount of musical score. The following perceptual time spans were employed in this study: .5, .2, .1, .04, and .02 seconds. Three different abilities were measured within the framework of perceptual time span; singing discrimination, playing discrimination and verbal reading.

Design and Method

Several pilot studies were conducted at Michigan State University in order to identify factors contributing to music reading achievement. The results of

these studies, together with a comprehensive review of the reports of achievements in music reading research, resulted in the development of the following evaluative devices.

Instruments for Data Collection

In attempting to discover existing relationships between music reading ability and factors previously identified, a number of tests were administered to a sample population for the study. The firs test was a sight reading test designed by Dr. Merrell Sherburn of the theory faculty, Department of Music, Michigan State University. This test was divided into five sections. The first section of the test required the subjects to sing a major scale up and down from any pitch, using numbers. This portion of the test was rated as 20 per cent of the total grade. The next section required the subjects to sing and sepll the "A" major scale. Fifteen per cent of the total grade was given for this portion of the test. The third section of the sight reading test consisted of numbers which corresponded to the diatonic scale. The subjects were required to sing the pitches which these numbers represented. Fourteen per cent of the total grade was possible for this section of the test. Section four of the sight reading test required the subjects to sing the pitches indicated by the previous

numbers (the numbers in section three) in the key of "D" major, translating the numbers to letter names as they sang. This section of the test was rated 7 per cent of the total grade. The final section of the sight reading test consisted of four eight-measure exercises which the subjects were required to sing. Because this was the longest section of the test, it was graded at 44 per cent of the total grade. One-fourth of a point was deducted for each incorrect melodic or rhythmic response. The first exercise in section five was in two-four meter and the key was "C" major. The movement of the rhythm was in quarter notes. The second exercise was in the key of "G" major and the meter signature was three-four. The rhythmic movement was quarter notes and half notes. Exercise number three was in the key of "C" major, two-four meter and the rhythmic movement here was in eighth and quarter notes. The last exercise, in the key of "C" major and with a three-four meter signature, had a rhythmic movement of both the quarter and the half notes. A facsimile of this test appears in Appendix A. The reliability coefficient for the sight reading test was .936, obtained by the split half method.

The previously described test was administered to the college music subjects. The college non-music subjects and the public school subjects were not required to take the second and the fourth sections of the

test. In the fifth section of the test, the sight reading section, the college non-music subjects and the public school subjects were asked to sing only the first two exercises. Each section of the test was adjusted so that the sight reading portion (section five) was rated at 66 per cent of the total grade of the test. One-half of a per cent was deducted for each error, either rhythmic or melodic. This test appears in Appendix A.

After the tests were designed, a jury of experts was chosen to validate them. The jury was chosen from the music theory faculty of Michigan State University's Department of Music. The members were: Dr. T. C. Johnson, Dr. Ruseell Friedewald and Dr. Jere Hutcheson. The procedure used for the tests' validation was followed according to the suggestions of Dr. Robert L. Ebel.[5]

The Gaston Inventory Survey of Music Background and Interest was filled out on each subject, and revealed the student's music interest, his family's music interest and his experience in music from the elementary school through college. A facsimile of the questionnaire appears in Appendix B.

In order to measure other factors, tests had to be devised. The first test consisted of twenty-five short

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[5]Robert L. Ebel, "Obtaining and Reporting Evidence of Content Validity," Educational and Psychological Measurements, XVI (1956), 269-282.

English phrases or sentences. The shortest phrase consisted of three three-letter words, i.e., "The old man," and the longest sentence contained eight words totaling twenty-seven letters. The writer consulted with the Reading Specialist of the College of Education, Michigan State University, before selecting the phrases and sentences to be used in the Verbal Recognition Test. The final selection of phrases and sentences used in the experiment appears in Appendix C.

For the other tests used in the study, four groups of slides containing musical notation were constructed, using only melodic passages. Most of the phrases were diatonic; however, some chromaticism was used. The first group of slides consisted of twenty-five three-note patterns, and the second group consisted of twenty-five four-note patterns. The third and fourth groups of slides were constructed using twenty-five five-note patterns and twenty-five six-note patterns, respectively. The short musical phrases used on the slides were taken from material contained in the Sight Singing Manual by Allen I. McHose and Ruth N. Tibbs.[6] The content of the slides included phrases in the following keys: C, D, F, Ab, Eb, and Bb, and the meter signatures were two-four,

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[6]Allen I. McHose, and Ruth N. Tibbs, Sight Singing Manual, Eastman School of Music Series, second edition (New York: Appleton Century, Crofts, Inc., 1954).

three-four, four-four, six-eight, nine-eight, and twelve-eight. Both the treble and bass clefs were used. The following note durations and their corresponding rests were used in the notation of the slides: whole, half, quarter, eighth, sixteenth, dotted-eighth, dotted-half, and the dotted-quarter note. The several pilot studies conducted prior to the experiment indicated that exposure times for the various slides might be one-half second, one-fifth second, one-tenth second, one twenty-fifth second, and one-fiftieth of a second.

The various perceptual times were used in this study in an attempt to determine if the students with the fastest perceptual time span were the best music readers.

After the slides containing music notation were completed, three tests were constructed. Test I was a Notation Copy Test. For this test, the subjects viewed the projection screen and were asked to write what they saw. Random perceptual time spans and musical phrase lengths were employed. The attempt was to measure visual perception of the musical score. Test II was an Aural Recognition Test. After viewing the projection screen, the subjects were asked to listen to a recording of a passage which was the same or different from the projected phrase. The subjects then indicated on their answer sheets whether the projection was the same or

different from the recording. The attempt here was to measure aural perception. Test III was a Performance Test. Subjects viewed the projection screen and were asked to play on their instruments what they had seen. Random perceptual time spans and musical phrase lengths were employed in this test as in Test I and II.

A response sheet was made for each of the four tests. The response sheet for test number one, the Notation Copy Test consisted of twenty-six three-inch music staves on which the students were to notate their responses. The response sheet for test number two, the Aural Recognition Test, consisted of twenty-six spaces for the subjects to mark a "T" for true and an "F" for false as he determined whether the visual and aural stimulus agreed or disagreed. There was no answer sheet for test number three, the Performance Test. The subject's response to this test was recorded on tape. The response sheet for test number four, the Verbal Recognition Test, contained twenty-five blank lines on which the subjects wrote their responses. A copy of these answer sheets appears in Appendix E.

The Sample

The subjects used in the experiment were from a variety of sources. Students enrolled as majors in the Department of Music were chosen for the experiment. The music subjects consisted of: twenty brass-wind

players, five on each level (freshmen, sophomores, juniors, and seniors); twenty woodwind players, five on each level; twenty string players; twenty keyboard players (piano and organ); and twenty vocal students. The total number of college music students used in the study was 100, consisting of twenty-five freshmen, twenty-five sophomores, twenty-five juniors and twenty-five seniors. No sex differentiation was made in selecting the college subjects, and forty males and sixty females were included in the test group.

Twenty non-music college students were selected from the Foundations of Music Class (145) for the study. Some of the non-music students had previously been enrolled in music courses in elementary school or either junior or senior high school. The others were introduced to music for the first time in the music foundations class. Music Foundations is the first of two classes designed for the elementary education majors. Course work in this class encompasses the study of music rudiments.

Subjects were also chosen from the fourth through the twelfth grade in the Detroit and Lansing, Michigan Public School Systems. The Director of Music in the Public Schools of Detroit, Dr. Robert Klotman, chose the elementary and the junior high school subjects from two schools. Dr. Klotman indicated that these schools served middle class neighborhoods of Detroit, Michigan.

Mr. S. Earle Trudgen, Director of Music in the Lansing, Michigan Public Schools chose the high school in which the experiment was conducted. The school served a population which included all socio-economic classes. A total of thirty students were selected from the elementary and junior high school levels; twenty-six from the high school level, consisting of fifteen students who had studied music privately or in an orchestra, band or choir; and fifteen general music students (students enrolled in the general music class). The total number of public school students used in the study was eighty-six.

Testing Procedure

The testing was accomplished between December 1, 1966 and May 1, 1967. The writer traveled to necessary locations to administer the tests. In each case tests were presented in the following order: the Background Inventory Questionnaire; four tachistoscopically administered tests; the Notation Copy Test; the Aural Recognition Test; the Performance Test and the Verbal Recognition Test. After the four perceptual tests were completed, each subject in the sample was required to take the sight reading test.

The data collecting section of the experiment was completed by collecting the college entrance qualifications scores for the college students and the I. Q. scores for the public school students.

After the data were collected, the mean scores and standard deviations were calculated for each group of students. This was followed by correlations between music background, the sight reading test, the four perceptual tests, intelligence quotient, perceptual time spans, and the data concerning the tachistoscopic speeds. For the purposes of this study, the meaning of the correlation coefficients are as follows:

r from .00 to ± .20 very low or negligible

r from .20 to ± .40 low; present but slight

r from .40 to ± .70 substantial or marked

r from .70 to ± 1.00 high to very high.[7]

Analysis of variance was performed next followed by T tests.

Organization of the Report

Chapter II consists of a review of the literature. Chapter III presents an analysis and interpretation of the findings, and a description of the statistical treatments employed. The last chapter is concerned with a summary of the report and is followed by conclusions and recommendations.

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[7]Henry E. Garrett, Elementary Statistics (New York: David McKay, Inc., 1962), p. 100.

CHAPTER II

REVIEW OF LITERATURE

The literature concerned with music reading achievement is considerable. In the fields of music education, music theory, and psychology, research has been conducted in the areas of music reading. Though all of the research was not directly concenred with factors which might influence achievement in music reading, these studies, along with other research which appeared significant, are reviewed.

In a study of the relationship of music reading and I. Q. scores, King[1] equated chronological age, semesters in school, school grade, sex, and extra-curricular music study. A group of sixty-four selected fourth and fifth grade pupils who had no or little skill in music reading were compared with a group of sixty-four pupils on the same grade level who excelled the average pupils in this skill. The Knuth Achievement Test, and the Otis Self-Administering Test of Mental Ability were administered. The gifted group of students was found to have a mean I. Q. of 117.45, while the first group had a mean I. Q.

[1]King, op. cit., p. 1.

of 100.89. The Critical ratio was found to be 2.92. The results obtained indicated a definite relationship between intelligence and the ability to read music. Poor music readers tested lower on the scale of intelligence than did good music readers. King states that the fourth and fifth grades were selected because students at this level had had two years of music instruction taught by supervisors of music.

In a more recent study of children in grades four, five, and six, Petzold[2] examined perception as the visual and aural identification and recognition of similarities and differences between tonal configurations. In the first phase of the study, the subjects were given three trials in which to attempt to learn a set of ten different tonal configurations. In the second phase, the subjects were given eight trials in which to learn five tonal patterns, and a similar number of trials in which to learn a song using the same patterns. Eighty-three subjects were used in phase one, and 134 were used in phase two.

Petzold reached the following conclusions: (1) no significant difference was found between boys and girls; (2) the students with more music training

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[2]Robert Petzold, "The Perception of Music Symbols in Music Reading by Normal Children and by Children Gifted Musically," Council of Research in Music Education, No. 1 (1963), 62-66.

consistently did better than their average classmates at all grade levels; (3) no significant difference in the ability to read music was found between subjects with one or more years of instrumental training and subjects with no such training. Prior practice in learning songs had no significant influence on learning tonal configurations. This study seems to indicate that music background is not an important factor in music reading ability.

Hammer[3] conducted research using a tachistoscope to determine the effect of tachistoscopic training on the development of melodic sight singing ability. Melodies were presented in the keys of C, G. D, F, and Eb. Both conventional and tachistoscopic techniques were used. A test was devised to measure the sight singing abilities of the subjects. The subjects came from fourth grade classes and the researcher taught both the experimental and control groups. The only difference between one group and the other was that one used the tachistoscope. The flashmeter was first set to open position, and the first tonal pattern was presented on the screen. The student practiced this by saying the pattern with letters or syllables. The pattern was then flashed several times at 1/100 of a second until everyone had seen it at this speed. Five to eight more patterns were practiced

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[3]Hammer, op. cit., p. 1.

successively in the manner described. The patterns were then presented in mixed order at the 1/100 of a second setting. Several more patterns were presented in the manner outlined.

The conclusions pointed out that at the fourth grade level, tachistoscopic training was more significant than conventional training. The conclusions further pointed out that tachistoscopic training was more effective in teaching melodic sight singing to those who had above average pitch discrimination and tonal memory abilities. Tachistoscopic training was not superior to conventional training in teaching melodic sight singing to those who were above the class average in I. Q., but it was superior in developing this skill in those who were below class average in I. Q. This study seems to indicate that perceptual time span is an important ability in relation to music reading achievement.

Hanson[4] investigated the ability of musicians to detect melodic and harmonic errors while inspecting the score during the performance of choral music. The study was particularly concerned with the ability of musicians to read and hear the melodic and harmonic intervals and chords. The subjects had to listen to a recording and then mark the proper place in the score where the error

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[4]Louis A. Hanson, "A Study of the Ability of Musicians to Detect Melodic and Harmonic Errors in the Performance of Choral Music While Inspecting the Score," Council of Research in Music Education, Bulletin No. 1, 1963, pp. 44-49.

had been made. Hanson found that one or two years of music training made a significant difference, but more than two years of music training made little difference. The class marks in ear training made little difference. The class marks in ear training courses correlated most closely with achievement on the test. Piano majors achieved significantly higher results than instrumentalists and vocalists, but age and sex of the subjects had little effect on the test results. This study is significant because it is concerned with music background.

Bugg and Harpel[5] stated that positive correlations between tonal memory and the other types of auditory discrimination existed. They found that tonal memory correlates substantially with almost all of the other types of auditory discrimination tested by the Seashore Measures of Musical Talents Test, by music appreciation as measured by the Organ Musical Discrimination Test, and that tonal memory correlates positibely with the results secured for the Kwalwasser-Dykema Test of Tonal Movement. Their data showed that when superior tonal memory is absent, marked superiority in pitch discrimination, timber discrimination, rhythm discrimination, time discrimination, music appreciation, and the perception of tonal movement rarely occurs. This particular

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[5]Eugene Bugg, and Lloyd Harpel, "The Significance of Tonal Memory for Musicality," Journal of General Psychology, XXXXV (July, 1946), 3-15.

study is significant because it is concerned with melodic memory. The musical slides used in the present study contained only melodic phrases.

Ortmann[6] was concerned with melodic dictation as early as 1926. He conducted an experiment in which 128 students were divided into two groups. Series of two, three, four, five, and six tones were given, and five examples in each series were used. The students were provided with printed forms carrying a number for each tone. They were instructed to draw a short dash through any tone that was changed while they listened to the examples. The element of writing involved in this procedure introduced no appreciable difficulty, and was found to be more reliable than the method which demands that the subjects remember the tone until the entire melody has been given, and then write the number of the altered tones or tone. The organ was used for the examples, producing one tone per second.

The conclusions showed that the psychological status of any tone in any melody is determined by its tonal environment, and by its absolute position in pitch and in the time series. "No one tone of any melody can be changed without thereby changing to a great or small extent the status of every other tone in the melody."[7]

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[6]Otto Ortmann, "On the Melodic Relativity of Tones," Psychological Monograms, Part V, XXXII, No. I (1926), 38-39.

[7]Ibid., p. 8.

He discovered that no tones in any melody have the same psychological status. He noted that whenever two or more tones of emphasis coincide upon a tone, that tone "stands out" from the rest. "The psychological status of any tone in a melody is not constant, the melodic relationship of tones is based upon pitch proximity with which it varies directly."[8]

Ortmann further concluded that when a test similar to this one is given, a melodic memory of two tones may be considered very inferior, one of four tones, normal, and one of six tones, superior. It was further stated that the number of tones in a melody is not in itself a complete determinant of the memory-span. Melodic memory is one element of musical talent, and may be sufficiently isolated to permit separate grading.

Ortmann's study was important for the present research because it dealt with melodic memory. The slides containing music notation used in this research were constructed using three, four, five, and six note patterns.

Ortmann[9] stated that achievement in ear dictation is possible for most people, and that more effective

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[8] Ibid.

[9] Otto Ortmann, Research Studies in Music (Baltimore, Maryland: Department of Research of the Conservatory of Music, Peabody Conservatory of Music, 1934), pp. 33-35.

methods of teaching aural comprehension can be used. He further stated that age is not a factor in the development of aural comprehension. With this lead in mind, many music educators have conducted experiments concerned with the findings of Ortmann. This particular study by Ortmann was significant for the present study because students from grade four to seniors in college were used as subjects.

In a study by Drexel,[10] it was found that with increase in age in the average child, there is an increase in the ability to sing a melody. It was suggested that children who are exposed to richer musical environments show a greater and earlier ability to sing a melody than those children whose musical environments are poorer. The study showed that by a specific training program, the initial abilities to sing may be improved greatly. Ortmann's study seems to indicate that music background is an important factor in music reading achievement.

Marquis[11] was concerned with sight singing in his investigation to see if the percentage of errors made in

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[10]Edith Drexel, "A Study of the Ability to Carry a Melody at the Pre-School Level," Child Development, IX (September, 1938), 319-332.

[11]James H. Marquis, "A Study of Interval Problems in Sight Singing Performance with Considerations of the Effect of Context," Journal of Research in Music Education, Bulletin No. 3, Spring, 1964, pp. 63-66.

singing musical intervals will differ, depending on the context in which the interval appears. He also wished to discover if those who make errors in singing a given interval presented in melodic context will tend, also, to make errors in singing the same interval presented in isolation. Marquis found little consistency between the ability to sing an interval in isolation and the ability to sing it in melodic context. The percentage of errors made in singing an isolated interval tended to differ from that made in singing it under various conditions of context.

Ortmann states the following concerning pitch direction:

> In all melodic work it is advisable to keep in mind the visual outline of the melody in notation since there is a close similarity between what the ear hears and what the eye sees.
>
> Ascending Examples, other things equal, are somewhat easier than descending examples. The ascending third, for example, is missed less frequently than the descending third, the ascending fifth less frequently than the descending fifth. Such a distribution is natural considering the basically ascending nature of our tonal system.
>
> The psychological difference, however, is not sufficiently marked to make such a distribution inevitable. Sufficient drill with descending examples can neutralize the difference and, under certain conditions, could probably even reverse it.[12]

Jersild and Bienstock,[13] conducted a similar study in which they found that by specific training programs,

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[12] Ortmann, Research . . ., op. cit.

[13] A. T. Jersild, and S. F. Beinstock, "A Study of the Development of Children's Ability to Sing," Journal of Educational Psychology, (1934), 481-503.

the initial ability to sing may be improved, and this improvement is a relatively permanent one.

Hutton[14] was concerned with a similar study. The problem here was to find out which method of teaching sight reading to fourth grade students was better. The subjects were divided into control and experimental groups, and each group was given a post-test and a pre-test. The experimental group was exposed to sight reading without the aid of any special visual materials. The experimental group was taught sight reading with the aid of flash cards, musical games, and slides used with the opaque projector. The flash cards used contained all of the intervals of the songs taught during the year. The results showed a significant increase in the sight singing ability of both the control and the experimental groups. The experimental group made a higher average on the final sight reading test. It was considered highly probable that the use of audio-visual devices in teaching music reading to fourth grade students would accelerate the learning process to a significant degree. There was no positive evidence available to indicate any correlation between music sight reading ability and reading achievement at this level. Hutton's research was significant for this study because reading achievement and sight reading ability

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[14]Hutton, op. cit., p. 1.

were considered. Test IV, the Verbal Reading Test of the present research, is correlated with the four tests containing music notation.

Madsen[15] found a highly significant difference between the intonation of unaccompanied solo vocal performances with reference to scale direction. There were no consistent patterns of difference between individual subjects or groups. The students with greater formal training sang with greater pitch accuracy. He further found that piano and violin players sang with as much pitch acuity as vocal majors. Finally, it was found that the relative difference between ascending and descending patterns remains constant regardless of practice. This study seems to indicate that music background is an important factor in music reading achievement.

In light of the research found in the field of music reading, perceptual time span, factors in music reading and sight singing, the writer was convinced that the study undertaken was necessary. King was primarily concerned with I. Q. as a factor in music reading achievement. His research indicated that there was a relationship between I. Q. and music reading achievement.

Petzold, Hanson, Drexel and Madsen were all concerned with music background as a factor in music reading

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[15]Clifford K. Madsen, "The Effect of Scale Direction on Pitch Acuity in Solo Vocal Performance," (unpublished Ph.D. dissertation, Florida State University, 1963).

achievement. Petzold concluded that music background is not significant in music reading ability. As a result of his research, he pointed out that no significant difference in the ability to read music was found between subjects with one or more years of instrumental training and subjects with no such training. Hanson's research pointed out that one or two years of music training made a significant difference in the ability to read music, but beyond two years made little difference. Drexel's research indicated that a richer musical environment contributes to music achievement more than a poorer musical environment. Madsen found a significant relationship between music reading achievement and music background.

Ortmann and Drexel were concerned with age as one of the factors in reading achievement in music. Ortmann stated that age is not a factor in the development of aural comprehension. His research is significant for the present study because students from the fourth grade to college seniors were used as subjects. Drexel concluded, as a result of her research, that with an increase in age in the average child, there is an increase in the ability to sing a melody.

Hanson's research seemed to indicate that class marks in ear training courses correlated closely with music reading ability. Hanson's research is significant

for the present study. Each student participating in the present study was administered a sight reading test. The results of the test was correlated with the other factors thought to be significant in music reading achievement. Hutton pointed out in her research that there was no evidence available to indicate any correlation between music sight reading ability and reading achievement at the fourth grade level.

Finally, Hammer's research indicated that perceptual time span is an important factor in relation to music reading achievement.

CHAPTER III

PRESENTATION AND ANALYSIS OF THE DATA

The statistical analysis of the data was undertaken to discover evidence of any relationship that perceptual time span, intelligence quotient, music background and verbal reading have to music reading. This chapter is devoted to presenting the findings of the study and their meanings. The analysis of the data were organized in the following sections: (1) music background information, (2) data concerning the sight singing test, (3) the four perceptual tests, (4) intelligence quotient, (5) perceptual time span, and (6) the data concerning the tachistoscopic speeds. For the purposes of this study, the meaning of the correlation coefficients are as follows:

r from .00 to $\pm$ .20 very low or negligible
r from .20 to $\pm$ .40 low, present but slight
r from .40 to $\pm$ .70 substantial or marked
r from .70 to $\pm$ 1.00 high to very high.[1]

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[1]Garrett, op. cit., p. 100.

Music Background Information

Statistics Describing Music Background Information

The statistics describing music background information are presented in Table 1. The statistics include the particular group concerned, the music background information mean score for each particular group of subjects, the standard deviation, and the number of subjects in each group.

TABLE 1.--Music background information scores.

Subject	Mean Score	Standard Deviation	Number
College music subjects	44.41	13.29	100
College non-music subjects	22.50	10.58	20
High school subjects	22.46	11.43	26
Junior high school subjects	12.43	4.57	30
Grade school subjects	8.03	2.86	30

As could be expected, there is a decreasing mean attainment with each sample of the experimental population. Students with limited music backgrounds achieved a lower mean score. A decreasing deviation size can also be noted in Table 1. As the standard deviation diminishes, it indicates more homogeniety in the group. This would be

natural since differences in background would tend to be more diffused as the students' musical training increases.

In order to determine whether the above differences between groups were significant, an analysis of variance was run. The results of the analysis of variance appear in Table 2.

TABLE 2.--Analysis of variance of music background information.

Source of Variance	Sum of Squares	df	Mean Square	F	Significance
Between	46796.54424	4	11699.1360	99.137	0.005*
Within	23719.98487	201	118.0099		
Total	70516.52913	205			

*Statistically significant.

The results of the analysis of variance revealed that there were significant differences between some of the groups of the sample. The analysis of variance revealed that the differences between groups reached statistical significance at the 0.005 level.

T tests were calculated to investigate the mean scores in order to find which of the differences between the means described in Table 2 were statistically significant. The results of those comparisons which revealed statistical significance are presented in Table 3.

TABLE 3.--Significance of the differences between the mean scores of music background information.

Categories Compared	Mean	t	df	Significance
High school Grade school	22.46 8.03	5.65	54	.01*
High school Junior high school	22.46 12.43	3.34	54	.01*
College non-music Junior high school	23.50 12.43	2.17	48	.05*
College non-music Grade school	23.50 8.03	6.00	48	.01*
Grade school College music	8.03 44.41	5.11	128	.01*

*Statistically significant.

The t tests proved to be significant in most of the cases at the .01 level, the single exception being the college non-music majors and the grade school students where the .05 level of significance was reached.

In order to ascertain the degree of relationship between music background and the other variables which were thought to have a high degree of relationship to music reading achievement, correlations were calculated between music background and the Sight Singing Test, the Notation Copy Test, the Aural Recognition Test, and the Performance Test, the Verbal Reading Test, intelligence, and perceptual time span. The results of these correlations are shown in Table 4.

TABLE 4.--Correlations between music background and the other variables.

	Intelligence Quotient	Sight Singing	Perceptual Speed .5 second	Perceptual Speed .2 second	Perceptual Speed .1 second	Perceptual Speed .04 second	Perceptual Speed .02 second	Notation Copy Test	Aural Recognition Test	Performance Test	Verbal Recognition Test	Total Four Tests
College music	.061	.092	.104	.230**	.179	.140	.100	.199	.010	.204**	.096	.211**
College non-music	.018	.492**	.755*	.349	.383	.167	.384	.424**	.608*	.723*	.057	.629*
High school	.016	.080	.493*	.435*	.662*	.609*	.366	.233	.550*	.531*	.493*	.666*
Junior high school	.114	.272	.055	.144	.206	.231	.034	.000	.178	.000	.244	.139
Grade school	.109	.039	.157	.114	.030	.095	.097	.000	.177	.000	.124	.075

*.01 Level of Significance.
**.05 Level of Significance.
.000 Did not participate in the test.

Table 4 reveals that music background did not correlate significantly with intelligence for any of the five groups of students participating in this study. The Sight Singing Test correlated significantly with music background only for the college non-music majors. The correlation between sight singing and music background was .492 for the college non-music majors. A correlation at the .492 level of significance indicates a substantial or marked relationship between the two variables correlated. Music background correlated significantly with only one of the perceptual time speeds used in the study. The correlation was .230 for the perceptual time speed of .2 second. The group achieving this correlation was the college music majors. A correlation of .230 reveals a low, but present, association between music background and the perceptual time speed of .2 second. The correlation between music background and perceptual time span was .755 for the perceptual time speed of .5 second for the college non-music majors. This particular correlation was significant at the .01 level of significance and reveals a high relationship between the two items correlated. The high school student's music background correlated significantly with most of the perceptual time speeds used, the single exception being .02 second. There were no significant correlations between music background and the perceptual

times used for the junior high school or the grade school students.

Correlations between music background and the four tachistoscopically administered tests were only statistically significant for test number three, the Performance Test. The correlation between these two variables, made by the college music majors, was .204 which is a low but present correlation, and the correlation was significant at the .05 level. The total of the four perceptual tests and music background correlated statistically significant for the college music majors, the college non-music majors, and the high school students. The correlations were .211, .629, and .666, respectively. All of these correlations were significant at the .01 level.

These findings do not support research by Drexel or Madsen. Drexel's research indicated that a richer musical environment contributes to music achievement more than poorer musical environments. Madsen found a significant relationship between music reading achievement and music background. Research by Petzold and Hansen does, however, support the findings of this study. Petzold pointed out that music background is not significant in music reading ability. As a result of his research he concluded that no significant differences in the ability to read music was found between subjects with one or more years of instrumental training and subjects with no such training.

Hanson's research pointed out that one or two years of music training made a significant difference in the ability to read music, but beyond two years made little difference. The present study indicates that there is a very slight relationship between music background and music reading achievement. Though the standard deviations for music background decreased as the students' music training increased, indicating more homogenity in the group, and pointing out that differences in music background tended to be more diffused as the students' training increased, music background did not prove to have a high degree of relationship with music reading achievement.

The Sight Singing Test

In order to examine the association of music reading achievement and the ability to sight sing, it seemed appropriate to administer two sight singing tests. The first test was administered to the college music students.

Another sight singing test was administered to the other students participating in the study: the college non-music majors, the high school students, the junior high school students, and the grade school students. The statistics describing the sight singing test scores achieved by the various groups of students appear in Table 5.

TABLE 5.--Statistics describing the sight singing test.

Subjects	Mean	Standard Deviation	Number
College non-music	46.10	15.18	20
High school	39.66	9.65	26
Junior high school	34.76	3.23	30
Grade school	36.46	6.93	30

Table 5 reveals that there is a decreasing mean attainment with each sample of the experimental population, the single exception being the grade school subjects. Students with more training in music achieved a higher mean score. The mean score for the college music majors was 46.10 and the standard deviation was 15.18. The low standard deviation for the college music subjects may be low because they are good singers, or because the sight singing test was too easy or too hard and failed to discriminate. The high standard deviation in the case of the college non-music subjects is indicative of the fact that their abilities to sight sing were well separated.

An analysis of variance was run in order to determine whether the differences between groups on the sight singing test were significant for the college non-music majors, high school students, junior high school students, and grade school students. The results of the analysis of variance appear in Table 6.

TABLE 6.--Analysis of variance of the sight singing test.

Source of Variance	Sum of Squares	df	Mean Square	F	Significance
Between	142336.38347	3	3324.849	560.894	0.005*
Within	12580.00489	101	5.927		
Total	154916.38837	105			

*Statistically significant.

The results of the analysis of variance revealed that there were significant differences between some of the groups of the sample. The analysis of variance revealed that the differences between groups reached statistical significance at the 0.005 level.

T tests were calculated to investigate the mean scores of the college non-music students, the high school, junior high school, and grade school students in order to find which of the differences between the means described in Table 6 were statistically significant. The results of those comparisons which revealed statistical significance are presented in Table 7.

The mean scores of sight singing were only significantly different in two cases, the high school students and college non-music majors; and the college non-music majors and junior high school students.

TABLE 7.--Significance of the differences between the mean scores of the sight singing test.

Categories Compared	Mean	t	df	Significance
High school College non-music	39.66 46.10	7.43	44	.01*
Junior high school College non-music	34.76 46.10	6.80	48	.01*

*Statistically significant.

Correlations between the sight singing test and the other variables were calculated for the individual groups of students used in this study in order to ascertain the degree of relationship between sight singing and the other variables included in this study as being dependent upon music reading achievement. The results of these correlations are shown in Table 8. The data in Table 8 reveals that sight singing and intelligence did not correlate significantly for any of the groups participating in the study. This finding does not support the research by King. The results obtained by King indicated that there was a definite relationship between intelligence and the ability to read music. Poor music readers tested lower on the scale of intelligence than did good music readers. Only one of the perceptual time speeds correlated with sight singing. The speed was .02 (1/50) second and the correlation was .495. This correlation

TABLE 8.--Correlations between sight singing and the other variables.

	Intelligence Quotient	Music Background	Perceptual Speed .5 second	Perceptual Speed .2 second	Perceptual Speed .1 second	Perceptual Speed .04 second	Perceptual Speed .02 second	Notation Copy Test	Aural Recognition Test	Performance Test	Verbal Recognition Test	Total Four Tests
College music	.180	.092	.123	.098	.138	.022	.069	.182	.034	.053	.195	.127
College non-music	.045	.492**	.245	.026	.362	.166	.495**	.308	.083	.326	.082	.254
High school	.056	.080	.132	.312	.219	.614	.130	.109	.657	.000	.159	.431**
Junior high school	.071	.272	.323	.060	.071	.339	.343	.000	.036	.000	.293	.311
Grade school	.083	.039	.105	.112	.003	.287	.034	.000	.030	.000	.222	.088

*.01 Level of significance.
**.05 Level of significance.
.000 Did not participate in the test.

was obtained by the college non-music students. The aural recognition test was the only test of the four perceptual tests to correlate significantly with the sight singing test. The correlation, .657, reached the .01 level of significance and was obtained by the high school students. The total of the four perceptual tests also correlated significantly with the sight singing test and the group obtaining this correlation was the one consisting of the high school students. This .431 correlation reached the .05 level of significance which is a substantial or marked statistical relationship between the two items. The other variables did not correlate significantly with sight singing for any of the groups participating in the study.

The results of the foregoing analyses imply that music background, perceptual time span, verbal reading, and intelligence quotient have little if no relationship with the ability to sight sing. The aural recognition test was the only test which correlated significantly with sight singing. It can be noted that this correlation was at the .01 level of significance and was obtained by the high school subjects.

The Four Perceptual Tests

In order to investigate the four tachistoscopically administered tests as a single unit of measurement, the tests were combined and totaled. Descriptive statistics

for the four perceptual tests are contained in Table 9. Table 9 reveals that mean achievement reflected chronological age as was the case in several other areas tested. The standard deviation for the junior high school and elementary school students was small, which reflects a small spread of scores made by these two groups. This would be natural and indicates that the mean score on the total of the four tests increases as the grade level increases.

TABLE 9.--Statistics describing the four perceptual tests.

Subjects	Mean	Standard Deviation	Number
College music students	141.74	8.60	100
College non-music	130.15	6.82	20
High school students	90.62	8.70	26
Junior high school	67.77	3.23	30
Grade school students	60.03	3.21	30

Analysis of variance was computed in order to estimate the statistical significance of the differences between the five groups participating in the study. The results of these analyses are presented in Table 10. The results of the analysis of variance revealed that at least one of the various pairs of differences was unlikely to have happened by chance. The differences between groups reached statistical significance at the 0.005 level.

TABLE 10.--Analysis of variance of the totals of the four perceptual tests.

Source of Variance	Sum of Squares	df	Mean Square	F	Significance
Between	246585.20338	4	61646.3008	115.432	0.005*
Within	10696.27721	201	53.2153		
Total	257281.48059	205			

*Statistically significant.

T tests were calculated to discover which of the mean scores of the total of the four perceptual tests were great enough to be statistically significant. The results of those calculations which showed significance are presented in Table 11.

The t tests proved to be significant in most of the cases at the .01 level, the exceptions being the college music students and the grade school students where the .05 level of significance was reached. In the other cases not reported, no significant difference was found between the four perceptual tests and the other variables.

In order to examine the association of the four perceptual tests and the other variables considered in this study, correlations were calculated between music background, the sight singing test, the five perceptual time speeds, intelligence and the total of the four

TABLE 11.--Significance of the difference between the mean scores of the totals of the four perceptual tests.

Categories	Mean	t	df	Significance
High school College non-music	90.62 130.15	2.4	44	.01*
High school College music majors	90.62 141.74	3.25	124	.01*
Junior high school College non-music	67.77 130.15	2.83	48	.01*
Grade school College non-music	60.03 130.15	2.73	48	.01*
Grade school College music majors	60.03 141.74	1.68	128	.05*

*Statistically significant.

tachistoscopically administered tests. The results of these correlations appear in Table 12.

Table 12 reveals that intelligence correlates with the four perceptual tests significantly for only the college music majors. The correlation was .224 and significant at the .05 level. Music background correlated significantly with the total of the four perceptual tests for the college music majors, the college non-music majors and the high school students. These correlations were significant at the .05, .01 and .01 level of significance respectively. Correlations between the four perceptual tests and sight singing were significant

TABLE 12.--Correlations between the totals of the four perceptual tests and the other variables.

	Intelligence Quotient	Music Background	Sight Singing	Perceptual Speed .5 second	Perceptual Speed .2 second	Perceptual Speed .1 second	Perceptual Speed .04 second	Perceptual Speed .02 second	Notation Copy Test	Aural Recognition Test	Performance Test	Verbal Recognition Test
College music	.224**	.211**	.127	.664*	.836*	.744*	.747*	.671*	.747*	.348*	.679*	.673*
College non-music	.164	.629*	.254	.803*	.803*	.728*	.493**	.495**	.512*	.665*	.872*	.659*
High school	.039	.666*	.431**	.855*	.829*	.740*	.773*	.681*	.320	.713*	.000	.878*
Junior high school	.028	.139	.111	.449*	.480*	.659*	.462*	.380	.000	.310	.000	.834*
Grade school	.209	.075	.088	.620*	.765*	.149	.179	.579*	.000	.866*	.000	.641*

*.01 Level of Significance.
**.05 Level of Significance.
.000 Did not participate in the test.

at the .05 level only for the high school students. The perceptual time speeds used in the study correlated significantly with the four perceptual tests for most of the groups concerned with the study, the exceptions being the .1 second and the .04 second perceptual speeds for the grade school students; and the .02 second for the junior high school students. The notation copy test, performance test, and aural recognition test correlated significantly with the total of the four tests for the college music majors and the college non-music majors. The aural recognition test correlated significantly with the tests at the .01 level for the junior high school and the high school students. The correlation between the four perceptual tests and the verbal reading test was significant at the .01 level for all of the students in the study.

The Four Individual Perceptual Tests

Though the total of the four tachistoscopically administered perceptual tests was discussed previously, Table 13 presents the descriptive statistics for each test.

The standard deviations in Table 13 indicate that the notation copy test and the performance test were very discriminating. They separated the students' abilities well. The high standard deviation on these two tests reveals that the students who scored high and low have

TABLE 13.--Statistics describing the four perceptual tests.

Test	Reliability	Mean	Standard Deviation
The Notation Copy Test	.91	20.99	13.87
The Aural Recognition Test	.90	42.53	4.37
The Performance Test	.88	20.41	17.58
The Verbal Reading Test	.90	27.56	4.50

high and low abilities. This is expected because we have a high range of scores for these two tests. The Aural Recognition Test and the Verbal Reading Test, on the other hand, did not discriminate between the abilities of the students as well.

Intelligence Scores

The statistics concerning intelligence are based on information obtained from two sources. Raw scores were obtained for the high school, junior high school and the grade school students from their individual schools. All of these students had been administered the California Test of Mental Maturity. The College Entrance Qualification scores were obtained for the college students. Tables 14 and 15 present the descriptive statistics concerning intelligence.

TABLE 14.--Statistics describing intelligence for the college students.

Subjects	Mean	Standard Deviation	Number
College music students	146.94	24.22	100
College non-music students	123.10	23.22	20

TABLE 15.--Statistics describing intelligence for the public school students.

Subjects	Mean	Standard Deviation	Number
High school students	70.42	18.71	26
Junior high school students	85.40	15.47	30
Grade school students	80.20	13.72	30

In order to determine whether the above differences between groups were significant, an analysis of variance was run. The results of the analysis of variance appear in Table 16.

TABLE 16.--Analysis of variance of intelligence scores for the public school students.

Source of Variance	Sum of Squares	df	Mean Square	F	Significance
Between	259271.20896	4	64817.8022	32.004	0.005*
Within	407073.78620	201	2025.2427		
Total	666344.99517	205			

*Statistically significant.

The results of the analysis of variance revealed that there were significant differences between some of the groups of the sample. The analysis of variance indicated that the differences between groups reached statistical significance at the 0.005 level.

The correlations in Table 17 show that intelligence did not relate significantly with the sight singing test, music background, the Verbal Recognition Test, the Performance Test, or the Aural Recognition Test. There was only one correlation that was significant between intelligence and the five perceptual time speeds used. The time was .02 second, and the correlation, significant at the .05 level, was obtained by the junior high school students, and the college music majors. The total of the four perceptual tests correlated with intelligence at the .05 level of significance. The group obtaining this correlation was the college music majors. The correlations obtained between intelligence and the other variables were all low. Based on the data for these correlations, it can be concluded that there is no appreciable relationship between intelligence and sight singing ability.

Analysis of Perceptual Time Span

The speeds used in the four perceptual tests to project the music and verbal phrases on the screen by an overhead projector with an attached tachistoscope were:

TABLE 17.--Correlations between intelligence quotient and the other variables.

	Background	Sight Singing	Perceptual Speed .5 second	Perceptual Speed .2 second	Perceptual Speed .1 second	Perceptual Speed .04 second	Perceptual Speed .02 second	Notation Copy Test	Aural Recognition Test	Performance Test	Verbal Recognition Test	Total Four Perceptual Tests
College music	.061	.188	.191	.134	.132	.172	.235**	.138	.037	.152	.180	.224**
College non-music	.018	.045	.081	.123	.025	.148	.007	.112	.146	.051	.321	.164
High school	.016	.056	.185	.006	.109	.018	.135	.364	.161	.000	.094	.185
Junior high school	.109	.083	.245	.260	.291	.290	.422**	.000	.203	.000	.078	.209
Grade school	.114	.071	.344	.067	.083	.196	.162	.000	.080	.000	.075	.028

*.01 Level of Significance.
**.05 Level of Significance.
.000 Did not participate in the test.

one-half second; one-fifth of a second; one-tenth of a second; one twenty-fifth of a second; and one-fiftieth of a second. Table 18 presents the descriptive statistics for the various times used in the study. Table 18 reveals that there is an increasing mean attainment with each sample of the experimental population. Less musically mature subjects achieved a lower mean score.

In order to determine whether the differences between groups were significant, five analyses of variance were run. The results of these analyses appear in Table 19.

The results of the analysis of variance revealed that there were significant differences between groups of the sample. The analysis of variance problems revealed that the differences between groups reached statistical significance at the 0.005 level.

Table 8 reveals that only one of the perceptual times used, .02 seconds, correlated significantly with sight singing test. The correlation between these two variables was significant at the .05 level, and was obtained by the college non-music majors. There were significant correlations between the totals of the four perceptual tests and the perceptual times used in this study for each group of the sample population. All of the perceptual times were significant at the .01 level for the college music majors, and the high school

TABLE 18.--Statistics describing perceptual time.

Subject	Time (seconds)	Mean	Standard Deviation
College music majors	.5	32.77	2.39
" " "	.2	33.88	2.86
" " "	.1	28.41	2.40
" " "	.04	24.29	2.03
" " "	.02	22.68	1.95
College non-music majors	.5	28.85	2.39
" " "	.2	31.90	2.22
" " "	.1	26.50	2.25
" " "	.04	22.25	1.41
" " "	.02	20.65	1.50
High school students	.5	20.38	1.68
" " "	.2	22.38	2.52
" " "	.1	18.08	1.85
" " "	.04	15.50	1.26
" " "	.02	14.27	1.37
Junior high school students	.5	13.77	1.50
" " " "	.2	16.50	1.43
" " " "	.1	13.33	1.62
" " " "	.04	12.00	1.95
" " " "	.02	11.16	0.95
Grade school students	.5	12.53	1.36
" " "	.2	15.13	1.57
" " "	.1	12.46	0.97
" " "	.04	10.00	1.26
" " "	.02	9.90	1.37

TABLE 19.--Analysis of variance of perceptual time.

Variance	Source of Variance	Sum of Squares	df	Mean Square	F	Significance
.5 Sec.	Between	15333.18486	4	3833.2962	888.4348	0.005*
	Within	867.24718	201	4.3147		
	Total	16200.43204	205			
.2 Sec.	Between	13299.39813	4	3324.8495	560.894	0.005*
	Within	1191.48092	201	5.9278		
	Total	14490.87864	205			
.1 Sec.	Between	9006.20809	4	2251.5520	527.745	0.005*
	Within	857.53949	201	4.2664		
	Total	9863.74758	205			
.04 Sec.	Between	7598.97391	4	1899.7435	460.609	0.005*
	Within	829.00667	201	4.1244		
	Total	8427.98059	205			
.02 Sec.	Between	5740.86799	4	1435.2174	513.193	0.005*
	Within	562.12539	201	27.9664		
	Total	6302.99515	205			

*Statistically significant.

students. The correlations between the perceptual times and the totals of the four perceptual tests reached the .01 level of significance for all of the perceptual speeds used except the time of .04 second which reached the .05 level of significance. The junior high school student's correlations between the perceptual times and the four perceptual tests were significant at the .01 level for each time except the .04 second. The correlations between the perceptual times and the totals of the four tests were significant at the .01 level for the grade school students for most of the speeds used, however, the perceptual times of .1 and .04 seconds were not significant.

The various perceptual times were used in this study in an attempt to determine if the students with the fastest perceptual time span were the best music readers.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Purpose of the Study

The purpose of this study was to discover evidence of any relationship that perceptual time span, intelligence quotient, music background and verbal reading have to music reading achievement.

Review of Literature

Research into music reading, aural and visual perception, factors in music reading, music background, and sight singing were investigated in an attempt to discover which variables were pertinent to music reading achievement.

Procedure

Two hundred and six students were selected for the study, which consisted of 100 music majors, twenty college non-music majors, twenty-six high school subjects, thirty junior high school subjects, and thirty grade school subjects. One hundred and twenty glass slides were

constructed for the study. Some slides contained three, four, five, and six note musical motives and others contained short verbal phrases or sentences. An overhead projector with an attached tachistoscope was used to project the slide material on a screen.

The subjects were administered a variety of tests. The tests consisted of a sight singing test, four perceptual tests, and a music background questionnaire. Finally, intelligence quotient scores were obtained for the public school students, and the college entrance scores were obtained for the college students participating in the study.

Presentation of the Data

The data for music background information, the sight singing test, intelligence quotient and the four perceptual tests were all treated statistically to discover the degree of relationship which these variables had to music reading achievement. Correlations, analysis of variance and *t* ratios were performed on the data.

Conclusions and Recommendations

Investigation of the data gathered in this study revealed that the factors thought to have a high degree of relationship to music reading achievement did not prove to be highly significant. Although this is true, several conclusions can be drawn and recommendations made based on the data.

Music Background

Music background was not found to have a high degree of relationship with intelligence, the sight singing test, perceptual time span, the verbal reading test, or the three tachistoscopically administered music tests. The data does not support research by Drexel or Madsen. Each of them found a significant relationship between music background and music reading achievement. Petzold's and Hansen's research does, however, support the findings of this study. They pointed out that music background is not significant in music reading achievement. Traditionally music educators have assumed that music background was a significant factor in music reading achievement. Though the data of the present study indicated that differences in music background tended to be more diffused as the students' musical training increased, the correlations between music background and the other variables were not significant for any particular group of the experimental population. Only small relationships between music background and music reading achievement were found, which means that students with a rich music background will not necessarily achieve a high level of accomplishment in music reading.

Perceptual Time

The data concerning perceptual time span does not support research by Hammer. Hammer's research indicated

that perceptual time span is an important ability in music reading achievement. The present study points out that perceptual time span did not have a significant relationship with the variables thought to be significant to music reading achievement. Music background, intelligence, the sight singing test, the verbal reading achievement test, or the four tachistoscopically administered music tests did not have a significant relationship with perceptual time span. Though there was an increasing mean attainment with each sample of the experimental population, indicating that subjects with less music training achieved a lower mean score, the relationship between perceptual time span, for each time used, and the other variables was not highly significant. The correlations were practically the same for all subjects of the experimental population. It is concluded that perceptual time span does not seem to make a difference in the ability of normal children to read music.

Intelligence

Intelligence was not found to have a high degree of relationship with the sight singing test, perceptual time span, the verbal reading test or the three tachistoscopically administered music tests. The data does not support research by King who found a high level of significance between intelligence and music reading achievement. His research indicated that there was a

definite relationship between intelligence and the ability to read music. Poor music readers tested lower on the scale of intelligence than did good music readers.

Based on the data is the conclusion that within the range of the intelligence level of the students of this study, there is no appreciable relationship between intelligence and sight singing ability.

Verbal Reading

In this study, there was no relationship found between verbal reading ability and music reading ability.

Music background, perceptual time span, verbal reading ability and intelligence have little if any bearing on the ability to read music as indicated by the data of this study. It is strongly indicated that music reading ability does not necessarily relate to the above factors; therefore, it can be concluded that "music reading is a special ability and should be treated as one." If the teaching of music reading is a special goal of music education, then new programs must be devised which are geared towards music reading and which employ new approaches.

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APPENDICES

APPENDIX A

SUMMARY TABLE FOR THE CORRELATIONS BETWEEN THE FOUR PERCEPTUAL TESTS AND INTELLIGENCE, THE SIGHT SINGING TEST, AND MUSIC BACKGROUND FOR THE VARIOUS GROUPS PARTICIPATING IN THE STUDY

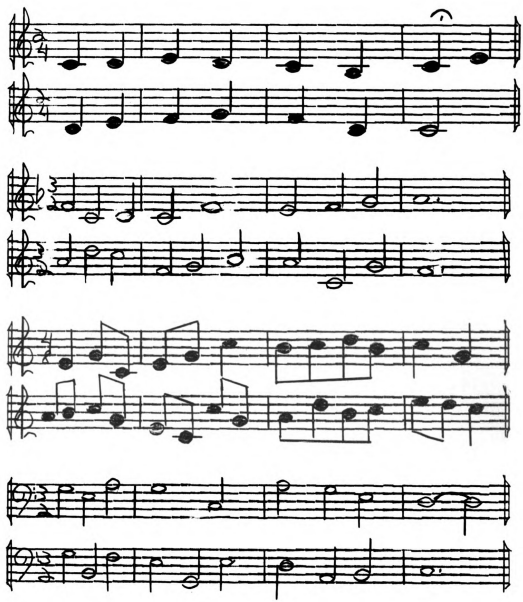
Correlations between the four perceptual tests and intelligence quotient, the sight singing test, and music background.

Test	Intelligence Quotient	Sight Singing	Music Background
The College Music Majors			
The Notation Copy Test	.[illegible]**	.152	.199
The Aural Recognition Test	.[illegible]	.034	.010
The Performance Test	.[illegible]**	.053	.204**
The Verbal Recognition Test	.192	.195	.096
The College Non-Music Students			
The Notation Copy Test	.112	.[illegible]	.424**
The Aural Recognition Test	.14[illegible]	.2[illegible]	.60[illegible]*
The Performance Test	.0[illegible]	.3[illegible]	.7[illegible]*
The Verbal Recognition Test	.1[illegible]	.[illegible]	.[illegible]*
The High School Students			
The Notation Copy Test	.04	.1[illegible]	.[illegible]
The Aural Recognition Test	.1[illegible]	.[illegible]*	.[illegible]*
The Performance Test	.000	.000	.000
The Verbal Recognition Test	.[illegible]	.[illegible]	.[illegible]*
The Junior High School Students			
The Notation Copy Test	.[illegible]	.000	.000
The Aural Recognition Test	.[illegible]	.[illegible]	.[illegible]
The Performance Test	.000	.000	.000
The Verbal Recognition Test	.067	.293	.284
The Grade School Students			
The Notation Copy Test	.[illegible]00	.000	.000
The Aural Recognition Test	.[illegible]	.030	.177
The Performance Test	.[illegible]	.000	.000
The Verbal Recognition Test	.075	.232	.123

*.01 Level of Significance.
**.05 Level of Significance.
.000 Did not participate in the test.

APPENDIX B

MELODIC SIGHT-SINGING TEST



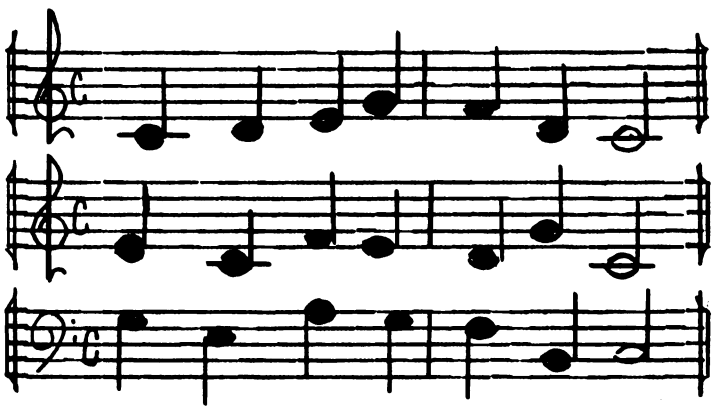
1. Sing a major scale up and down from any pitch, using numbers (20%).
2. Sing and spell the A major scale (15%)
3. Sing the following scale numbers with correct pitches in any major key (@ 1/2 14%): 1235431; 3143251; 5365471; 3426751.
4. Sing the pitches indicated by the numbers in the key of D major translating the numbers to letter names as you sing (@ 1/4 7%).
5. Sing the following melodies in correct pitch and rhythm (@ 1/4 44%).

1. Sing a major scale up and down from any pitch (35%).
2. Sing one of the following (A, B, or C) with correct pitch in any major key: (1 @ 21%)

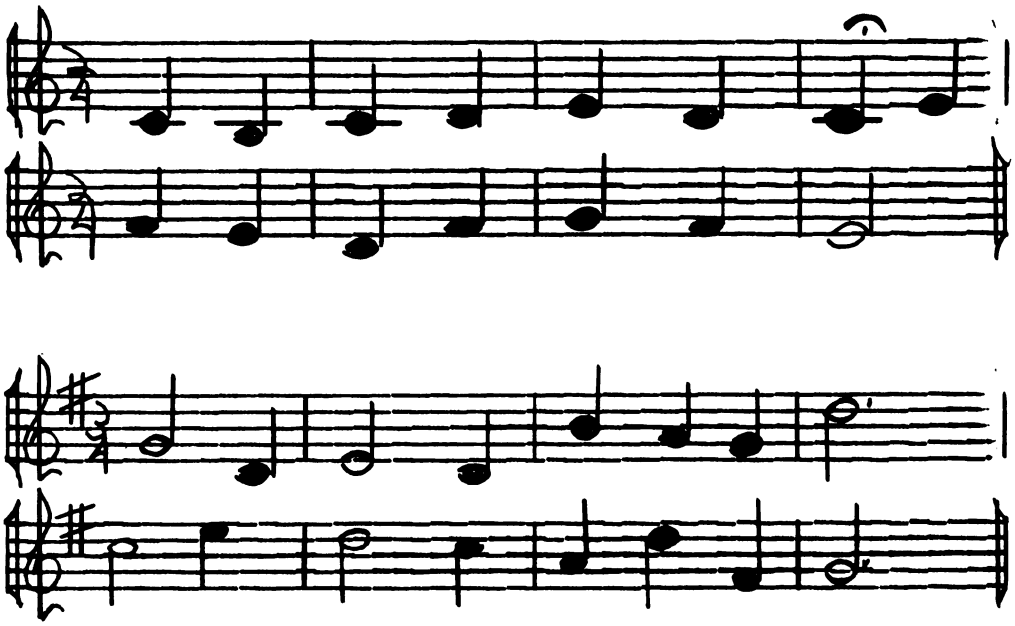
   A. 1235421; 3143251; 5365471

   B. Do, Re, Mi, Sol, Fa, Re, Do
   Mi, Do, Fa, Mi, Re, Sol, Do
   Sol, Mi, La, Sol, Fa, Ti, Do

C.



3. Sing the following melodies in correct pitch and rhythm. (1/2 @ 44%)



APPENDIX C

QUESTIONNAIRE FOR ALL SUBJECTS

QUESTIONNAIRE

Name_____

Class Level_____

Number of Persons in High School Graduating Class_____

Number of Music Teachers in High School:

Vocal_____ Instrumental_____

Check any of the following which apply to you. If the study occurred while in elementary school, place an E under class level, J for junior high school, S for senior high school and C for college.

Music Study		Class Level	Number of Months
Private Piano	_____	_____	_____
Private Voice	_____	_____	_____
Private Instrument (specify instrument)	_____	_____	_____
Class Piano	_____	_____	_____
Class Voice	_____	_____	_____
Class Instrumental (specify instrument)	_____	_____	_____

Music Courses in Junior-Senior High School

		Class Level	Number of Months
Music Literature	_____	_____	_____
Music Theory	_____	_____	_____
General Music	_____	_____	_____
Music Appreciation	_____	_____	_____
Other (specify)	_____	_____	_____

Performance Experience

Junior-Senior High School		Number of Semesters
School Chorus	_____	_____
Band	_____	_____
Orchestra	_____	_____
Small Ensemble	_____	_____
Stage Band	_____	_____
Church Choir	_____	_____
Church Instrumental	_____	_____
Other (Specify)	_____	_____

College		Number of Semesters
University Chorus	_____	_____
State Singers	_____	_____
University Orchestra	_____	_____
Women's Glee Club	_____	_____
Men's Glee Club	_____	_____
Marching Band	_____	_____
Informal Groups	_____	_____
Other (specify)	_____	_____

Recreational Instruments		Number of Years
Guitar	_____	_____
Ukelele	_____	_____
Banjo	_____	_____
Accordian	_____	_____
Other (specify)	_____	_____

Check any of the following items which are in your home:

Piano _____ Record Player _____
Organ _____ Television _____
Radio _____

Do any members of your family play a musical instrument?_____
If yes, specify the member and instrument_____
_____

Do any members of your family participate in any musical activities?_____ Specify the activity_____

Does your family attend musical events, i.e., concerts, recitals, etc.?

Never_____ Seldom_____ Frequently_____
Extensively_____

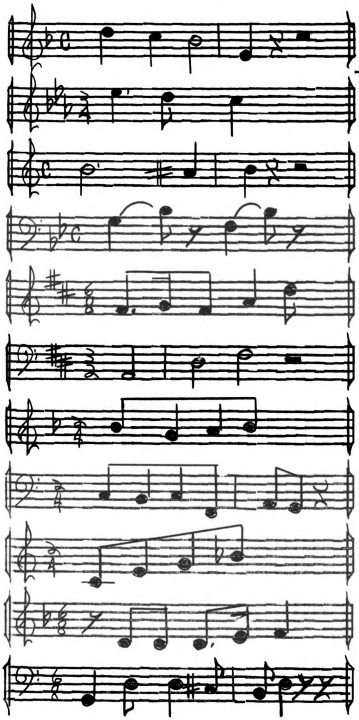
List the musical events, i.e., concerts, jazz festivals, etc., you have attended since entering Michigan State University. Exclude dances.

Check the types of music you most prefer:

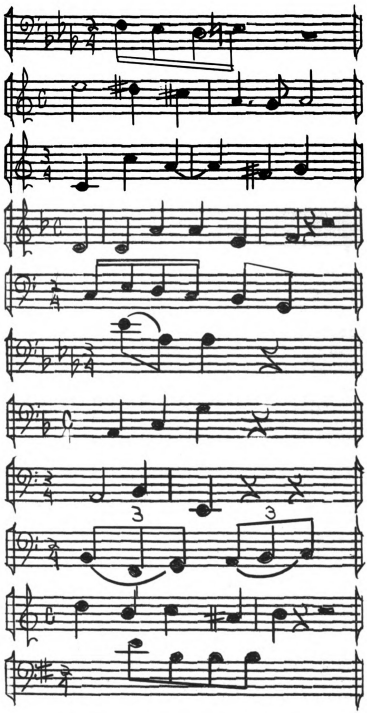
Classical	_____
Jazz	_____
Ballads	_____
Folk Music	_____
Sacred	_____
Show Tunes	_____
Rhythm and Blues	_____
Light Classics	_____
Opera	_____
Other (specify)	_____
	_____
	_____
	_____
	_____

APPENDIX D

SLIDE MUSICAL PHRASES



Musical Phrases for Test 1



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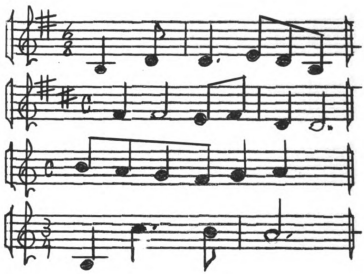
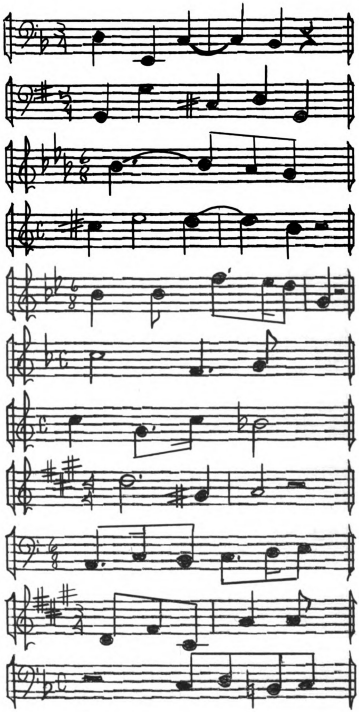
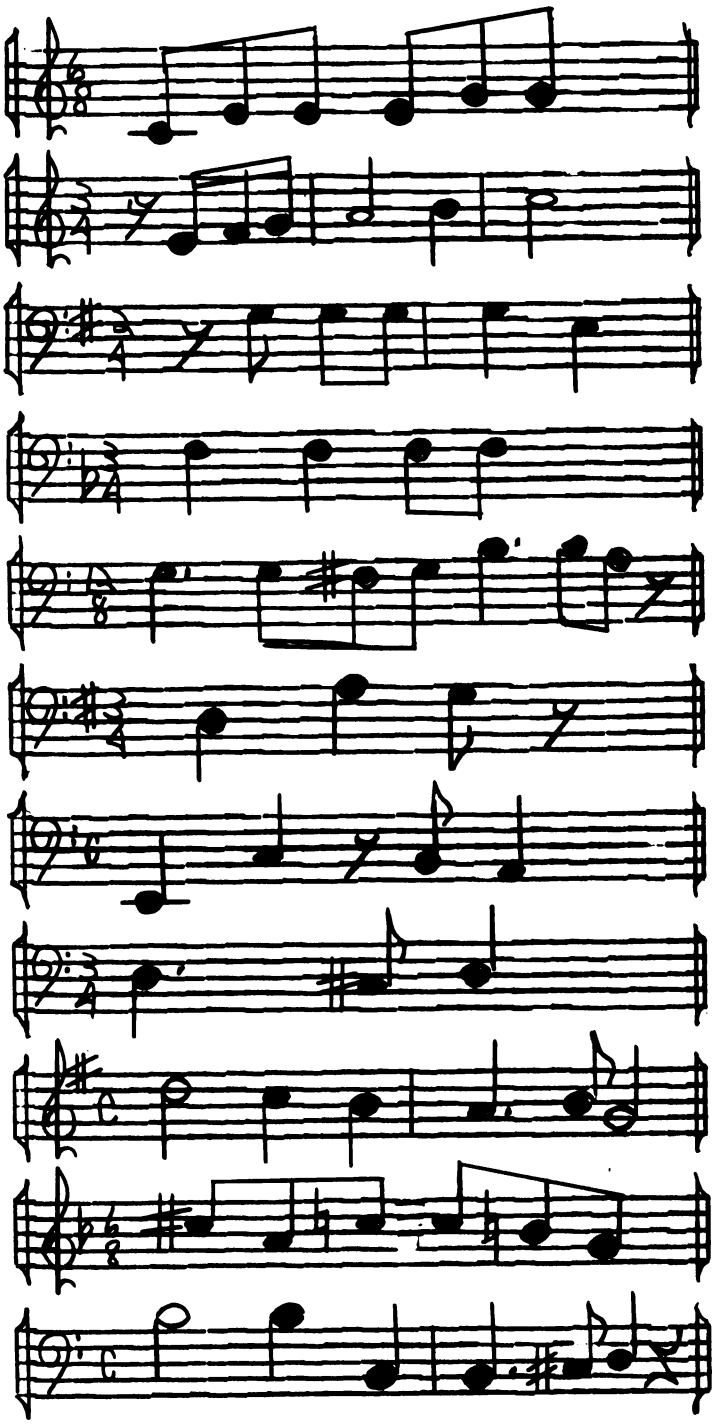


Musical Phrases for Test 1 (continued)



Musical Phrases for Test 2



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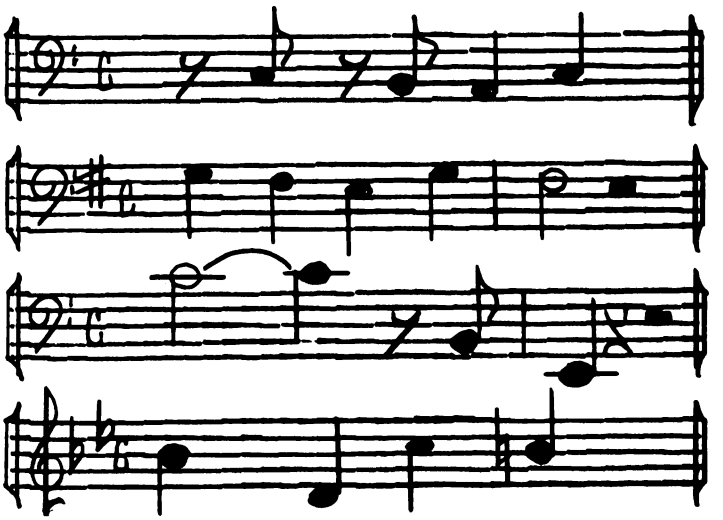
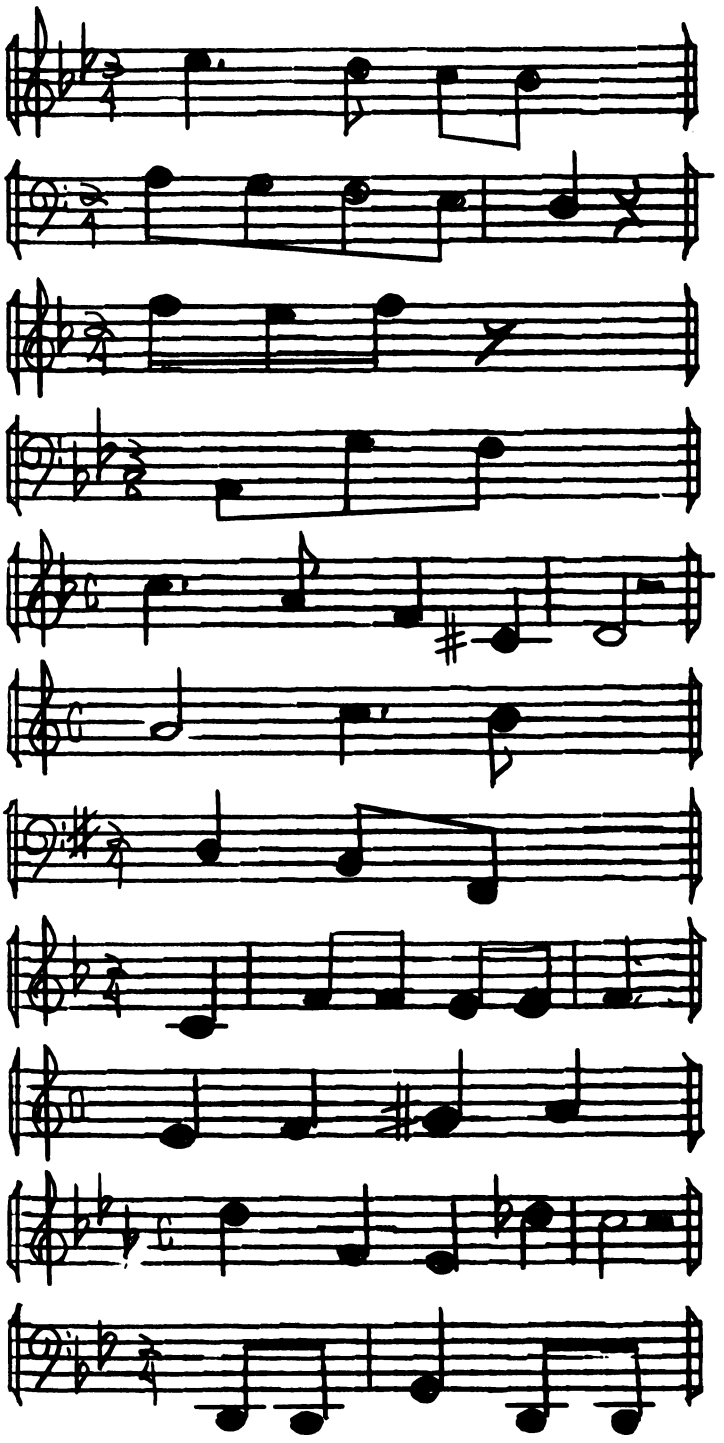
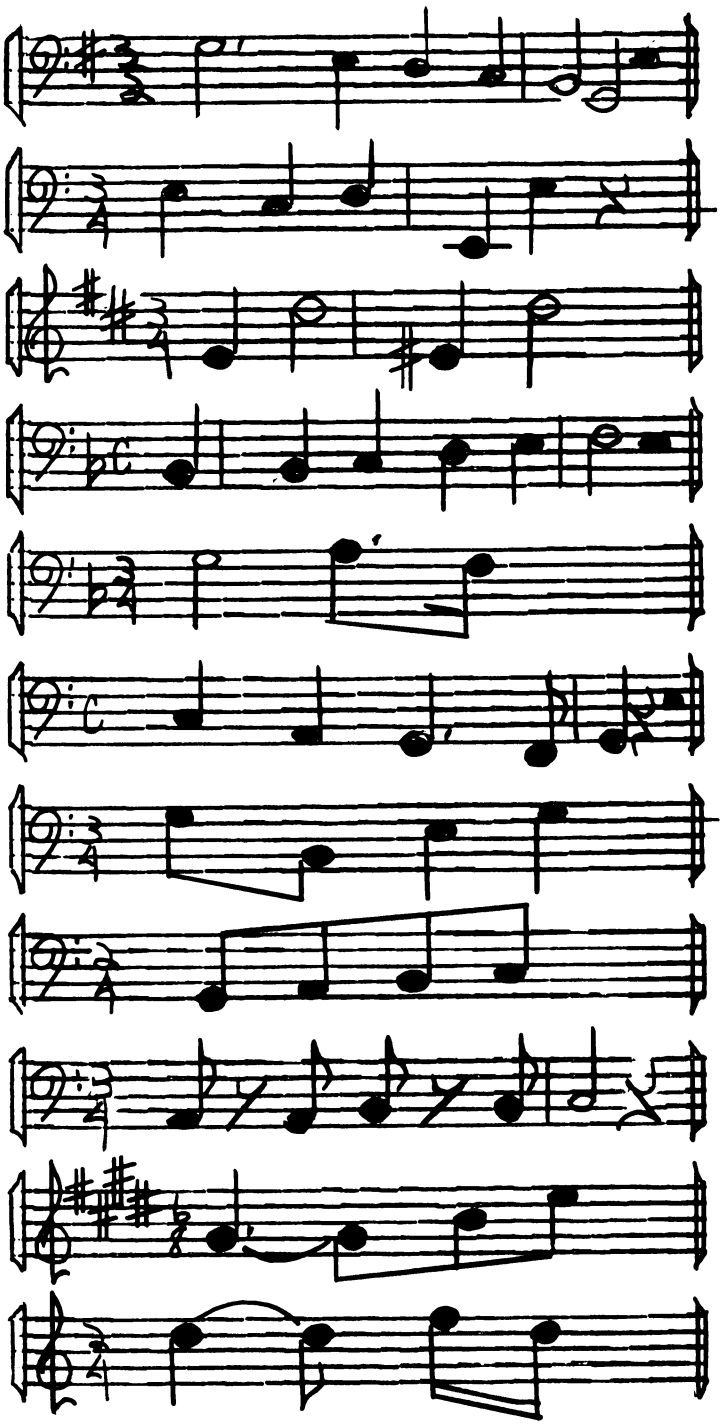


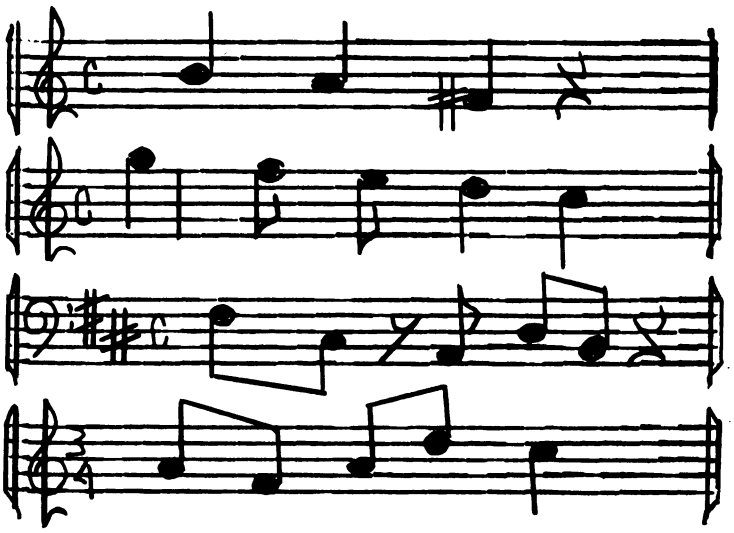
Musical Phrases for Test 2 (continued)



Musical Phrases for Test 3



Musical Phrases for Test 3 (continued)



Musical Phrases for Test 3 (continued)

APPENDIX E

VERBAL PHRASES

VERBAL PHRASES

1. The small boy will go to school.
2. The old men
3. When you come I will go.
4. The funny man
5. The red cow is going to the farm.
6. It is down there on the floor.
7. The white duck must go to the barn.
8. The black bird can fly to the nest.
9. May I go as he did?
10. You were too little for them.
11. We are to go at once.
12. The little chickens
13. I am at home all night.
14. The yellow cat
15. Then he said he would try.
16. The small boat
17. We were to stop at three.
18. The new coat was made for the girl.
19. I may get what I want.
20. You will like what I say.

APPENDIX F

TEST INSTRUCTIONS TO THE SUBJECTS

INSTRUCTIONS TO THE EXAMINEES

For the examiner:

SAY: Look at page one of your test booklet. It says: "instructions to examinees." Read these instructions silently while I read them aloud. They are: This is a test of aural-visual recognition. On page one of your answer booklet are twenty-six (26) music staves. You are to look at the exposure on the screen, and then write them on your answer sheet. The staves are numbered from one to twenty-six. Before each exposure, the examiner will say "exposure, number one, two, three, etc." He will then wait for approximately five seconds and then trigger the exposure.

Give the examinees time to discuss the directions and check to see if the information is properly understood.

SAY: When you have finished, wait for further instructions.

When the examinee has finished:

SAY: Now open the booklet to Test 2 and fold it back so that only the answer sheet shows.

Demonstrate and be sure that the examinee has Test 2.

SAY: In this test of aural-visual recognition, you are to look at the exposure on the screen. Next you are to listen to it or one similar which will be played on the tape recorder. Following this you are to mark a "C" in the square if the example heard is the same as the example exposed on the screen or a "F" if the example is different.

Give the examinees time to discuss the directions and check to see if the information is properly understood.

SAY: When you have finished, wait for further instructions.

When the examinee has finished:

SAY: Now open the booklet to Test 3 and fold it back so that only the answer sheet shows.

Demonstrate and be sure that the examinee has Test 3.

SAY: In this test of aural-visual recognition, you are to look at the exposure on the screen, next you are to listen to it or one similar which will be played on the tape recorder. After this you are to mark a "C" in the square if the example heard is the same as the example exposed on the screen or a "F" if the example is different.

Give the examinees time to discuss the directions and check to see if the information is properly understood.

SAY: When you have finished, wait for further instructions.

When the examinee has finished:

SAY: Now open the booklet to Test 4 and fold it back so that only the answer sheet shows.

Demonstrate and be sure that the examinee has Test 4.

SAY: This is test number 4. You are to look at the exposure on the screen and then play the exposed material on your instrument. (For the non-instrumental subjects, the subjects should sing the material).

Give the examinees time to discuss the directions and check to see if the information is properly understood.

SAY: When you have finished, wait for further instructions.

When the examinee has finished:

SAY: Now open the booklet to Test 5. This is the last test, test number 5. This time the exposure on the screen will be a short phrase such as "The boy is eating." You are to look at the exposure on the screen and then write exactly what you have seen on the answer sheet. There will be five exposures before the actual test begins.

Give the examinees time to discuss the directions and check to see if the information is properly understood.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