

AN EXPERIMENTAL STUDY OF THE
EFFECT OF PRACTICE UPON IMPROVEMENT
IN MELODIC DICTATION

Thesis for the Degree of Ph. D.
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Harry M. Langsford
1959



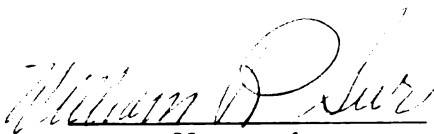
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UPON IMPROVEMENT IN MELODIC DICTATION

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Major professor

Date November 20, 1959



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AN ABSTRACT

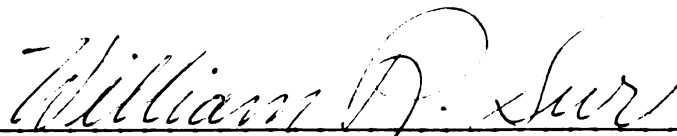
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DOCTOR OF PHILOSOPHY

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1959

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ABSTRACT

Statement of the problem

The problem under examination in this experimental study is one of major importance to the teacher of melodic dictation. Simply stated, the problem was to determine whether or not any relationship exists between the amount of practice time spent in melodic dictation and the amount of improvement shown over a given period of time.

This experimental study was founded upon one basic premise, which is that the skills involved in taking melodic dictation as well as the other skills which are dealt with in aural harmony courses are improvable. This empirical knowledge, however, had not been validated by sufficient experimental studies. It was with this lack of statistical information in mind that the present study was undertaken.

Methods of procedure

The population of the study was comprised of students from the writer's second-semester ear training classes at Wayne State University.

In order to gain the necessary knowledge of the relationship between practice and improvement, an experimental design was

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evolved whereby all participating students submitted to a controlled test-practice-retest situation.

The entire population at the beginning of the semester took a tape-recorded melodic dictation test devised by the writer, and individual scores were noted. In addition, a series of aptitude tests was given (Drake and Seashore), and three matched groups were formed on the basis of these test results. Each group was then assigned a different number of hours to practice melodic dictation during the semester; i.e., ten, twenty, or forty hours. At the end of the semester, after all practicing had been completed, the tape-recorded melodic dictation test was regiven. The scores from this testing were also noted and the variances between the two testings were subjected to statistical analysis so that the relationship between practice time and improvement could be computed. The same procedure was replicated a second semester to increase the size of the population and the validity of the results. The total population of the study was forty-eight students: twenty-seven the first semester and twenty-one the second semester.

Statistical analysis

The data thus obtained were subjected to various statistical techniques. A "t" test was employed to test the significance of the

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gains within and between all groups each semester. By means of the simple analysis-of-variance technique, an F ratio was computed for the total population of each experiment, and for the two experiments combined, to statistically determine the relationship between practice time and improvement.

Results of the study

1. Although the mean gains within each group both semesters were found to be significant, no significant statistical relationship was found to exist in either experiment between the amount of time spent in practicing melodic dictation and improvement.

2. Practice is effective, but the amount of improvement is not necessarily the result of, nor proportionate to, one factor only; i.e., amount of practice time.

3. All students, with only one exception, made improvement.

4. The twenty-hour groups, as a whole, seemed to show a somewhat higher mean gain than either the ten- or forty-hour groups.

5. Controlled experimentation in the area of melodic dictation is very difficult. In addition, the relatively small population of this study created limitations which must be recognized in the interpretation and application of the results. The uncontrolled variables such as the amount of practice time spent outside of class in

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sight-singing, rhythmic dictation, et cetera, undoubtedly influenced the individuals' amount of improvement in melodic dictation.

6. Students with more than three years of piano study tended to make more than the average amount of improvement.

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FOREWORD

For the past several years the author of this dissertation has been teaching harmony and ear training classes at Wayne State University, Detroit, Michigan. There has appeared over the years an increasing need for a more complete understanding of the relationship between practice and improvement in melodic dictation, one of the skills taught as a part of the education of a music major. Also, experience has indicated the desirability of an experimental study to determine, if possible, the underlying reasons for the wide variance in the amount of improvement in melodic dictation shown by students of this particular discipline.

It was for these reasons that the study was undertaken. Although the derived results are subjected to statistical analysis for purposes of validation and interpretation, the dissertation is basically a study in the field of music education and has many implications for the teaching of melodic dictation.

Special mention and thanks are due Dr. William Sur, who as Committee chairman gave unfailing support to the writer and much time and effort in offering many valuable suggestions. The author

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rington and Mr. Robert Unkefer gave much valuable counsel during the course of the experiments. The writer also wishes to express his gratitude to Miss Evelyn Holtorf of Wayne State University for her assistance with the statistical aspects of the study. Finally, the author would like to express his thanks and appreciation for constant help and encouragement at home.

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CHAPTER I

INTRODUCTION

Definition of the problem

Since music, unlike the visual arts and literature, is an art which exists in time, a temporal art, the training of a musician must take into account the temporal aspect of the subject matter under consideration and a methodology must be adopted which meets the specialized needs of the music student.

Music educators have long held the opinion, and rightly so, that courses in aural harmony, or ear training as the courses are sometimes called, afford training in many of the most important skills to be acquired by a musician. Some of the more important abilities to be acquired by a musician through training are as follows:

1. The development of an adequate tonal memory.
2. The development of a good perception of rhythm.
3. The development of the ability to transcribe into musical notation the melodic, rhythmic, and harmonic elements of music.

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4. The development of the ability to hear mentally the sounds and perceive the rhythms of musical notation apart from hearing the actual physical sounds of the music.

In essence, the last two abilities mentioned above simply mean that a music student through training must learn to see with his ears and hear with his eyes. The art of music demands that a high level of proficiency be attained in these special abilities if one is to be a successful, practicing musician.

The temporal aspect of the art of music places a much greater importance upon the faculty of memory than does the spatial quality of the visual arts or literature. The sounds of music must be heard and remembered as they occur in time. The intelligent listening to music requires that the listener be aware of not only the musical sounds being heard at any given moment, but also, the remembered sounds which have preceded this moment, as well as an anticipation of what the music might do in succeeding moments. This level of listening, which depends largely upon memory, is rarely reached by the untrained listener.

Because of its very fleeting quality, music demands of its students—if they are to become successful musicians—a high degree of tonal memory, rhythmic perception, and harmonic awareness. The subject under consideration in this study, the ability to do melodic

dictation, employs all of the aforementioned abilities to a greater or lesser extent.

One of the specific skills developed in ear training classes is the ability to accurately translate dictated aural melodies into musical notation, utilizing both rhythmic and melodic notation. This procedure is known as "melodic dictation."

It is apparent to teachers of melodic dictation that not all students reach the same level of achievement at the end of a given period of time even though exposed to the same amount of classroom instruction with the same teacher. This situation is not in any sense unusual nor limited to this particular musical skill. In all learning, individual differences play a most active role in the response of the student to the learning situation, and hence, in the student's level of achievement. The reasons for this apparent phenomenon are numerous and many answers are to be found in the functioning of the learning process itself as well as in the areas of heredity and environment.

The problem under examination in this experimental study is one of major importance to the teacher of melodic dictation. Its solution is of prime concern to all those involved not only in the teaching, but also in the administration, of ear training courses. The problem, simply stated, was to determine whether or not any

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relationship exists between the amount of practice and the amount of improvement shown in melodic dictation over a given period of time. The determination of whether such a relationship exists is of crucial importance to the pedagogy and methodology of aural harmony courses. It was with this need in mind—that is, the necessity to show either a positive or negative relationship between amount of practice and amount of improvement in melodic dictation—that this study was undertaken. When this relationship is known and understood, both the teacher and the student of ear training will be in a much better position to evaluate progress in this area: the teacher, to advise the student in relation to practice time; and the student, to better understand his progress or lack of progress.

This experimental study was founded upon one basic premise, which is that the skills involved in taking melodic dictation, as well as the other skills which are dealt with in aural harmony and ear training courses, are improvable.

One of the main considerations for the teacher of melodic dictation is the matter of how much drill or practice time is necessary on the part of each student in order to achieve the maximum or even a satisfactory amount of improvement during any one semester. Empirically, the teacher knows that the skills involved in the total procedure known as melodic dictation are improvable. As a

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result, this knowledge has led some to an unsafe assumption; i.e., that there is a direct relationship between the amount of practice in melodic dictation that a student does and that student's improvement in his ability to take melodic dictation. However, this assumption has no foundation in fact resulting from any experimental, statistical studies in this specific area. It was with this lack of statistical information in mind that the present study was undertaken. This study dealt directly and experimentally with the relationship between the amount of practice time and improvement in the ability to take melodic dictation as shown in the statistics derived from a test-practice-retest situation.

Nature of the study

This study was of an experimental nature and the results have been handled on a statistically sound basis in order to insure validity of judgments based on the derived statistics. The basic procedure was to compare the amount of improvement in the scores of individuals and groups on a melodic dictation test with the amount of time these same individuals and groups spent in practicing melodic dictation during one semester.

In order to gain the necessary knowledge of the relationship between practice and improvement a pattern was evolved whereby all

participating students submitted to a controlled test-practice-retest situation. After a series of aptitude tests were given, three matched groups were formed on the basis of the results of the testing, and each group was assigned a specific number of hours to practice melodic dictation during the semester. At the beginning of the semester the entire population of the experiment took a melodic dictation test and each individual score was noted. This same test was taken again at the end of the semester after all practicing was completed. The scores from this testing were noted and the variances between the two testings were subjected to statistical analysis.

This same procedure was carried on for two semesters with a replication of the first experiment carried over for a second semester. Each experiment, however, utilized a new group of students at the same course level; i.e., a second-semester ear training class. During a third semester certain additional information was derived which has been applied to the analysis of the results from the experimental groups.

In order to insure validity in the findings, as many variables as possible which might affect results were controlled. These included method of testing, time of testing, method of practicing, physical surroundings during testing and practicing, and the period of time during which practicing was to be completed.

The results from each of the two experimental groups individually, as well as from the combined group of the total population of the two experiments, have been tested for significant statistical differences and the findings compiled. From these findings certain conclusions have been drawn and recommendations made for the teaching of melodic dictation and for further experimentation.

Importance of the study

The issue involved in this study is one of great import to the pedagogics of aural harmony. It can be readily seen how the certain knowledge that a direct relationship existed between practice and improvement in melodic dictation would be reflected in the approach of both teacher and student to the study of this skill. Likewise, if the converse were shown to be true—that no relationship exists between practice and improvement—this knowledge, too, would be reflected in the approach to the subject.

Whether or not a teacher may prognosticate the improvement which can be expected from students on the basis of the number of hours these students spend practicing melodic dictation is also one of the basic, underlying issues of this experimental study.

There is a great need to know from experimental and statistical research just what relationship, if any, exists between practice

and improvement in melodic dictation. It is only with this certain knowledge that the teaching of melodic dictation will be assured of moving forward with a minimum of wasted effort and misguided advice. Only in this way can the teachers of melodic dictation be of the utmost assistance to their students. An understanding of the relationship between practice and improvement should also give both the teacher and the student a clearer concept of the psychological processes involved in the acquisition of this particular musical skill.

One basic premise underlay this experimental study; i.e., that improvement in the ability to take melodic dictation is possible for all students who possess normal auditory ability. The study was undertaken within the frame of reference of university music majors having reached the second-semester level in ear training.

It has been the purpose of this study to show how much improvement is achieved by a controlled number of students over a certain specified and controlled number of practice hours. An attempt has been made to relate directly the time spent in practicing to the improvement shown and to draw valid conclusions from the statistics thus derived. The handling of the material from this study should be meaningful in implementing the body of knowledge relative to the psychology of ear training and should be of

assistance to both teacher and student alike in gaining a greater understanding of the processes involved in the acquisition of this most important musical skill.

Relationship to other studies

Very little research has been carried on in the area which was the subject of this study. Much need has existed for a practical and yet statistically accurate approach to the problem of the relationship between practice and improvement in melodic dictation. No study has been undertaken to deal directly and solely with the skills involved in taking melodic dictation in the context of practice time as related to achievement in this area.

C. E. Seashore at the University of Iowa was a pioneer in the testing of musical aptitudes. In his earlier studies, Seashore contends that musical aptitudes such as pitch discrimination and tonal memory are not improvable; that these aptitudes had physiological limits set at birth and that training had no effect upon these aptitudes. However, since 1940, Wyatt observes that Seashore "concedes that his tests do not necessarily measure physiological limits and regards them as measures of abilities which are subject to improvement through environmental influences. . . ,"¹ which statement

¹Ruth F. Wyatt, "The Improvability of Pitch Discrimination," Psychological Monographs, LVIII, No. 2 (1945), 55.

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shows considerable alteration from his original viewpoint. As was stated earlier, this present study was undertaken with the basic premise in mind that the ability to take melodic dictation is improvable, a premise that is borne out in a number of related studies. Wyatt, in her study of the improvability of pitch discrimination, found that "pitch discrimination of initially pitch deficient adults was significantly improved after intensive training designed to be 'remedial.'",¹

These statements substantiate James Mursell's observation that "all things considered, we must regard the claim that pitch discrimination is a function which depends directly upon inherited structure and so cannot be influenced or improved by training as an unproved assumption."²

However, in an earlier study by Stanton, a different opinion is expressed more closely akin to Seashore's earlier observations. In this study she noted improvement in pitch discrimination after practice and greater improvement in ratio to longer periods of practice or training. She is inclined, however, to regard the change as

¹Ibid., p. 54.

²James L. Mursell, Psychology of Music (New York: Norton, 1937), p. 74.

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one in "cognitive" conditions "consequent upon general maturation rather than on musical training.",¹

In another study, made by Connette, it was found that the "average improvement in pitch discrimination in a group of twenty-three subjects amounts to approximately fifty percent in five days with the techniques used.",²

Another interesting approach to one of the abilities attributed to all successful musicians has been made by L. A. Hansen³ in his study of the ability of musicians to detect errors in the performance of music while inspecting the score. A number of other studies have been made dealing with the improvability of pitch discrimination or the effect of training on pitch discrimination and also rhythmic discrimination. In addition, E. H. Cameron has done a study in the discrimination and singing of tones.⁴

¹Hazel M. Stanton, Measures of Musical Talent ("University of Iowa Studies: Studies in the Psychology of Music," Vol. II, 1935), pp. 1-140.

²E. Connette, "The Effect of Practice with Knowledge of Results," Journal of Educational Psychology, VII (1941), 523-32.

³Louis A. Hansen, "A Study of the Abilities of Musicians To Detect Melodic and Harmonic Errors in the Performance of Choral Music While Inspecting the Score" (unpublished doctoral dissertation, University of Iowa, 1955).

⁴E. H. Cameron, "Effects of Practice in the Discrimination and Singing of Tones," Psychological Monographs, XXIII (1917), 159.

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Although other studies have dealt with various aspects of tonal memory or musical memory, such as those by Bogen¹ and Swadley,² none have dealt directly with the specific problem of improvement in melodic dictation as related to time spent in practice. These previous studies are related to the present study in that pitch discrimination, rhythmic recognition, and tonal or musical memory all are involved in the technique of taking melodic dictation. The present study combined all of the various aptitudes previously examined individually into a specific examination of the final product—melodic dictation.

This study filled the need for basic research in this important area in the training of a musician and should clarify some of the dilemmas regarding practice in which the teacher of ear training, as well as the student, sometimes finds himself.

¹David Bogen, "Significance of Tonal Memory and Sense of Pitch in Musical Talent" (unpublished Master's thesis, University of California at Los Angeles, 1933).

²Ellis Swadley, "Correlation between Measures of Musical Talent by Seashore and the Musical Memory Test by Drake" (unpublished Master's thesis, Ball State Teachers College, 1940).

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CHAPTER II

ORGANIZATION OF THE STUDY

Description of the experimental design

The principal factor considered in this study was the relationship between practice time and improvement in the ability to take melodic dictation. The problem was to relate the amount of improvement shown by certain selected students in their ability to take melodic dictation to the amount of time which they spent in controlled practice of melodic dictation. Realizing that the population of the study conducted the first semester was small, it was decided, a priori, to replicate the experiment a second semester in order to facilitate the study by increasing the size of the population and thus to more adequately validate the findings. Hence, the period of time covered by this study was one year of two sixteen-week semesters. The primary data were derived from the experiments carried on during these two semesters; however, certain secondary conclusions were drawn from the experience of a third semester.

The population of each semester's experiment was made up of second-semester music majors at Wayne State University, Detroit, Michigan. All of these students were members of regularly scheduled second-semester ear training classes taught by the writer during

the period of the experiments. The following factors influenced the choice of the second-semester class level for this experiment:

1. All students would have had one semester of elementary ear training in which melodic dictation was introduced.
2. A certain amount of "weeding out" occurs during the first semester so that only the more serious students continue into the second-semester classes.
3. At least a limited amount of common background for all participants is thus assured.
4. The level of achievement in melodic dictation at this stage usually is such that the potential for growth is great, since only the introductory period of development in this area has passed in the experience of each student, thus allowing for the possibility of a wide range in individual responses to the learning stimuli.

In order to reach the desired goal of this study—i.e., the determination of the relationship between practice and improvement, an experimental design utilizing a test-practice-retest pattern was employed. Figure 1 shows this design. Every student participating in the experiment, therefore, took the specially prepared Melodic Dictation Test, among other tests, at the beginning of the semester in order to ascertain his level of achievement before practice had taken place. Following preliminary testing, the students were assigned a specific number of hours which they had to spend in practicing melodic dictation in the prescribed manner. At the end of the semester, after all practicing had been completed, a second testing of the Melodic Dictation Test was required of all participating students. Prepractice and postpractice test scores were then evaluated and

FIGURE 1
EXPERIMENTAL PROCEDURE

Group	Test 1: Melodic Dictation Diagnostic Test (MD-1)	Practice Session (hrs.)	Test 2: Melodic Dictation Achievement Test (MD-2)	Difference between Prepractice and Postpractice Scores
A	Mean score before practice	10	Mean score after practice	Mean gain
B	Mean score before practice	20	Mean score after practice	Mean gain
C	Mean score before practice	40	Mean score after practice	Mean gain
Total	Combined mean score before practice		Combined mean score after practice	Average mean gain

related to the practice times of the various individuals and groups of individuals making up the population of the experiment. Various statistical techniques were employed for the analyzation of the raw score data in order to determine whether there was any statistical significance in the variance between prepractice and postpractice test scores. Judgments were then made from the data thus derived. This experiment was replicated during a second semester for the purpose of enlarging the experimental population to insure the validity of the derived data so that reliable judgments and interpretations might be forthcoming from the results of the experiments.

Preliminary testing of students

At the beginning of the two semesters during which the experiment was conducted, all students in Music 104 (the second-semester ear training class) were given the following tests:

1. Seashore Measures of Musical Talent—Form A:
Pitch
Rhythm
Tonal Memory
2. Drake Musical Aptitude Test—Forms A and B:
Musical Memory
Rhythm
3. Melodic Dictation Test (devised by the writer)

These test scores were then used to assist in the setting up and matching of comparable groups for purposes of the experiment to follow.

The reasons for utilizing these particular tests in this experimental situation may be stated as follows:

1. These tests (Seashore and Drake) deal with abilities which are put to use in taking melodic dictation.
2. Materials for both the Seashore and Drake Tests are readily available.
3. Both tests are standardized and are accepted instruments for the testing of musical aptitude.
4. By giving both the Seashore and Drake Tests, at least two aspects of rhythm and tonal memory are tested—both of which are employed in taking melodic dictation.
5. The length of the tests is such that no excessive amount of class time need be consumed in the administration of the tests.
6. Both tests are recorded on high-fidelity, long-playing records, thus assuring that each testing will be identical.

The Melodic Dictation Test was devised by the experimenter as an instrument to test prepractice achievement and postpractice achievement in melodic dictation. This instrument was devised out of necessity; for no other test was available which filled the requirements of a progressive test containing material closely akin to the material which the students were receiving in class. It was necessary that the melodies used in this test encompass such a wide range of difficulty that a ceiling effect would not be operative. A copy of this test is found in Appendix XVIII.

The Melodic Dictation Test is composed of melodies both isorhythmic and rhythmic. The first few melodies are simple, isorhythmic in nature, and require note-by-note dictation. The test progresses to more difficult exercises which require the notation of both rhythm and melody. The length of each melody is also varied; beginning with a note-by-note approach which requires little tonal memory through longer and more complex melodies which require a much greater length of tonal memory as well as a high development of rhythmic perception and rhythmic memory. A perfect realization of this melodic dictation test would result in a score of 322 points—a level never reached by any of the participating students.

As a result of this format, there is, in this test, a wide variance in the degree of difficulty of the exercises which make up the test from very simple and short melodies to relatively complex melodies consisting of four phrases. For this reason, the Melodic Dictation Test as developed meets the requirements necessary for an instrument which is intended for use as a measure of both prepractice and postpractice achievement. The entire test was recorded on magnetic tape and was administered by means of a Viking tape playback and heard simultaneously by all students taking the test by means of high-fidelity earphones. All instructions relative to the execution of the test by the auditor are included in logical sequence

with the melodies. This taping procedure insures an exact replication of the test each time the tape is played.

The preliminary testing of the students which was necessary as a first step in the setting up of the experimental groups occupied approximately the first six or seven class meetings. After the experimental groups were formed, practicing began and continued for the remaining twelve weeks of the semester.

Matching of comparable groups

In order to proceed with the experimental design it was necessary to establish three comparable groups from among the total population of the experiment each semester. Since the main purpose of the study was to investigate the relationship between the amount of practice and improvement in melodic dictation, the three comparable groups would then be assigned various amounts of practice time to be accomplished during the semester, thereby making it possible to make comparisons, at the end of the semester, between the achievements of the various groups.

Great care was exercised in the establishment of the population of each of these three experimental groups. It was most necessary to be assured that the three groups were as nearly comparable as possible at the beginning of the experiment, if—on the basis of a

second set of scores obtained from these groups after practice, valid and logical conclusions were to be drawn. Unless such equality between the three groups could be shown initially, the scores of the groups could not logically be compared at the end of the experiment, and no reliable deductions could be made relative to the relationship between practice and improvement.

The matching of the three groups was accomplished on the basis of the mean scores derived from the administration of the Seashore, Drake, and Melodic Dictation Tests given to the entire population of Music 104 at the beginning of each semester. The raw scores for the three matched groups each semester are to be found in Appendixes I and II.

During the first experiment there were three groups of nine students each, making a total of twenty-seven students participating. Table 1 gives the mean scores in the matched groups for the various tests given in preparation for the first semester's experiment. (The Seashore score is a total score for the three sections of the test which were given; i.e., pitch, rhythm, and tonal memory.) Table 2 gives the mean scores on the same tests for the second experiment in which there were seven students in each of the three groups, for a total of twenty-one participants in the second experiment.

TABLE 1
MEAN PREPRACTICE SCORES FOR MATCHED GROUPS,
FIRST EXPERIMENT

Test	Group 1	Group 2	Group 3
Drake Musical Memory Test	24.2	24.5	24.5
Drake Rhythm Test	37.4	42.6	42.4
Seashore Measurements of Musical Talent (three tests: Pitch, Rhythm, Tonal Memory) ..	101.0	102.6	100.7
Melodic Dictation Test	167.4	166.3	166.4

TABLE 2
MEAN PREPRACTICE SCORES FOR MATCHED GROUPS,
SECOND EXPERIMENT

Test	Group 1	Group 2	Group 3
Drake Musical Memory Test	23.1	23.1	23.1
Drake Rhythm Test	48.1	54.8	54.5
Seashore Measurements of Musical Talent (three tests: Pitch, Rhythm, Tonal Memory) ..	102.4	103.8	103.3
Melodic Dictation Test	152.9	154.6	153.4

Ideally, had the entire population been large enough to make it possible, students with identical scores on the various tests would have been selected for each of the groups. Due to the fact that the twenty-seven students participating in the first experiment and the twenty-one in the second comprised relatively small populations, it was not possible to find enough perfectly matched scores. However, a study of Tables 1 and 2 will show an almost perfect matching of the mean scores of all groups in the Drake Musical Memory Test and the Melodic Dictation Test, the tests which were weighted the heaviest in the process of matching the groups.

In addition, an attempt was made to provide that the population of each group be made up of students with high scores, average scores, and low scores on all tests. This was necessary so that at the end of the experiment not only the individual scores on the retest might be compared with initial scores, but more important still, so that comparisons between the total group scores might be made in relation to the time each group spent in practice, in order that valid conclusions could be drawn from an analysis of the data thus obtained.

Investigative procedure

After the matched groups had been formed from the entire population of the experiment, it was necessary to assign to each of these groups a different, specific number of hours which the individual

members of the groups were to spend in practicing melodic dictation. Each of the three groups of students was assigned a different number of practice hours; the practicing was to be completed by the end of the semester. This procedure was necessary in order to be able to make comparisons between the various groups in terms of improvement as related to the amount of time each group and each individual spent in practice during the semester.

In order to keep the practice time within practical limits and still maintain a relatively large time differential between groups, it was decided that each group would be assigned either ten, twenty, or forty hours of practice time. In addition, it was felt that this wide variance in times would accommodate as many types of students as possible—both the student who learned the technique quickly and/or started with more facility and who might need less time to show improvement as well as the slower student who might need more practice to show improvement.

Another important factor which was considered in selecting this particular sequence of practice hours was the morale of the participating students. A great deal of initial interest was shown by all the students in the experiments. It was necessary that this interest be maintained until the conclusion of the experiment. It was considered that the assignment of either ten, twenty, or forty hours of practice time to the various groups would best cultivate

this important interest. If any student felt that he was being unduly restricted in the amount of time he could spend in practicing melodic dictation, or if any student felt he was obliged to practice an excessive amount, these attitudes would not be conducive to the best possible results, and the experiment would be hindered and less conclusive. These attitudes did not appear to any appreciable degree in either of the experimental groups and, as a result, interest was maintained at a high level throughout the experiment.

It should be pointed out here that the control over practice extended only over the practice of melodic dictation. The practicing of the other abilities which were being taught in class was unhindered, such as sonority recognition, rhythmic dictation, sightsinging, and beginning harmonic dictation. However, less stress was placed on these elements and there was little, if any, time spent on them outside of class by students participating in the Melodic Dictation Experiment. Melodic dictation practice was controlled both from the standpoint of the amount of time spent practicing and of the method utilized in presenting the material during the practice sessions.

Since the three groups were comparable and as nearly matched as possible in every respect, an arbitrary assignment of either ten, twenty, or forty hours was made to each of the

three groups. As soon as the assignments were made, practicing was allowed to begin.

All groups began practicing at the same time since it was deemed desirable for the most satisfactory results that the practice time for each group be spread over the same total span of time which remained during the semester; i.e., all groups began practicing at the same time and continued until the end of the semester. Each student was encouraged to prorate his practice time evenly over the entire span of the practice period. It follows, then, that in order to keep up to schedule and finish the total number of hours at the proper time (the end of the semester), a student in the twenty-hour group had to spend twice as much time each week practicing as did an individual in the ten-hour group, but only half as much time each week as an individual in the forty-hour group. The practicing was thus spread out evenly by each group over the entire number of weeks allotted to practice. During both experiments the practicing was carried on over a period of some twelve weeks. Approximately the first four weeks of each semester were absorbed by the preliminary testing of students and with the necessary organization of the population of the study into comparable groups before practice could begin.

At this time also, each participating student completed a biographical data sheet giving information regarding past musical experience, instrument or instruments played, length of study on major instrument, musical organizations in which the student was currently participating, and other pertinent information which might be of assistance in analyzing the results at the conclusion of the experiments. A copy of this biographical data sheet is to be found in Appendix XV.

At the end of the semester and after all practicing had been completed, two tests were repeated which had been given at the beginning of the experiment. These two tests were the Melodic Dictation Test of nine melodies and the Drake Musical Memory Test. Each of these tests was given the second time in the same room, with the same equipment, and at the same time of day, as they had been administered originally. Thus, the physical circumstances surrounding both testings were as nearly alike as possible.

After the tests had been corrected and scores totaled, a comparison was then made between the results of the two testings. Individual scores, as well as total group scores, were recorded and related to the amount of practice time which produced the scores.

It seemed advisable, at this point, to have a student appraisal of the project. Therefore, before the students were informed of

their retest scores on the Melodic Dictation Test, each participating student completed an evaluation sheet on which was entered the student's own evaluation of his progress, as well as his evaluation of the sufficiency or insufficiency of the practice time allotted him. Other suggestions and comments were made on the evaluation sheet with respect to the student's experiences with the practice tapes, as well as related classroom activities during the semester's experiment. An evaluation sheet may be found as Appendix XVI.

The biographical data sheet and the evaluation sheet were devised by the writer and were utilized in the hope that the information thus derived might shed further light on the various aspects of the experiment and make more meaningful the results. This information, then, in turn might assist in any further experimentation carried on as a follow-up to the present study.

Materials and equipment used

The Melodic Dictation Test, which was administered to all participating students both at the beginning and at the end of the experiment, consisted of specially prepared melodic exercises recorded on magnetic recording tape. All instructions relative to the actual realization, by the student, of the recorded melodies were

included in this recorded test. By this means, an exact replication of the test itself was assured.

The practice material furnished to the students was also tape-recorded. The material consisted of ten tapes of specially prepared and recorded melodic dictation exercises. The average listening time of these practice tapes was approximately twenty-five minutes. The material on these practice tapes covered a wide range of difficulty, from note-by-note dictation to more-complex and lengthier three- and four-phrase exercises. In this respect, the material on these practice tapes was very similar to the material on the Melodic Dictation Test, and also, was of the same type of exercise with which the student was becoming familiar during the formal class sessions. A copy of all the practice tape-recorded melodies may be found in Appendix XIX. Some of the musical material used in both the Melodic Dictation Test and also on the practice tapes was original and some of the material was taken from folk-song literature.¹

There was a very real reason for maintaining a close similarity between the test and practice material and the materials used in the actual classroom teaching. It was felt that the results would

¹R. H. Ottman, Music for Sight-Singing (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1956).

be of more practical value and usefulness to the teacher of ear training if the material used in the testing and in the practice was comparable to the material used in class. There was less danger of a superficiality in the results and of an unrealistic approach to the problem if the material was related and of a similar nature to that material which was being consistently used in the formal classroom situation and with which the students were familiar.

This parallelism between the experimental situation and the actual classroom procedure was continued not only in the area of the material used, but also in the method of presentation used in the Melodic Dictation Test and in the practice material. Like techniques of presentation and familiar terminology were used in the preparation of both the Melodic Dictation Test and the practice tapes.

The initial administration of the Melodic Dictation Test, the practicing during the semester, and the second administration of the Melodic Dictation Test were all accomplished in the same room: the record-listening room of the Liberal Arts Music Department at Wayne State University. This listening room is so designed that an entire class of as many as thirty-two students may listen simultaneously to either a tape recording or a record. By the same token, one or two students may be listening to a tape recording simultaneously with other students listening to a long-play record. Both the initial

Melodic Dictation Test (MD-1) and the retest (MD-2) were administered in this same room, at the same time of day, and with the same equipment both semesters that the experiment was continued. In this way as many variables as possible were controlled. In addition, the participating students used the practice tapes during the experiments, in the same manner, with the same equipment, and in the same room.

The Melodic Dictation Test and the practice material was recorded on Scotch Brand Magnetic Tape, Number 111 A-P, plastic. All of the taped material was played on Viking tape-deck playbacks and was received by the listener by means of high-fidelity earphones. The tapes were recorded originally on the finest of high-fidelity recording equipment, the melodies being played on a Baldwin concert grand to insure the best possible quality of sound.

Classroom procedures and organization of Music 104

As stated before, the entire population of both semester's experiments was drawn from the students in Music 104, a second-semester ear training class at Wayne State University taught by the writer. A brief outline of the course is given here to provide background information so that a better understanding might be forthcoming

of the relationship between course materials and the experimental design of this study.

Each student in Music 104 was required to attend two class sessions of fifty minutes during each week for sixteen weeks. These class sessions were devoted exclusively to the techniques involved in ear training and aural harmony, with the fundamentals and materials of music (the theoretical paper work of beginning theory) being taught in another course. Frequent reference is made, of course, to this companion course—i.e., a corequisite of Music 104—so that the students will realize the interrelatedness of the two courses and not consider the two courses as mutually exclusive or isolated.

The material covered in Music 104 is as follows:

1. Simple, note-by-note melodic dictation.
2. Easy one- and two-phrase melodic dictation.
3. Rhythmic dictation (the recognition and notation of rhythm patterns played melodically).
4. Sight singing of folk melodies using tone syllables, numbers, letter names, and neutral syllables in treble, bass, tenor, and alto clefs.
5. Sonority recognition practice of major, minor, augmented, and diminished triads voiced in four parts.
6. Position recognition practice (beginning) of major, minor, and diminished triads in root position and first inversion.

7. Continued interval recognition practice.
8. Beginning harmonic dictation—taking treble and bass lines only with a figured bass and harmonic analysis of the exercise included.

Each class meeting included work in a number of the aforementioned areas of instruction. The ability and progress of the class determined to some extent the content of any one class period. Since melodic dictation had been started in a very simple way during the first-semester class and is continued, becoming progressively more difficult through the end of the sophomore year, some slight emphasis in point of time spent in class is placed on melodic dictation.

The final grade received by the student reflected not only his proficiency in taking melodic dictation, but also in his progress and ability in the other areas of study. However, it was made quite clear to all the participating students that the results of the experiment would in no direct way influence the final grade he received in the course, except where practice in melodic dictation resulted in improvement of this facility as exhibited in class tests. A quiz was administered biweekly, with all quizzes weighted equally in terms of importance so that no undue nervousness would be encountered, as might be the case on an unusually important midsemester or final exam.

The melodic material used for dictation in class was very similar to that used both on the experimental melodic dictation test and on the practice tapes. In this way, as practical an experimental design as possible was achieved.

Student practice procedure

As soon as the comparable groups were formulated, the students were free to begin practicing. The listening room, in which the practicing was done, was open all day and no restrictions were placed on the individual students as to when they might practice, nor how long they might practice at any one time. However, it was suggested that they limit themselves to approximately one-hour periods in order to avoid fatigue which would reduce the effectiveness of the practice.

The one limitation placed upon the participating students beyond that of the total number of hours they were to practice was that all practicing of melodic dictation was to be limited to this one method and was to be done in the listening room only. No "dubbing" of material from the original tapes to student-furnished tapes for home practice was permitted. A student assistant was in attendance at all times in the listening room to supervise the procedure and to

assist in the physical aspects of the practicing. Melodic material used for practice is to be found in Appendix XIX.

A student desiring to practice melodic dictation would go to the listening room and request of the student assistant a specific tape with practice material recorded on it. The student assistant would procure the tape, mount it on the tape-deck, and place it in operation. The listener was free to adjust the intensity of the sound to any desired level. The student using the tape would adjust the earphones and volume and then transcribe the melodies on manuscript paper as they were dictated to him. All melodies were played on the piano, since the piano was also the standard instrument for playing melodic dictation exercises in class and the student was most acquainted with this sound medium for this purpose.

At the conclusion of the tape, the student would correct his paper by comparing it with the accurate realization of the material to which he had just listened. This correct copy was made available to him by the student assistant. In correcting his paper, the student was able to notice the kinds and frequency of the mistakes he was making. He might also compare the present paper with a previous paper made up of material from the same tape to see whether he was making the same mistakes consistently or had improved. In this way, the student was able to intelligently make an attempt to improve the

accuracy of his dictation during future practice periods, as well as during routine classroom drills.

If so desired, the student might take over the same practice tape or choose another one for further practice. The student assistant, when requested to do so, would help in the correction and analysis of each practice paper.

Another very important activity of the student assistant was to record the time spent by each student in practice. The time was noted at the beginning of each practice session for all students and a record kept of the amount of time spent during each session. Also, an accumulative total was maintained for each student in all three groups. In addition, the student assistant supervised the conduct of the students in the room and maintained quiet.

No changes were made in the normal presentation of material in class while the experiment was in progress, and teaching proceeded as usual. Although the material studied in class, in addition to melodic dictation, undoubtedly had an effect on the improvement of the students' ability to take melodic dictation due to the interrelationship and interdependence of these skills, all students participating in the controlled melodic dictation experiment were also subject to the same amount of class time under the same instructor so that each student's experiences and time in class were as nearly alike as possible.

At the conclusion of all practice at the end of each semester, the Melodic Dictation Test was administered for a second time to all participating students, and the evaluation sheet was completed by all students. The results of MD-2 had no direct bearing on the course grade of the individual student as this had been explained to the students at the beginning of the experiment. Of course, if the practicing had resulted in an improved technique, this might be reflected in the regular final given to cover all the material presented in the course during the semester. It was the students' hope that this improvement would appear as a result of participation in the experiment.

CHAPTER III

STATISTICAL ANALYSIS OF THE EXPERIMENTS

First experiment

During the first semester's experiment, as has been noted, there were three matched groups of nine students each. Hence, the total population of this experiment comprised twenty-seven participants.

The Melodic Dictation Test given both prior to practice and after the assigned number of hours of practicing had been completed contained a series of melodies which, if accurately transcribed, would have resulted in a perfect score of 322 points. In correcting this test, both melodic errors and errors in rhythm were counted.¹ Some exercises in this test require that only melodic notation be made. The more difficult, longer exercises also involve the proper notation of rhythm. It was on this basis that the raw scores of both MD-1 and MD-2 were tabulated. No student has ever achieved a perfect score on this test, which shows that the ceiling effect is not operative here.

¹For a complete explanation of scoring techniques used, see Appendix XVII.

The mean scores and mean gains of all three groups in the first experiment are to be found in Table 3. The total raw scores of both MD-1 and MD-2 and the resultant total number of points improvement made by each group and each individual over the period of one semester may be found in Appendix III.

These postpractice increases as shown by the mean gains in Table 3 may be expressed in terms of the maximum possible increase. It can be noted from these scores and from the raw scores as found in Appendix III that, in relation to their prepractice performance, the postpractice increase for the ten-hour group was 19.9 percent of the maximum possible increase; i.e., the improvement necessary to attain the maximum score of 322. For the twenty-hour group this figure was 31.0 percent, and for the forty-hour group the gain represents 29.9 percent of the maximum possible increase. These results show the ceiling effect to be nonoperative here.

Before it was possible to determine the relationship between these gains and the time spent in practice, it was necessary to ascertain whether the mean gain of each group was statistically significant. A "t" test was employed, therefore, to ascertain the significance of these gains within each group and between groups.

A review of the "t" values as given in Table 3 will show that the gains made by each group are significant, being well above

TABLE 3

MELODIC DICTATION TEST MEAN SCORES, MEAN GAINS,
AND "t" VALUES OF ALL THREE GROUPS,
FIRST EXPERIMENT

Group	N	Mean Score MD-1	Mean Score MD-2	Mean Gain	"t" Value
10 hr.	9	166.4	230.4	64.0	5.09
20 hr.	9	166.3	266.1	99.8	5.28
40 hr.	9	167.1	263.6	96.3	5.43
All groups	27	166.7	253.4	86.7	8.88
"t" value between 10-hour and 20-hour groups					1.58
"t" value between 10-hour and 40-hour groups					1.48
"t" value between 20-hour and 40-hour groups					0.14

the value of 2.77 at the .01 level of significance, the value necessary in order to show significance. "If a sample 't' reaches the .01 level of significance, one would conclude that it is not a chance deviation from zero, or that some correlation exists between the two variables involved."¹

After it was determined that the mean gains within each of the three groups were statistically significant, the next step was to determine if there was any relationship between these gains and the time spent in practice. A simple "analysis of variance" technique was employed to test this relationship between gain and time. Thus, the statistics were subjected to an F test, and an F ratio was derived.

An F ratio for the entire population of this experiment would have to reach 3.40 at the .05 level (with 24 degrees of freedom) in order to be considered significant. However, the F ratio derived from the statistical handling of the data from the three different groups, taken as a total, was only 1.40—not significant.

Even though the F ratio was not significant, "t" values were computed for each pair of groups and are reported in Table 3. However, as expected, these "t" values failed to reach significance,

¹Quinn McNemar, Psychological Statistics (New York: John Wiley and Sons, Inc., 1949), p. 71.

the largest "t" value being 1.58 (between the ten- and twenty-hour groups), considerably below the necessary 2.77 value to show significance.

In order to clarify the results further, it is possible to say that, based on the F test, the gains made by the various groups were not made in proportion to the differing amounts of time spent in practice. In other words, increased practice was effective, but the time spent in practice was not the determining factor in bringing about the gain. Still another way of saying this would be to state that very little correlation is shown to exist between the time spent in practice and the amount of gain between all three groups.

Second experiment

For the second experiment there were three matched and comparable groups as before, but comprising only seven students in each group. Thus, the total population of this second experiment was twenty-one students.

The mean scores, mean gains, and "t" values of all three groups in the second experiment are to be found in Table 4. The total raw scores of both MD-1 and MD-2 and the resultant total number of points of improvement made by each group and each individual over the period of one semester may be found in Appendix V.

TABLE 4

MELODIC DICTATION TEST MEAN SCORES, MEAN GAINS,
AND "t" VALUES OF ALL THREE GROUPS,
SECOND EXPERIMENT

Group	N	Mean Score MD-1	Mean Score MD-2	Mean Gain	"t" Value
10 hr.	7	153.4	229.0	75.6	5.27
20 hr.	7	152.9	231.0	78.1	3.54
40 hr.	7	154.6	233.1	78.6	4.44
All groups	21	153.6	231.0	77.4	7.73
"t" value between 10-hour and 20-hour groups					0.10
"t" value between 10-hour and 40-hour groups					0.13
"t" value between 20-hour and 40-hour groups					0.02

The pattern which seemed to emerge from the results of the first experiment was not continued in the replication of the experiment. In the first experiment, the twenty-hour group made the most gain—898 points—and a mean gain of 99.8 points. The forty-hour group was next with a gain of 867 points and a mean gain of 96.3 points. The ten-hour group was far behind, with a total gain of only 576 points and a mean gain of 64.0 points. The twenty-hour group made 1.6 times the amount of gain that the ten-hour group achieved, but, interestingly enough, the forty-hour group made only 1.5 times the gain of the ten-hour group. This clearly shows the lack of a relationship between the time spent in practice and amount of improvement.

In the second experiment the forty-hour group achieved the greatest mean gain, but this was only 0.5 of a point higher than the twenty-hour group. In terms of raw score total gain, the forty-hour group's total gain was only 3 points higher than that of the twenty-hour group (see Appendix VI).

In addition, the results of the second experiment show a much closer grouping of the mean gains and the total gains, with a difference of only 3 points existing between the highest and lowest mean gains. There was no clear, observable, and consistent pattern which emerged from the results of the two experiments.

Again, as in the first experiment, it was necessary to determine whether or not the mean gains of all three groups were significant. The "t" test was again employed to test the significance of these gains. As in the first experiment, the gains within the three groups are significant, being much above the necessary value of 2.83 at the .01 level of significance.

After it had been statistically established that the gains within the groups were significant, a simple analysis of variance (F test) technique was employed as before to determine the relationship between these gains and the time spent in practicing. In order to show a significant correlation between gains and time, the F ratio between all three groups (total) should have been approximately 3.55 (18 degrees of freedom). The F ratio, however, was only 0.02. Once again, as in the first experiment, the "t" values were computed for each pair of groups and are reported in Table 4. As was expected, these "t" values, also, fail to reach significance since none of them reach 2.83, the level necessary to show significance, the highest being only .13. Here again, as in the first experiment's results, no correlation is shown between the time spent in practice and the amount of gain between all three groups.

To interpret the F in another way, one could say that the improvement shown by the three groups combined could have been

due to chance; that the improvement was not the product of practice alone, since the F was so small. This fact is even more evident in the results of this second experiment than in the first since in the first the total F was 1.40 as compared to an F of only 0.02 in the second experiment.

Combined experimental group results

It was deemed unnecessary to replicate the experiment a third semester, since no recognizable pattern was seen to emerge from the experiment either time it was conducted. Therefore, in order to enlarge the total population of the study and to thereby increase its validity, the results of the two experiments were combined into one larger group.

In combining the results of the experiments of the two semesters, statistics were obtained as shown in Table 5, which contains the mean scores, mean gains, and "t" values of the total, two experiments. In actuality, these figures reflect the results from six different groups; i.e., the results from three groups for two experiments. The total raw scores of these combined groups may be found in Appendix IX.

The average mean gain of the two experiments combined was 82.6, as compared with a mean gain of 86.7 during the

TABLE 5

MELODIC DICTATION TEST MEAN SCORES, MEAN GAINS,
AND "t" VALUES OF ALL SIX GROUPS,
COMBINED EXPERIMENTS

Group	N	Mean Score MD-1	Mean Score MD-2	Mean Gain	"t" Value
10 hr.	16	160.7	229.8	69.1	7.43
20 hr.	16	160.4	250.8	90.3	6.40
40 hr.	16	161.8	250.4	88.6	7.14
All groups	48	160.9	243.6	82.6	3.73
"t" value between 10-hour and 20-hour groups					1.25
"t" value between 10-hour and 40-hour groups					1.26
"t" value between 20-hour and 40-hour groups					0.90

first experiment and 77.4 points, the mean gain of the second semester.

As in each of the individual experiments, the statistics of the combined experimental group were subjected to a "t" test to evaluate the significance of the total gains within each group. By referring to Table 5 it will be seen that the improvement made within each group (gain) is significant and that the total group "t" is also significant.

In addition, the "analysis of variance" technique was again employed to determine whether the combined data presented any further evidence of a significant relationship between gain and time spent in practice. The F ratio of 1.19 was obtained. Since with the larger population an F ratio, in order to show significance at the .05 level, would have to reach a value of 3.21, it is obvious that in combining the results of the two experiments it was still not possible to show any correlation between gains and time spent in practice. Therefore, it is safe to assume once more, as was noted in reference to the results of the two experiments which made up the statistics of the combined population, that gains are not directly related to increased practice time.

Drake Musical Memory Test gains

An interesting fact to be noted is that improvement was shown by each group in the total raw scores obtained from the replication of the Drake Musical Memory Test at the end of the semester after the practicing of melodic dictation had taken place. In addition to the improved group scores, all except five individuals out of the total forty-eight made better scores on the retest of the Drake Musical Memory Test. This suggests that this test is not a "pure" aptitude test. Apparently the practicing of melodic dictation which requires the application of musical memory resulted in the by-product of an improved musical memory as tested by the Drake test. The likelihood of a student's becoming "test-wise" and remembering any of the tonal patterns on the Drake test would be very slight, since fifteen weeks had elapsed between testings.

This increase in tonal memory through consistent practice of melodic dictation is hardly surprising. The possession of an excellent tonal memory is most definitely an asset to a student in his ear training, as tonal memory is constantly employed in the act of taking not only melodic dictation but also harmonic dictation and rhythmic dictation when the rhythms are clothed in melody. Apparently, the practicing of melodic dictation is one way of increasing the span of tonal memory. Table 6 gives the mean scores and mean gains for all groups and for both experiments. The raw scores on this test for both semesters are to be found in Appendixes X, XI, and XII.

TABLE 6

DRAKE MUSICAL MEMORY TEST, MEAN SCORES AND MEAN
GAINS, FIRST AND SECOND EXPERIMENTS

Group	N	Mean Score First Test	Mean Score Second Test	Mean Gain
<u>First Experiment</u>				
10 hr.	9	24.5	17.3	7.2
20 hr.	9	24.5	14.3	10.2
40 hr.	9	24.2	16.2	8.0
Total	27	24.6	15.9	8.7
<u>Second Experiment</u>				
10 hr.	7	23.1	12.5	10.6
20 hr.	7	23.1	16.0	7.1
40 hr.	7	23.1	17.0	6.1
Total	21	23.1	15.1	8.0

Simple correlation coefficients

“One of the chief tasks of a science is the analysis of the inter-relations of the variables with which it deals.”¹ This analysis takes the mathematical form of relationships between variables.

¹Ibid., p. 90.

It is important to determine the form of the relationship and also the accuracy with which predictions or judgments are made.

The accuracy of prediction can, of course, be determined from the data, and it is convenient that we have some general measure of this accuracy. One such measure which can be computed and which will yield information as to the degree of accuracy and the degree of relationship is the correlation coefficient, designated "r."¹

In the further explanation of the correlation coefficient we can question rather simply: Is there a tendency for an individual who achieves a high (or low) score on one test to achieve a high (or low) score on another test also?

The following are sample correlation coefficients derived from statistics developed out of the first experiment. First, correlations were computed between the Drake Musical Memory Test (first testing) and the amount of gain (improvement) on the Melodic Dictation Test (MD-2). Table 7 gives the correlation coefficients for each of the three groups.

A correlation coefficient of 0.31 was achieved between the Drake Musical Memory Test and the prepractice scores of the Melodic Dictation Test (MD-1) for the total population of the first experiment. However, the correlation dropped to 0.05 between the Drake Musical Memory Test and the gain (improvement) in the raw scores of the postpractice administration of the Melodic Dictation Test (MD-2) for the entire population of the study.

Further correlation coefficients are as follows:

¹Ibid.

TABLE 7
CORRELATION COEFFICIENTS: FIRST DRAKE MUSICAL
MEMORY TEST, RAW SCORE GAIN ON
MELODIC DICTATION TEST

Group	Correlation Coefficient
10 hr.	0.30
20 hr.	0.10
40 hr.	0.16

Drake Musical Memory and Drake Rhythm 0.23

Drake Musical Memory and the total Sea-
shore scores from the pitch, rhythm, and
tonal memory sections of the Seashore
Measures of Musical Talent 0.11

Drake Musical Memory and Seashore Tonal
Memory 0.50

Drake Rhythm and Seashore Rhythm Tests 0.14

All of the above correlation coefficients were derived from the statistics compiled from the results of the first experiment.

After the matched groups for the second experiment had been established, the following correlations were computed for the entire population of the second experiment.

Drake Musical Memory and Drake Rhythm
Tests 0.16

Drake Rhythm and MD-1	0.03
Drake Musical Memory and MD-1	0.04
Drake Musical Memory and MD-2 for the entire group	0.05

Multiple correlation coefficient

A further analysis of the statistics from the two experiments was deemed advisable at this point. Since the factor of intelligence was certainly playing an influential part in the results of the various tests which had been given, the scores derived from an instrument reflecting the general intelligence of the students participating in the experiment were thought to be useful. The American Council on Education Psychological Examination is a test of scholastic aptitude used for indicating a student's mental abilities and the caliber of school achievement that might be expected from him.

This A.C.E. test had been administered to all of the students in this experiment by the Educational Counseling Center at Wayne State University at the time of the students' entrance into the university. The scores on this test were readily available through the center and were obtained for all forty-eight students participating in the present study.

A multiple correlation technique is used when "it is desired to predict one variable by using several other variables as a team of predictors."¹ In the case of the present study, it was the prediction of MD-2—the score on the postpractice Melodic Dictation Test—that was desired. The other variables used in the multiple correlation computations were the A.C.E. test scores, the prepractice Drake Musical Memory Test scores, the Drake Rhythm Test scores, and the Seashore Tonal Memory, Rhythm, and Pitch test scores. Out of the total population of forty-eight students (both experiments combined), the six students with the highest A.C.E. scores and the six students with the lowest A.C.E. scores were selected as a basis for the multiple correlation. The process involved the attempt to predict the one variable—MD-2—on the basis of the other six variables listed above. Differently stated, the problem entailed the determination of the extent that MD-2 was affected by the total action of these six variables acting as a team.

At the outset, before computing the multiple correlation, simple correlations between the A.C.E. scores and the other six variables were computed. This was done, in part, in order to ascertain whether there was any correlation between mental ability as

¹Ibid., p. 144.

shown on the A.C.E. scores and ability in any of the other six areas tested. The various scores of the twelve selected students—the six with the highest and the six with the lowest A.C.E. scores—are shown in Appendix XIII. On the basis of these A.C.E. scores, the resulting correlation coefficients are listed in Table 8.

Based on a dependent variable and six independent variables which might be used as predictors or which might be considered as causes of variation in the dependent variable, a multiple correlation was computed using McNemar's method of computing a multiple correlation of more than three variables.¹ The dependent variable in this study was MD-2, which is the raw score of the Melodic Dictation Test after the practicing had been accomplished. By means of the multiple-correlation technique, the action of the independent variables upon MD-2 was found to be either little or much.

It must be borne in mind that the foregoing simple correlation coefficients between the six independent variables and the multiple-correlation coefficient which was computed are products of the statistical handling of the scores of the six students with the highest A.C.E. scores and the six students with the lowest A.C.E. scores. It was felt that the use of these twelve students' scores in such a

¹Ibid., pp. 153-60.

TABLE 8
CORRELATION COEFFICIENTS RESULTING
FROM SIX VARIABLES

Variable	Variable					
	A.C.E.	Drake Musical Memory (first)	Drake Rhythm	Sea- shore Tonal Memory	Sea- shore Rhythm	Sea- shore Pitch Dis- crimi- nation
MD-2	0.28	0.48	0.45	0.56	0.03	0.30
A.C.E.		0.18	0.16	0.03	0.16	0.21
Drake Musical Memory			0.17	0.54	0.01	0.06
Drake Rhythm				0.33	0.57	0.23
Seashore Tonal Memory					0.03	0.04
Seashore Rhythm						0.002

computation would result in the most satisfactory understanding of the interrelationships existing between the various variables and would yield valuable data in addition to being the most practical way of handling the large body of data.

The multiple correlation between MD-2 and the six variables made up of the score on the A.C.E. test, the Drake Musical Memory and Rhythm tests, and the Seashore Tonal Memory, Rhythm, and Pitch tests resulted in the unusually high coefficient of 0.784, a most interesting development. This result would lead one to believe that improvement in melodic dictation is achieved as a result of the influential operation of a number of factors rather than only one, such as the amount of time spent in practicing melodic dictation.

In the process of computing the data for the multiple correlation from the aforementioned six variables, i.e., scores on six tests, two high simple correlation coefficients were obtained. These coefficients were 0.57 between the Drake Rhythm and the Seashore Rhythm tests and 0.56 between MD-2 and the Seashore Tonal Memory Test.

These results would seem to indicate that, taking everything into consideration, it is not wise to prognosticate MD-2 on the basis of one isolated test, although the high correlation coefficient between the Seashore Tonal Memory test and MD-2 would tend to substantiate the view that a good tonal memory, at least that facet of it as tested in the Seashore Tonal Memory Test, contributes much to the possibility of success in taking melodic dictation. However, as in predicting success in any field, it is the wise counselor who uses a

team of predictors in arriving at any judgment regarding possible success.

An interesting comparison may be made here between the simple correlation coefficients derived from the results of various tests given to the entire population of the first experiment and the coefficients derived from the results of these same tests obtained from the group of twelve students selected from the total population on the basis of their high or low A.C.E. scores, this selection of twelve students having been made, primarily, for purposes of the multiple correlation computation.

Correlation between:	<u>First Experiment</u>	<u>Twelve Students</u>
Drake Musical Memory Test and Drake Rhythm Test	0.225	0.17
Drake Musical Memory Test and Seashore Tonal Memory Test	0.504	0.54
Drake Rhythm Test and Seashore Rhythm Test	0.139	0.57

A relatively high correlation existed between the Drake Musical Memory Test and the Seashore Tonal Memory Test for both the total population of the first experiment and the selected twelve students. However, a much higher correlation existed between the Drake Rhythm and the Seashore Rhythm tests for the twelve students

than for the entire population of the first experiment. The correlations between the Drake Musical Memory and the Drake Rhythm tests for both groups are correspondingly low.

Taking all the statistical data into consideration, the results indicate that very little relationship exists between the amount of time spent practicing and the corresponding improvement in melodic dictation. Nevertheless, most significant and enlightening information relative to the abilities necessary for success in melodic dictation was provided by the results from the various tests which were administered and from the statistical techniques which were employed.

THE

CHAPTER IV

INTERPRETATION OF THE STATISTICAL ANALYSIS

Effect of practice on all experimental groups

Although investigators involved in statistical research are eager to announce a positive finding—i.e., a difference, rather than no difference—a careful study of the preceding data, carefully collected from realistically controlled conditions, leads to only one conclusion: The findings of this study show that no statistical relationship exists between the time spent in practice and improvement in melodic dictation. This is not to say that these findings are any less important because statistically, no relationship was found to exist.

At the outset of the study the goal was to determine experimentally and statistically whether or not there was any significant relationship between the amount of time spent in practice of melodic dictation and improvement in this important facet of a musician's development and education. The statistical results of this study have shown that time spent in practicing was not the determining factor in improvement. This finding,

in itself, is most interesting and informative. Much useful information is to be gained from a careful study of the data not only from the standpoint of the scores of the groups, but also, the scores of the individuals and their gains.

In reviewing the scores of the entire population of the two semesters' experiments, it will be seen that all students, with only one exception, made improvement in the facility of taking melodic dictation. In other words, their scores on MD-2 after practice had improved over MD-1, taken before practice took place. The one student who failed to improve the MD-2 score was below par physically at the time of the second testing, and this physical disability is reflected in a negative gain.

There was a great difference in the amount of gain shown in the MD-2 score on the part of the individual students. This difference in the amount of improvement ranged all the way from a negative gain of 28 points (MD-2 lower than MD-1 by 28 points) to a positive improvement of 177 points, a difference between greatest and least gain of 208 points. Even within one group alone—the twenty-hour group of the first experiment—there was a difference in the amount of gain of 162 points between low and high gain. This fact is significant in itself in negating the assumption that time spent in practice and improvement shown are directly related.

This finding suggests that other variables were operating in a very influential manner on each individual and within each group to such an extent that the time element was relegated to a relatively unimportant role in the results of this study.

Again, to further substantiate the lack of significant relationship between practice time and improvement, a study of the scores of the various individuals in all groups shows a striking lack of a definite pattern. In the first experiment, even with two students having identical scores on MD-1 and both practicing ten hours, one student achieved an MD-2 score 41 points higher than the other student. Even more convincing are the scores of two students in the first experiment whose MD-1 scores were separated by only 3 points. The one student with the lower of the two scores gained only a total of 76 points, while the other student gained 136 points—a difference of 60 points. Obviously, some variable other than practice time affected these scores.

In the results of the second experiment, further enlightenment is gained:

<u>Student</u>	<u>MD-1</u>	<u>MD-2</u>
Student in forty-hour group	176	298
Student in forty-hour group	176	244

This difference of 54 points in improvement is most unlikely to have been occasioned by pure chance.

There does appear to be some consistency, however, in one respect. Of the six students who achieved a score on MD-1 of less than 100 points, and even though they had the greatest opportunity for improvement (the farthest to go to reach perfection), all but one made relatively little improvement, as reflected in their MD-2 scores.

In terms of mean gain, the first experiment seemed to indicate that a possible trend might develop. It appeared that twenty hours was the amount of practice time which would produce the greatest results in terms of improvement. Results also showed a distinct leveling off after twenty hours of practice. However, the anticipated trend indicated in the first experiment did not materialize, since in the second experiment it was the forty-hour group which achieved the highest mean gain but only 0.5 point higher than the twenty-hour group and 3 points higher than the ten-hour group. The mean gains of these three groups, as has been pointed out earlier, were much more closely grouped than those of the first experiment.

When the results from the combined populations of the two experiments were figured, the twenty-hour group again showed a slightly higher mean gain than the forty-hour group—1.7 points

higher. The mean gain of the twenty-hour group here was 21.2 points higher than the mean gain of the ten-hour group. On the basis of raw scores and mean gains between groups and, speculating beyond the data, it might appear that a saturation point is reached by the students after finishing twenty hours of practice. The additional twenty hours of practice failed to produce a comparable gain with that of the first twenty hours. Specific reasons for this failure on the part of the forty-hour group will be suggested later.

When the results are viewed from the standpoint of whole groups, it appears that there was a slight tendency for the twenty-hour group to be the most successful. However, when individual results are noted, it may be seen that some students in the ten-hour group achieved a much greater amount of improvement than students in the twenty-hour group, even when the relative abilities of the individuals as reflected in their MD-1 scores is taken into consideration. The same could be said to hold true for individuals in the twenty- and forty-hour group, especially during the second experiment where there were such gains as 127 points for a student in the twenty-hour group and 39 for a student in the forty-hour group, with their initial scores being separated by only 25 points.

Viewing the results of the two semesters' experiments from a purely statistical standpoint, as has been pointed out earlier, the F scores for the separate experiments and for the combined population showed no relationship between the amount of practice and gain. It can be said definitely then that, based on the statistical analysis of the results, time spent in practice does not correlate to any significant degree with gain or improvement in melodic dictation. It is necessary to look further to suggest reasons for the gain between prepractice and postpractice melodic dictation test scores.

Third-semester results

As further proof of the lack of significant correlation between practice time and improvement, the results from a third-semester experience—during which time a somewhat different technique was employed in the utilization of the Melodic Dictation Test—should be given.

At the beginning of the succeeding semester following the conclusion of the second experiment, the entire population of Music 104 was given the same Melodic Dictation Test as had been given to the two previous experimental groups, and the scores from this testing derived from this new group of students were recorded. The

test was given in the same manner, using the same equipment, and in the same room as that of the previous testings. Following the administration of this test the normal routine in the classroom was continued as before. However, the students were allowed to practice melodic dictation as much or as little as they desired. Hence, the population of the class was not divided into groups as before, nor were they assigned a specific number of hours to practice.

At the end of this semester, the Melodic Dictation Test was readministered to the entire group. In addition, the students were asked to indicate how much time they had spent in practice during the semester, at the same time assuring them that their answers would in no way influence their grade for the course. The greatest number of hours any student had practiced during this semester was ten, and there were a number of students who had not done any practicing on their own outside of class. All of these students also filled out biographical data sheets. The individual scores, gain, and mean gain for this group are shown in Appendix XIV.

The mean gain for the combined experimental groups was 82.7 points; the third semester's nonexperimental group mean gain was 54.6 points. This represents a drop in mean gain of 28.1 points between the combined experimental groups and the third-semester group. The variance in the amount of gain during the third semester

was quite similar to the variance of the combined experimental groups. The difference between the highest amount of gain and the lowest amount of gain in the third-semester group was 154 points, as compared with a difference of 177 points between the students with the highest and lowest amount of gain in the combined experimental groups.

Even with much less time spent in practice, every student during this third semester showed an improved score on MD-2. Even students who indicated they had done no practicing outside of class made relatively large gains of up to 102 points.

It is interesting to note the relative improvement of two students who had identical MD-1 scores of 179 points: one from a twenty-hour group and one from the third-semester group.

<u>Student</u>	<u>MD-1</u>	<u>MD-2</u>	<u>Gain</u>
Student from twenty-hour group, second experiment	179	272	93
Third-semester student with two hours' practice time	179	264	90

The one student who had spent twenty hours of practice time achieved a gain only three points greater than that of a student who had practiced two hours.

From a study of all the foregoing statistics, it is obvious that practice does affect the amount of gain, but nowhere can it be shown statistically that there is a direct relationship between the amount of practice time and improvement. Some form of practice would seem to be valuable for all students, but it is not possible to say how much time should be spent in practice in order to achieve the greatest possible improvement in each individual. It is apparent that the normal growth within the individual, based on other interrelated factors, brings about improvement in this ability even with little or no conscious practicing of melodic dictation.

Other variables affecting improvement

Although the variable of time does not seem to be the determining factor in the improvement of melodic dictation, the study points up the relative importance of certain other experimentally uncontrollable variables which have an influence on the amount of improvement shown by individual students.

An analysis of individual scores shows a wide variance in the gains of students within the same experimental population—as much as 162 points. This indicates that there are marked individual differences within the same population. Each student responds in a different way to the same set of stimuli. The stimulus under

consideration in this study is practice time. Without necessarily being aware of it, the student applies and interrelates his past musical experience and growth to the immediate task during practice, in class, and while taking the Melodic Dictation Tests.

In an experimental situation, the researcher must be careful to control all the possible variables which may affect the results of the experiment. This careful procedure was followed in the present study. However, there are certain variables over which the experimenter has little or no possible control. These variables also, in addition to the variables consciously controlled by the researcher, may have marked influence over the results of the research. This undoubtedly was the case in the present study.

Some of the variables which are not controllable but which evidently affect a student's improvement in the ability to take melodic dictation are listed below. It is not possible to list these variables in their inexorable order of importance since the degree of influence exerted by each variable will vary according to each individual's capacity and response.

1. Absorption of material from classroom presentation.
2. Degree of motivation.
3. Ability to concentrate.
4. Previous training and experience.

5. Innate ability in music.
6. Physical condition.
7. Mental alertness.
8. Level of boredom.
9. Ability to make meaningful application of knowledge.

The above-listed conventional cognitive factors—plus application, understanding of the test requirements, and others—undoubtedly influence results in a study such as this.

To one degree or another, all of these cognitive factors have affected the results of all the students who participated in this study. Furthermore, most of these variables could be said to be active in the learning process in all areas of education.

Not all students derive the same benefit from classroom attendance in the same number of class sessions with the same teacher. The response to the instructor on the part of different students is quite likely to be radically dissimilar.

The elements of motivation and boredom are closely allied. One student may have a real desire to improve, while a second student will merely put in the necessary time practicing in a very perfunctory manner. The potential for improvement by the interested student is much greater than that of the bored, disinterested student.

The ability to concentrate, especially when applied to such a facility as melodic dictation which requires an unusual application of the memory skill, is most important. The melodic dictation procedure involves a very complex set of responses. The student must be able to translate aural patterns of pitch and rhythm into visual, musical notation. Much of the difficulty which students encounter in remembering a musical phrase stems from the student's inability to concentrate and/or an ignorance on the part of the student of how and what to concentrate upon at a given time. Training in this area should be given to assist in the development of a better tonal memory.

A discussion of the student's previous training and experience as related to results in the experiment is to be found later in this study. Suffice it here to say that the information regarding this variable, gleaned from the biographical data sheets, is most interesting and enlightening.

Another variable which is not controllable, and yet which must certainly affect the amount of improvement shown in this skill of melodic dictation, might be called "innate" ability in music as shown by any given student. This ability is most difficult to define, and still more difficult to test. Yet, from experience, a teacher knows that certain students seem to be more "musical" than others; that

they seem to be more teachable than other students, and that they exhibit more of the native ability required of successful musicians.

As was previously indicated, the Drake Musical Memory Test was given at the beginning and at the end of each semester during which the experiment was carried on. Although this test is called an aptitude test, supposedly testing some kind of unchanging ability—in this case, the ability of musical memory—a large percentage of students improved their scores on the second testing after practicing the allotted time on melodic dictation. This finding suggests that the Drake Musical Memory Test is not a pure aptitude test if the definition of aptitude is some kind of unchangeable ability. Whether or not it is possible to devise an instrument which is reliable and valid to test pure aptitude in music has long been subject to argument. To labor the point in this study would prove irrelevant and fruitless.

The physical condition and mental alertness of the individual while employed in practice or in testing is of utmost concern to the researcher, but these are variables over which he has no direct control. The one instance recorded in the statistics of this study in which a student made a negative gain—i.e., achieved a poorer score on MD-2 than on MD-1—was a direct result, it is believed, of poor physical condition at the time of retest for MD-2. The subject admitted to being extremely tired and almost unable to remain

awake during the testing period. This physical inability to remain alert showed up in the resultant lowering of the score of MD-2.

Another variable which exerts much influence on the results of practice or instruction is linked closely to that of mental alertness and is the ability to absorb more than the average amount of material from each classroom presentation and drill. Some students are more able to integrate their learning experiences and relate areas of knowledge, which on the part of some students seem totally unrelated, to the skill they are trying to develop or to the subject matter under consideration. A student who can see the real relationship between rhythmic dictation, sight singing, and melodic dictation will attain a much higher level of achievement than the student who considers the various aspects of the subject as mutually exclusive and isolated entities.

Success in melodic dictation is dependent upon the configuration of a number of musical skills and knowledge. The successful student brings these various skills to bear in the procedures involved in taking melodic dictation. If the student either fails to do this or is not equipped to make these applications, it is doubtful how much success he will achieve. Obviously, individual differences are most apparent in this area of the learning process. Improvement, specifically in melodic dictation, then, is the result of

a favorable combination of many factors which are applied in developing this particular skill.

Biographical data sheets and evaluation forms

Information relative to the applied music experiences of the participating students as taken from the biographical data sheets sheds further light on the reasons for the wide variance in the amount of gain shown on MD-2 and gives further evidence that the factor of time spent in practice of melodic dictation is not the deciding factor in the amount of improvement shown in this ability.

The students whose major field in applied music was voice showed the most consistency in achieving above-average gains in MD-2. There were twelve such students. Sixty-seven percent of these students were above average in amount of gain, and only 25 percent were below average.

The next best showing was made by those students who were piano students. The average number of years of piano study for the total population of the study was 2.9 years. About 58 percent of the total group fall either into the pattern of having above the average number of years of piano study and an above-average gain, or had below the average number of years of piano study and achieved a below-average total gain. Table 9 graphically shows this distribution.

TABLE 9
RELATIONSHIP BETWEEN YEARS OF
PIANO STUDY AND GAIN

Gain	Piano Study	
	Below Average	Above Average
High	9	15
Low	13	11

Fifty-eight percent of the piano students having more than 2.9 years of piano study achieved an above-average gain, while 42 percent were below the average in total amount of gain on MD-2.

The above figures would seem to indicate that a student with a good piano background of three or more years of study has a better potential for doing superior work in melodic dictation than a student with less piano experience. The weight of evidence in this direction is, however, not overwhelming and conclusive. Two individual cases may be cited as having a bearing on this point and further show that it is not necessarily always true that the more

years of piano study the better the performance in melodic dictation. In the second experiment two out of the three students who achieved the greatest improvement in MD-2 scores indicated that they had no piano experience at all. The person who achieved the greatest gain on MD-2 as a result of the second experiment indicated eleven years of piano study, although his score was only 4 points higher than one student with no piano study and only 5 points higher than the other student who had no piano study. These results lend further credence to the belief that improvement in melodic dictation is the result of the action of many variables on the individuals under consideration. No definite pattern emerges here to show a clear relationship between the number of years of piano study and improvement in melodic dictation, but rather, only a possible trend or tendency for this to be true. Those students with more than 2.9 years of piano study seemed more consistent in achieving an above-average gain in melodic dictation than the students whose major instrument was either a stringed, brasswind, woodwind, or percussion instrument.

The poorest group showing was made by the students whose major instrument was in the woodwind family. Only 33 percent of these students were above the average in amount of improvement on MD-2, while 60 percent made a below-average gain.

These results would seem to lead to at least two conclusions:

1. Based on the results of this study, there apparently is a closer relationship between facility in vocal technique and improvement in melodic dictation than there is between study in any other applied field and improvement in melodic dictation.
2. Knowledge of the piano keyboard and its associative value with certain pitches—i.e., mental imagery of the keyboard while taking melodic dictation—may be of considerable value to some students of melodic dictation.

On the evaluation sheets which the students filled out after MD-2 had been taken, the students were asked to evaluate their progress and predict the amount of gain they felt they had made on their MD-2 scores over their MD-1 scores. This evaluation was asked of them, obviously, before they had knowledge of their MD-2 scores, but after all practicing had been completed. The combined ten-hour groups were unusually accurate in evaluating their own progress. The distribution of evaluations from the combined experimental groups appears in Table 10.

It is interesting to note that among those students who were inaccurate in evaluating their own progress, a number which amounted to twenty-five students out of the total forty-eight, eighteen

TABLE 10
STUDENTS' EVALUATIONS OF AMOUNT OF GAIN
IN MELODIC DICTATION

Group	Estimation		
	Accurate	Over-estimated	Under-estimated
10 hr.	10	3	3
20 hr.	6	2	8
40 hr.	7	2	7

underestimated the amount of improvement. Since it is impossible to say whether or not these evaluations as a whole were completely objective and sincere, it is unwise to attempt to draw definite conclusions from these data. However, the pattern would seem to indicate that beyond ten hours, students made more improvement than they were able to recognize. Since the improvement was spread out over a greater number of hours of practice time for the twenty- and forty-hour groups, the effect on these groups was apparently to minimize the recognition of improvement because of the relatively slow speed at which the improvement was achieved.

In addition, the students were asked to comment on whether they considered the time they had spent in practice to be insufficient, sufficient, or excessive. The preponderance of the forty-hour group felt that this amount of time was excessive. The majority of the twenty-hour group thought this amount of time for practice was sufficient, and the preponderance of the ten-hour group felt that this amount of time was insufficient. The ratio indicated here between the actual amount of time spent in practice and the students' evaluation of its sufficiency was unusually perfect. These findings would seem to indicate that twenty hours of practice was the most favorable amount of time to achieve best results, a fact also somewhat borne out by the statistical mean gain of the combined twenty-hour group during the two experiments.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary of findings

A summary of the specific conclusions drawn from an examination of the results of the study follows:

1. All students, with only one exception, made improvement during the course of the two semesters the experiment was being conducted.

2. An analysis-of-variance technique was employed for both semesters of the experiment and was also utilized in dealing with the combined data to test for significant statistical differences. On the basis of the obtained empirical data analyzed by the analysis-of-variance technique, it has been shown that very little difference occurred between the groups as a result of the different numbers of hours spent practicing melodic dictation. The relationship between time spent in practice and amount of gain for all three groups during both experiments, for all practical purposes, was found to be non-existent. However, it should be noted that the relatively small

population of this study places rather severe limitations upon the study itself and upon the results. For the forty-eight students participating in this experiment there was no significant relationship shown to exist between time spent in practice and improvement. Great care must be taken, however, not to misunderstand nor misapply the information gained from this study which was limited (a) by the size of the population, and (b) by the difficulty of controlling student work outside of class in the areas of rhythmic dictation, harmonic dictation, chord and intervallic recognition, sight-singing, and instrumental and vocal performance.

The findings of this study are not all-inclusive nor terminal, and directly apply only to this study. Experimentation involving a much larger population and greater controls would enlarge the scope of these findings and increase the practicability of their application to the teaching of melodic dictation.

3. In computing simple correlation coefficients between the results of various tests used, the highest simple correlation coefficient was 0.504 between the Drake Musical Memory Test and the Seashore Tonal Memory Test for the entire population. This is a relatively high correlation and has significant meaning for this

study. The conclusion can be drawn that a person achieving a high score on the Drake Musical Memory Test might be expected to tend toward a high score on the Seashore Tonal Memory Test. The correlations between these tests and the second Melodic Dictation Test, however, are not significant. This would seem to indicate that these two tests are not necessarily good predictors of success in melodic dictation.

4. In the computation of a multiple correlation, the following test scores were used and correlated with MD-2 (the retest of the Melodic Dictation Test):

A.C.E.
Drake Musical Memory (first testing)
Drake Rhythm
Seashore Tonal Memory
Seashore Rhythm
Seashore Pitch

The correlations were computed using a group of twelve students from the total forty-eight in the experiment. This population was composed of students having the six highest and the six lowest A.C.E. scores of mental ability. The multiple correlation coefficient for this population was 0.784, which shows a remarkably high level of significance between MD-2 and the six variables in this particular population. These six tests are therefore

indicated as being a good team of predictors of success in melodic dictation.

5. Prediction of achievement in melodic dictation for an individual or a group can be much more accurate through the use of a team of predictors rather than if the basis of prediction is the score of one isolated test.

6. There are no significant correlations between the Drake Musical Memory Test and the raw score gains of the Melodic Dictation Test for the entire population of the study. Musical memory is not the only factor involved in taking melodic dictation. A good musical memory is essential, but it will not in itself alone assure outstanding achievement in the improvement of melodic dictation.

7. Since all students improved their scores on MD-2 during a third semester, when no specified number of hours of practice was assigned to a new group of students, this is further proof that the time element is not the determining factor in the extent of improvement. A number of students in this third semester did no practicing at all outside of class and yet achieved considerable gain.

8. The twenty-hour groups, as a whole, seemed to do slightly better than the ten- or forty-hour groups in terms of mean gain. However, after twenty hours of practicing, a point of diminishing returns apparently was reached when further effort was not productive of comparable improvement.

9. It is impossible to prognosticate the amount of gain which can be expected from an individual student or from a group in terms of time spent practicing melodic dictation.

10. Many other variables exercise strong influence on a student's success in improving his melodic dictation such as practicing the piano, sight-singing, rhythmic dictation, and intervallic practice.

11. Students with more than three years of piano study have a tendency to be more successful in achieving a greater gain.

12. The element of boredom in practice seems to have been a contributing factor in the lack of success of the forty-hour groups in achieving greater gain. The student evaluation sheets of the forty-hour groups imply this.

Prognosticative value of test data

As the results of this study have shown, there is little prognosticative value in a single test of aptitude alone when prediction of expected improvement in melodic dictation is being attempted.

Oftentimes, too much importance is placed on the results of a single aptitude test in predicting a student's potential as a music major, for example.

The only two pairs of tests in this study which were shown to be interrelated, where a certain level of achievement on one might indicate a similar level of achievement on the other, were the Drake Musical Memory Test with the Seashore Tonal Memory Test, and the Drake Rhythm Test with the Seashore Rhythm Test. Apparently these two pairs of tests are each testing very similar aptitudes. However, even though there was shown to be a nonsignificant level of correlation between these tests and the first Melodic Dictation Test (MD-1), a high correlation coefficient of 0.56 was found between the Seashore Tonal Memory Test and the second Melodic Dictation Test (MD-2) when the scores of the twelve students selected for the multiple correlation computation were used. This fact might indicate that for these twelve students (6 high A.C.E. scores and 6 low A.C.E. scores) the Seashore Tonal Memory Test was a good predictor of success on MD-2.

The only relatively sure way of predicting the amount of improvement which might be expected from a given group as a result of melodic dictation practice would be, however, on the basis of a team of predictors such as was used in this study.

It would seem, on the basis of the results and information derived from this study, to be a most dangerous procedure to attempt

to prognosticate an individual's expected amount of improvement in melodic dictation on any basis whatsoever except possibly after a variety of aptitude, achievement, and mental ability tests had been administered. The great number of individual differences which become apparent in this area of musical endeavor make it almost impossible to make any kind of valid judgment regarding success. The researcher is not on solid ground even when dealing with groups exposed to the same stimuli and is in an even more untenable position when making individual judgments, whether these judgments are made on the basis of a series of test scores or on the basis of practice time when considering the amount of improvement to be expected in melodic dictation.

Implications for the teaching of melodic dictation

Certain implications for the teaching of melodic dictation are evident from the results of this statistical study:

1. Students should be taught to understand the importance of the various musical facilities which are brought to bear while taking melodic dictation. They should be shown how successful melodic dictation is achieved through the application of many interrelated musical activities. Students should be urged to make meaningful applications to dictation of all musical ideas, concepts, and abilities. Students should become more aware that they are not learning

isolated techniques and should be shown how to relate their various musical experiences and apply all their musical knowledge as needed to improve their facility to take melodic dictation.

2. Much emphasis should be placed on the aural recognition of tonal and rhythmic patterns and on the visual recognition of aural melodic and rhythmic patterns. The ability to “see with the ears and hear with the eyes” is most important to successful melodic dictation.

3. All students should be urged to practice melodic dictation, but an explanation should be given to them that due to individual differences some students may have to practice a longer time to achieve satisfactory improvement than will others. They should know that practice time alone is not going to determine the amount of gain to be expected.

4. Earlier and increased stress should be placed on keyboard experience as an aid in improving melodic dictation. Students with little or no piano study prior to university entrance may be distinctly handicapped in aural harmony courses particularly. These students should at least be urged to begin studying piano at the earliest possible time.

5. A wide variety in the degree of difficulty and number of practice tapes should be furnished to the student. Whether this tape-recorded method of practice or some other method is used, much new melodic practice material should be made continually available to the students. The introduction of new material for practice reduces the incidence of boredom during practice and also minimizes the degree of memorization of the practice material which unconsciously takes place.

6. Students should be made aware of the absolute necessity of developing a high degree of concentrative power which ability is closely related to that of tonal memory, an important element involved in melodic dictation.

7. Teachers of melodic dictation should realize that every student in an aural harmony class will respond to the teaching stimuli in terms of that individual's past experience and current knowledge and that individual differences will become apparent during the learning process. This knowledge could have some implications relative to grading procedures.

8. Teachers should expect all students to make improvement in their ability to take melodic dictation but should also expect to

find wide differences in the amount of improvement even between individuals within similar groups.

Suggestions for further research

As a result of this present study and the experience derived from it, certain suggestions can be made for broadening the area covered in this study. Further research in the general area of aural harmony is necessary. This research would be beneficial to both teacher and student alike and would add to the sum total of knowledge pertaining to this important area of ear training and aural harmony which is so vital in the education of a musician.

The following suggestions for further research are the result of experimentation carried on for the present study. The results from this further research would follow up and enlarge upon the data obtained from this study.

1. If the population of a study were sufficiently large, it would be beneficial to divide the total group into four groups instead of three as in the present study. Three of the four groups then could be assigned certain differing numbers of hours to practice melodic dictation while the fourth group would refrain entirely from practicing melodic dictation. A comparison of mean gains between these four groups and a statistical analysis could be made to gain

further information relative to the correlation between time spent in practice and improvement in melodic dictation.

2. A further study might profitably be made of progress achieved in improving melodic dictation as a result of using practice tapes employing the human voice as well as other instruments including the piano to determine if the sound medium has any direct effect on the results. It might be found that some other instrument rather than the piano could be more effectively used in melodic dictation. Further, it would be valuable to know, for instance, whether a trombone player would improve more rapidly in melodic dictation if the trombone were used in making the practice tapes rather than the piano. Experiments could be carried out utilizing other instruments in the same manner.

3. The method of practice should be studied. A comparison of the gains made by a group of students practicing with tape-recorded melodies with another group practicing melodic dictation in some other manner might lead to beneficial results.

4. A statistical study might be done on the relationship between success on the Aliferis Music Achievement Test and improvement in melodic dictation. This study might show evidence of the importance of the ability to mentally hear and envision the musical

notation. There may well be a definite correlation between this ability and the ability to take accurate melodic dictation.

5. A comparative study could be done to show whether or not there is any relationship between improvement in melodic dictation and the final course grades, not only for one semester but also for succeeding semesters.

6. A continuing study should be made of a group of students as they progress through succeeding ear training classes in order to ascertain the relationship between increased facility in melodic dictation and initial MD-1 scores. Much valuable information about the rate and amount of growth should accrue from such a study.

7. A similar experimental study to the present one might be conducted with an attempt being made to control other variables which influence improvement in melodic dictation; i.e., piano practice, rhythmic dictation practice, sight-singing, intervallic practice, and to some extent, harmonic dictation. Admittedly, this control would be very difficult to achieve, but in an area of learning as complicated and complex as melodic dictation, further experimentation and study is necessary, incorporating within the framework of such a study some control, if possible, over practice done outside of class in

these other related areas. It is recommended further that any future studies involve much larger populations.

There is still much that is not known or understood in the area of the psychology of ear training. The complexity of the aptitudes required in the performance of even one aspect of the ear training program, such as melodic dictation, is such that much more experimentation must be carried out before a complete understanding of the total process involved in the development of this ability can be expected. The instructor of an aural harmony course is dealing with the responses and reactions of the human personality in teaching this facility. The challenge to improve the techniques of teaching this most complex ability in order to make possible greater facility and understanding on the part of the student should be ever before the progressive teacher of melodic dictation.

APPENDIXES

APPENDIX I

RAW SCORE DATA FOR MATCHED GROUPS,

FIRST EXPERIMENT

APPENDIX I

RAW SCORE DATA FOR MATCHED GROUPS,
FIRST EXPERIMENT^a

No.	Test			
	Drake Musical Memory	Drake Rhythm	Seashore Measure- ments of Musical Talent	Melodic Dictation
<u>Group I</u>				
11	20	18	102	159
3	13	28	105	247
17	25	31	102	146
16	25	37	100	220
21	29	61	104	240
20	28	58	100	161
27	47	54	94	59
4	13	37	99	109
7	18	29	103	166
	<u>218</u>	<u>353</u>	<u>909</u>	<u>1,507</u>
<u>Group II</u>				
1	10	36	101	303
22	34	74	102	184
8	19	28	105	102
10	20	30	104	119
24	37	53	100	101
14	22	37	99	224
12	21	47	105	138
9	19	40	103	112
26	39	56	105	214
	<u>221</u>	<u>401</u>	<u>924</u>	<u>1,497</u>

^aNo. = the number arbitrarily assigned each student. Best possible scores: Drake Musical Memory Test, 0; Drake Rhythm Test, 0; Seashore Measurements of Musical Talent Test, 110; Melodic Dictation Test, 322.

APPENDIX I (Continued)

No.	Test			
	Drake Musical Memory	Drake Rhythm	Seashore Measure- ments of Musical Talent	Melodic Dictation
<u>Group III</u>				
2	12	58	105	180
5	14	124	100	208
15	24	22	99	84
18	26	49	104	90
19	27	44	101	129
6	15	27	107	304
25	37	69	102	174
23	37	50	96	155
28	29	83	93	174
	<u>221</u>	<u>526</u>	<u>907</u>	<u>1,498</u>

APPENDIX II

RAW SCORE DATA FOR MATCHED GROUPS,

SECOND EXPERIMENT

APPENDIX II

RAW SCORE DATA FOR MATCHED GROUPS,
SECOND EXPERIMENT^a

No.	Test			
	Drake Musical Memory	Drake Rhythm	Seashore Measurements of Musical Talent	Melodic Dictation
<u>Group I</u>				
5	39	36	102	124
12	28	73	100	84
22	24	57	104	179
17	23	51	97	77
4	20	41	103	196
9	15	29	106	158
20	13	50	105	252
	<u>162</u>	<u>337</u>	<u>717</u>	<u>1,070</u>
<u>Group II</u>				
6	32	55	103	99
7	30	77	101	207
1	25	60	98	131
10	23	30	110	179
18	22	49	103	114
19	19	43	107	176
15	11	70	105	176
	<u>162</u>	<u>384</u>	<u>727</u>	<u>1,082</u>

^aNo. = the number arbitrarily assigned each student. Best possible scores: Drake Musical Memory Test, 0; Drake Rhythm Test, 0; Seashore Measurements of Musical Talent Test, 110; Melodic Dictation Test, 322.

APPENDIX II (Continued)

No.	Test			
	Drake Musical Memory	Drake Rhythm	Seashore Measure- ments of Musical Talent	Melodic Dictation
<u>Group III</u>				
14	31	77	102	208
11	27	54	104	153
8	26	42	96	133
13	22	50	105	184
16	19	57	102	122
21	20	36	104	168
2	17	66	110	106
	<u>162</u>	<u>382</u>	<u>723</u>	<u>1,074</u>

APPENDIX III

MELODIC DICTATION TEST TOTAL RAW SCORES AND

TOTAL GAIN OF ALL THREE GROUPS,

FIRST EXPERIMENT

APPENDIX III

MELODIC DICTATION TEST TOTAL RAW SCORES AND
TOTAL GAIN OF ALL THREE GROUPS,
FIRST EXPERIMENT

Group	N	Test	Retest	Gain
10 hr.	9	1,498	2,074	576
20 hr.	9	1,497	2,395	898
40 hr.	9	1,507	2,374	867
Total	27	4,502	6,843	2,341

APPENDIX IV

**MELODIC DICTATION TEST MEAN GAINS, STANDARD
DEVIATION AND STANDARD ERROR OF ALL
GROUPS, FIRST EXPERIMENT**

APPENDIX IV

MELODIC DICTATION TEST MEAN GAINS, STANDARD
DEVIATION, AND STANDARD ERROR OF ALL
GROUPS, FIRST EXPERIMENT

Group	N	Mean Gain	Standard Deviation	Standard Error
10 hr.	9	64.0	35.6	12.58
20 hr.	9	99.8	53.4	18.90
40 hr.	9	96.3	50.2	17.78
Total	27	86.7	49.8	9.76

APPENDIX V

**INDIVIDUAL SCORES ON MELODIC DICTATION
TEST, FIRST EXPERIMENT**

APPENDIX V

INDIVIDUAL SCORES ON MELODIC DICTATION
TEST, FIRST EXPERIMENT

Test	Retest	Gain
<u>Ten-Hour Group</u>		
304	315	11
208	241	33
180	303	123
174	252	78
174	293	119
155	223	68
129	182	53
90	143	53
84	122	38
<u>1,498</u>	<u>2,074</u>	<u>576</u>
<u>Twenty-Hour Group</u>		
303	318	15
224	309	85
214	306	92
184	207	23
138	282	144
119	253	134
112	188	76
102	279	177
101	253	152
<u>1,497</u>	<u>2,395</u>	<u>898</u>
<u>Forty-Hour Group</u>		
247	305	58
240	212	-28
220	321	101
166	276	110
161	302	141
159	294	135
146	266	120
109	245	136
59	153	94
<u>1,507</u>	<u>2,374</u>	<u>867</u>

APPENDIX VI

MELODIC DICTATION TEST TOTAL RAW SCORES AND TOTAL GAIN OF ALL THREE GROUPS, SECOND EXPERIMENT

APPENDIX VI

MELODIC DICTATION TEST TOTAL RAW SCORES AND
TOTAL GAIN OF ALL THREE GROUPS,
SECOND EXPERIMENT

Group	N	Test	Retest	Gain
10 hr.	7	1,074	1,603	529
20 hr.	7	1,070	1,617	547
40 hr.	7	1,082	1,632	550
Total	21	3,226	4,852	1,626

APPENDIX VII

MELODIC DICTATION TEST MEAN GAINS, STANDARD DEVIATION, AND STANDARD ERROR OF ALL GROUPS, SECOND EXPERIMENT

APPENDIX VII

MELODIC DICTATION TEST MEAN GAINS, STANDARD
DEVIATION, AND STANDARD ERROR OF ALL
GROUPS, SECOND EXPERIMENT

Group	N	Mean Gain	Standard Deviation	Standard Error
10 hr.	7	75.6	43.51	14.41
20 hr.	7	78.1	53.93	22.00
40 hr.	7	78.6	31.07	17.76
Total	21	77.4	44.91	10.01

APPENDIX VIII

**INDIVIDUAL SCORES ON MELODIC DICTATION
TEST, SECOND EXPERIMENT**

APPENDIX VIII

INDIVIDUAL SCORES ON MELODIC DICTATION
TEST, SECOND EXPERIMENT

Test	Retest	Gain
<u>Ten-Hour Group</u>		
208	271	64
153	222	69
133	199	66
184	315	131
122	245	123
168	219	51
106	131	25
<u>1,074</u>	<u>1,603</u>	<u>529</u>
<u>Twenty-Hour Group</u>		
124	251	127
84	85	1
179	272	93
77	211	134
196	241	45
158	293	135
252	264	12
<u>1,070</u>	<u>1,617</u>	<u>547</u>
<u>Forty-Hour Group</u>		
99	138	39
207	268	61
131	141	10
179	318	139
114	235	121
176	244	68
176	288	112
<u>1,082</u>	<u>1,632</u>	<u>550</u>

APPENDIX IX

MELODIC DICTATION TEST TOTAL RAW SCORES

AND GAIN OF ALL SIX GROUPS,

COMBINED EXPERIMENTS

APPENDIX IX

MELODIC DICTATION TEST TOTAL RAW SCORES
AND GAIN OF ALL SIX GROUPS,
COMBINED EXPERIMENTS

Group	N	Test	Retest	Gain
10 hr.	16	2,572	3,677	1,105
20 hr.	16	2,567	4,012	1,445
40 hr.	16	2,589	4,006	1,417
Total	48	7,728	11,695	3,967

APPENDIX X

**DRAKE MUSICAL MEMORY TEST RAW SCORES
AND GAIN OF ALL THREE GROUPS**

APPENDIX X

DRAKE MUSICAL MEMORY TEST RAW SCORES
AND GAIN OF ALL THREE GROUPS

Group	N	Test	Retest	Gain
<u>First Experiment</u>				
10 hr.	9	221	156	65
20 hr.	9	221	129	92
40 hr.	9	218	146	72
<u>Second Experiment</u>				
10 hr.	7	162	88	74
20 hr.	7	162	112	50
40 hr.	7	162	119	43

APPENDIX XI

INDIVIDUAL SCORES AND GAIN ON DRAKE MUSIC MEMORY TEST, FIRST EXPERIMENT

APPENDIX XI

INDIVIDUAL SCORES AND GAIN ON DRAKE MUSIC
MEMORY TEST, FIRST EXPERIMENT

Test	Retest	Gain
<u>Ten-Hour Group</u>		
15	6	9
14	15	-1
12	3	9
29	19	10
37	20	17
37	26	11
27	29	-2
24	18	6
<u>221</u>	<u>156</u>	<u>65</u>
<u>Twenty-Hour Group</u>		
10	2	8
22	7	15
39	27	12
34	27	7
21	6	15
20	14	6
19	15	4
19	6	13
37	25	12
<u>221</u>	<u>129</u>	<u>92</u>
<u>Forty-Hour Group</u>		
13	6	7
29	12	17
25	12	13
18	13	5
28	20	8
20	16	4
25	15	10
13	8	5
47	44	3
<u>218</u>	<u>146</u>	<u>72</u>

APPENDIX XII

INDIVIDUAL SCORES AND GAIN ON DRAKE MUSIC MEMORY TEST, SECOND EXPERIMENT

APPENDIX XII

INDIVIDUAL SCORES AND GAIN ON DRAKE MUSIC
MEMORY TEST, SECOND EXPERIMENT

Test	Retest	Gain
<u>Ten-Hour Group</u>		
31	13	18
27	20	7
26	20	6
22	5	17
19	4	15
20	11	9
17	15	2
<u>162</u>	<u>88</u>	<u>74</u>
<u>Twenty-Hour Group</u>		
39	22	17
28	14	14
24	26	-2
23	24	-1
20	16	4
15	3	12
13	7	6
<u>162</u>	<u>112</u>	<u>50</u>
<u>Forty-Hour Group</u>		
32	21	11
30	21	9
25	23	2
23	13	10
22	23	-1
19	7	12
11	11	0
<u>162</u>	<u>119</u>	<u>43</u>

APPENDIX XIII

**RAW SCORES ON ALL TESTS FOR THE SIX STUDENTS WITH
THE HIGHEST A.C.E. SCORES AND THE SIX STUDENTS
WITH THE LOWEST A.C.E. SCORES**

APPENDIX XIII

RAW SCORES ON ALL TESTS FOR THE SIX STUDENTS WITH
THE HIGHEST A.C.E. SCORES AND THE SIX STUDENTS
WITH THE LOWEST A.C.E. SCORES

A.C.E.	MD-2	Drake Musical Memory (first)	Drake Rhythm	Sea- shore Tonal Memory	Sea- shore Rhythm	Sea- shore Pitch Dis- crimi- nation
<u>High Group</u>						
155	282	21	47	29	29	47
126	318	10	36	29	29	43
125	266	25	31	29	27	46
119	315	15	27	30	29	48
117	211	23	51	26	29	42
115	131	17	66	30	30	50
<u>Low Group</u>						
72	182	27	44	27	28	46
74	279	19	28	30	30	45
74	141	25	60	25	28	45
76	241	14	124	28	26	46
77	294	20	18	29	30	43
84	276	18	29	30	28	45

APPENDIX XIV

**MELODIC DICTATION TEST RAW SCORES AND GAIN
FROM A THIRD-SEMESTER GROUP**

APPENDIX XIV

MELODIC DICTATION TEST RAW SCORES AND GAIN
FROM A THIRD-SEMESTER GROUP

MD-1	MD-2	Gain ^a
312	319	7
130	212	82
310	319	9
248	288	40
109	124	15
252	272	20
214	298	84
297	302	5
193	195	2
201	236	35
179	264	90
152	309	157
123	219	96
188	290	102
133	199	66
142	188	46
106	200	94
150	212	62
137	204	68
178	202	24
41	113	72
176	254	78
316	319	3

^aMean gain for the twenty-three students = 54.6.

APPENDIX XV

BIOGRAPHICAL DATA SHEET

APPENDIX XV
BIOGRAPHICAL DATA SHEET

Experimental Groups

Name _____ Date _____
 Last First

Address _____
 Number Street Zone City

Phone _____ Age _____

High school _____ City _____

Date graduated _____ Performing groups in high school _____

Major instrument _____ Other instruments played _____

Number of years private study on major instrument _____ Other _____

Do you play the piano _____ Private study _____ years

Semesters of ear training _____ Semesters of theory _____

Had you ever received formal instruction in sight singing before
 coming to Wayne? _____ How much? _____ Course in solfeggio _____

What performing group or groups are you currently an active participant

Grade in Music 102 _____

DO NOT WRITE BELOW THIS LINE

Scores: Drake: Tonal memory _____ Retest _____
 Rhythm _____

Seashore: Pitch discrimination _____
 Tonal memory _____

Aliferis: Rhythmic discrimination _____
 Melodic _____ Harmonic _____ Rhythmic _____

Melodic dictation: First test _____ Retest _____

Grade received in Music 104 _____

APPENDIX XVI

EXPERIMENTAL STUDY STUDENT EVALUATION SHEET

APPENDIX XVI
EXPERIMENTAL STUDY
STUDENT EVALUATION SHEET

June, 1958

1. Before knowing your score on the retest of the ten melodies which were given at the beginning of the semester before your hours of practice, do you feel that you have (check the answer which best describes your feeling:

Improved greatly _____
Shown moderate improvement _____
Shown little improvement _____
Can see no improvement at all _____

2. Check the group you were in: 10-hr. _____, 20-hr. _____, 40-hr. _____

Do you feel improvement in melodic dictation is possible? _____

What factor do you think is responsible for a possible lack of improvement? _____

3. Do you feel that the amount of time spent in practice with the recorded tapes was:

Insufficient _____
Sufficient _____
Too much _____

4. Can you see any carry-over from your melodic dictation practicing into other elements of your ear training course? If so, in what way has there been a correlation?

5. Make a general statement regarding procedure, number of tapes available, over-all set-up of the experiment, and include any suggestions that you have which you feel would improve the administration of this study.

APPENDIX XVII

EXPLANATION OF SCORING PROCEDURES

FOR MELODIC DICTATION TEST

APPENDIX XVII

EXPLANATION OF SCORING PROCEDURES FOR MELODIC DICTATION TEST

In correcting the Melodic Dictation Test, both melodic errors and errors in rhythm were counted.

In the exercises not requiring rhythmic notation, as well as in those exercises requiring both melodic and rhythmic notation, each note which was melodically incorrect was counted as an error. This meant, of course, that whenever one interval was misjudged and a wrong note placed, all succeeding notes would be wrong even though these notes were "in phase" with each other following the error. It was felt that a student should have the ability to recognize the lack of correspondence between the tonality as suggested by his notation and the tonality as heard aurally, and would thus remedy the error and return to the proper notation without notating the entire exercise incorrectly as the result of one misjudged interval.

In the exercises involving both rhythmic and melodic notation, the number of beats in the exercises were totaled. Each beat which was incorrectly notated counted one point; thus in a four-measure phrase of common time there was the possibility of notating sixteen beats either correctly or incorrectly. If three of the four measures

containing sixteen beats were notated correctly, a total of twelve points would be allowed.

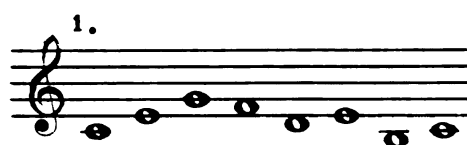
In each case, the melodic and the rhythmic notations of each beat had to be correct in order to achieve a perfect score. The melodic and rhythmic notations were corrected separately and then totaled for the final score.

APPENDIX XVIII

EXPERIMENTAL ACHIEVEMENT TEST

EXPERIMENTAL ACHIEVEMENT TEST

131

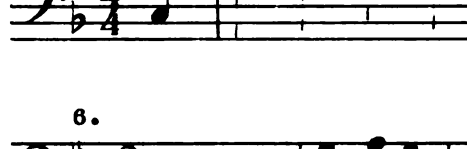
1. 

2. 

3. 

4. 

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6. 

7. 

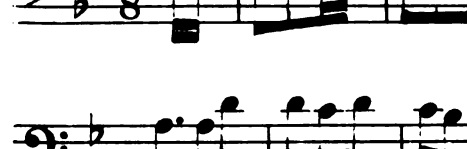
8. 

9. 

10. 

11. 

12. 

13. 

14. 

APPENDIX XIX

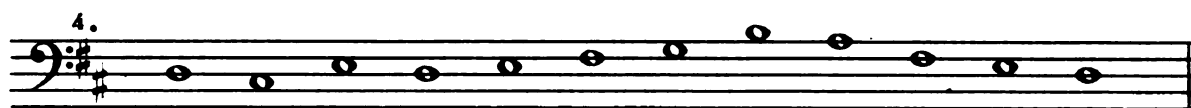
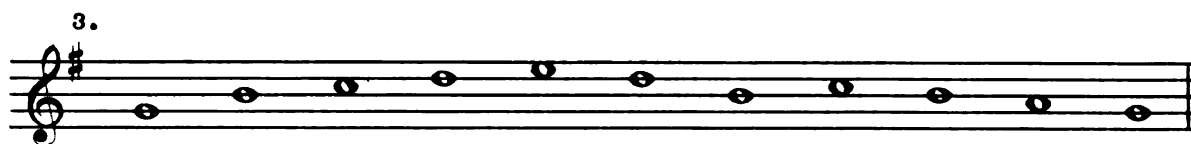
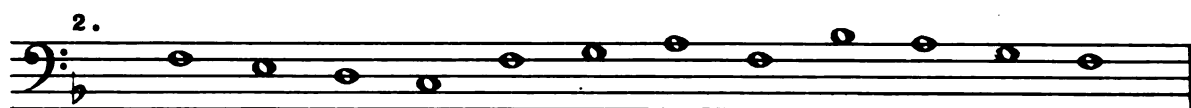
ANSWER SHEET, EXPERIMENTAL STUDY

PRACTICE TAPE NO.1

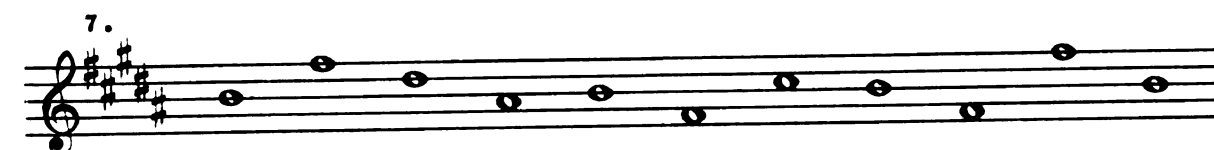
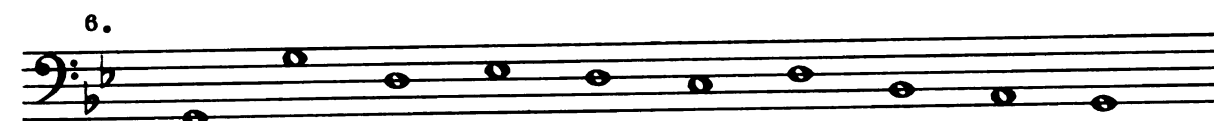
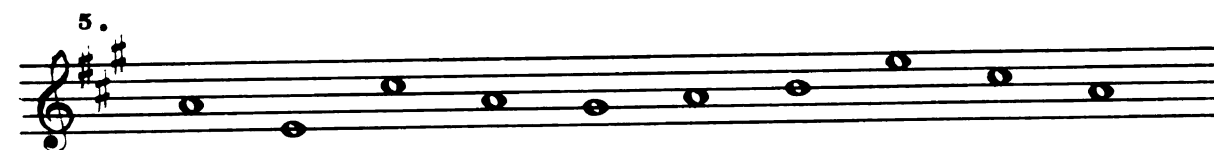
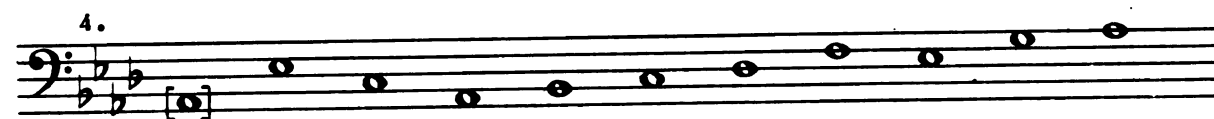
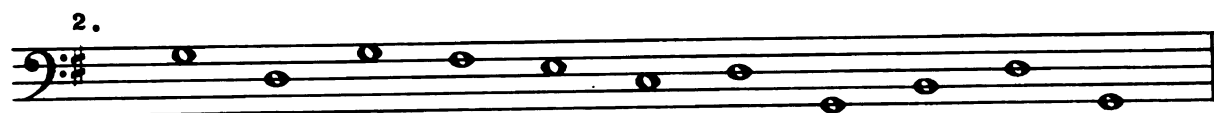
133



PRACTICE TAPE NO.2



PRACTICE TAPE NO.3





PRACTICE TAPE NO.4

137

1. 

2. 

3. 

4. 

5. 

6. 

7. 

8. 

PRACTICE TAPE NO.5

1. 

2. 

PRACTICE TAPE NO.6

1. Maj. 3 min. 3 P 4 P 5 Maj. 2

2. min. 6 P 4 Maj. 7 min. 2 min. 3

3. Maj. 6 min. 7 Maj. 2 P 5 min. 6

4. min. 3 min. 2 Maj. 7 P 4 min. 6

5.

5. Musical staff 5: Treble clef, key of G major, 4/4 time. Notes: G4 (quarter), A4 (quarter), B4 (quarter), C5 (quarter), D5 (quarter), E5 (quarter), F#5 (quarter), G5 (quarter).

8.

7.

The musical notation for exercise 7 is written on a five-line staff with a treble clef. The notes are: G4 (first line), A4 (first space), B4 (second line), C5 (second space), D5 (third line), E5 (third space), F5 (fourth line), G5 (fourth space), A5 (fifth line), B5 (first line of the next octave), C6 (first space), D6 (second line), E6 (second space), F6 (third line), G6 (third space), A6 (fourth line), B6 (fourth space), C7 (fifth line), D7 (first line of the next octave), E7 (first space), F7 (second line), G7 (second space), A7 (third line), B7 (third space), C8 (fourth line), D8 (fourth space), E8 (fifth line), F8 (first line of the next octave), G8 (first space), A8 (second line), B8 (second space), C9 (third line), D9 (third space), E9 (fourth line), F9 (fourth space), G9 (fifth line), A9 (first line of the next octave), B9 (first space), C10 (second line), D10 (second space), E10 (third line), F10 (third space), G10 (fourth line), A10 (fourth space), B10 (fifth line), C11 (first line of the next octave), D11 (first space), E11 (second line), F11 (second space), G11 (third line), A11 (third space), B11 (fourth line), C12 (fourth space), D12 (fifth line), E12 (first line of the next octave), F12 (first space), G12 (second line), A12 (second space), B12 (third line), C13 (third space), D13 (fourth line), E13 (fourth space), F13 (fifth line), G13 (first line of the next octave), A13 (first space), B13 (second line), C14 (second space), D14 (third line), E14 (third space), F14 (fourth line), G14 (fourth space), A14 (fifth line), B14 (first line of the next octave), C15 (first space), D15 (second line), E15 (second space), F15 (third line), G15 (third space), A15 (fourth line), B15 (fourth space), C16 (fifth line), D16 (first line of the next octave), E16 (first space), F16 (second line), G16 (second space), A16 (third line), B16 (third space), C17 (fourth line), D17 (fourth space), E17 (fifth line), F17 (first line of the next octave), G17 (first space), A17 (second line), B17 (second space), C18 (third line), D18 (third space), E18 (fourth line), F18 (fourth space), G18 (fifth line), A18 (first line of the next octave), B18 (first space), C19 (second line), D19 (second space), E19 (third line), F19 (third space), G19 (fourth line), A19 (fourth space), B19 (fifth line), C20 (first line of the next octave), D20 (first space), E20 (second line), F20 (second space), G20 (third line), A20 (third space), B20 (fourth line), C21 (fourth space), D21 (fifth line), E21 (first line of the next octave), F21 (first space), G21 (second line), A21 (second space), B21 (third line), C22 (third space), D22 (fourth line), E22 (fourth space), F22 (fifth line), G22 (first line of the next octave), A22 (first space), B22 (second line), C23 (second space), D23 (third line), E23 (third space), F23 (fourth line), G23 (fourth space), A23 (fifth line), B23 (first line of the next octave), C24 (first space), D24 (second line), E24 (second space), F24 (third line), G24 (third space), A24 (fourth line), B24 (fourth space), C25 (fifth line), D25 (first line of the next octave), E25 (first space), F25 (second line), G25 (second space), A25 (third line), B25 (third space), C26 (fourth line), D26 (fourth space), E26 (fifth line), F26 (first line of the next octave), G26 (first space), A26 (second line), B26 (second space), C27 (third line), D27 (third space), E27 (fourth line), F27 (fourth space), G27 (fifth line), A27 (first line of the next octave), B27 (first space), C28 (second line), D28 (second space), E28 (third line), F28 (third space), G28 (fourth line), A28 (fourth space), B28 (fifth line), C29 (first line of the next octave), D29 (first space), E29 (second line), F29 (second space), G29 (third line), A29 (third space), B29 (fourth line), C30 (fourth space), D30 (fifth line), E30 (first line of the next octave), F30 (first space), G30 (second line), A30 (second space), B30 (third line), C31 (third space), D31 (fourth line), E31 (fourth space), F31 (fifth line), G31 (first line of the next octave), A31 (first space), B31 (second line), C32 (second space), D32 (third line), E32 (third space), F32 (fourth line), G32 (fourth space), A32 (fifth line), B32 (first line of the next octave), C33 (first space), D33 (second line), E33 (second space), F33 (third line), G33 (third space), A33 (fourth line), B33 (fourth space), C34 (fifth line), D34 (first line of the next octave), E34 (first space), F34 (second line), G34 (second space), A34 (third line), B34 (third space), C35 (fourth line), D35 (fourth space), E35 (fifth line), F35 (first line of the next octave), G35 (first space), A35 (second line), B35 (second space), C36 (third line), D36 (third space), E36 (fourth line), F36 (fourth space), G36 (fifth line), A36 (first line of the next octave), B36 (first space), C37 (second line), D37 (second space), E37 (third line), F37 (third space), G37 (fourth line), A37 (fourth space), B37 (fifth line), C38 (first line of the next octave), D38 (first space), E38 (second line), F38 (second space), G38 (third line), A38 (third space), B38 (fourth line), C39 (fourth space), D39 (fifth line), E39 (first line of the next octave), F39 (first space), G39 (second line), A39 (second space), B39 (third line), C40 (third space), D40 (fourth line), E40 (fourth space), F40 (fifth line), G40 (first line of the next octave), A40 (first space), B40 (second line), C41 (second space), D41 (third line), E41 (third space), F41 (fourth line), G41 (fourth space), A41 (fifth line), B41 (first line of the next octave), C42 (first space), D42 (second line), E42 (second space), F42 (third line), G42 (third space), A42 (fourth line), B42 (fourth space), C43 (fifth line), D43 (first line of the next octave), E43 (first space), F43 (second line), G43 (second space), A43 (third line), B43 (third space), C44 (fourth line), D44 (fourth space), E44 (fifth line), F44 (first line of the next octave), G44 (first space), A44 (second line), B44 (second space), C45 (third line), D45 (third space), E45 (fourth line), F45 (fourth space), G45 (fifth line), A45 (first line of the next octave), B45 (first space), C46 (second line), D46 (second space), E46 (third line), F46 (third space), G46 (fourth line), A46 (fourth space), B46 (fifth line), C47 (first line of the next octave), D47 (first space), E47 (second line), F47 (second space), G47 (third line), A47 (third space), B47 (fourth line), C48 (fourth space), D48 (fifth line), E48 (first line of the next octave), F48 (first space), G48 (second line), A48 (second space), B48 (third line), C49 (third space), D49 (fourth line), E49 (fourth space), F49 (fifth line), G49 (first line of the next octave), A49 (first space), B49 (second line), C50 (second space), D50 (third line), E50 (third space), F50 (fourth line), G50 (fourth space), A50 (fifth line), B50 (first line of the next octave), C51 (first space), D51 (second line), E51 (second space), F51 (third line), G51 (third space), A51 (fourth line), B51 (fourth space), C52 (fifth line), D52 (first line of the next octave), E52 (first space), F52 (second line), G52 (second space), A52 (third line), B52 (third space), C53 (fourth line), D53 (fourth space), E53 (fifth line), F53 (first line of the next octave), G53 (first space), A53 (second line), B53 (second space), C54 (third line), D54 (third space), E54 (fourth line), F54 (fourth space), G54 (fifth line), A54 (first line of the next octave), B54 (first space), C55 (second line), D55 (second space), E55 (third line), F55 (third space), G55 (fourth line), A55 (fourth space), B55 (fifth line), C56 (first line of the next octave), D56 (first space), E56 (second line), F56 (second space), G56 (third line), A56 (third space), B56 (fourth line), C57 (fourth space), D57 (fifth line), E57 (first line of the next octave), F57 (first space), G57 (second line), A57 (second space), B57 (third line), C58 (third space), D58 (fourth line), E58 (fourth space), F58 (fifth line), G58 (first line of the next octave), A58 (first space), B58 (second line), C59 (second space), D59 (third line), E59 (third space), F59 (fourth line), G59 (fourth space), A59 (fifth line), B59 (first line of the next octave), C60 (first space), D60 (second line), E60 (second space), F60 (third line), G60 (third space), A60 (fourth line), B60 (fourth space), C61 (fifth line), D61 (first line of the next octave), E61 (first space), F61 (second line), G61 (second space), A61 (third line), B61 (third space), C62 (fourth line), D62 (fourth space), E62 (fifth line), F62 (first line of the next octave), G62 (first space), A62 (second line), B62 (second space), C63 (third line), D63 (third space), E63 (fourth line), F63 (fourth space), G63 (fifth line), A63 (first line of the next octave), B63 (first space), C64 (second line), D64 (second space), E64 (third line), F64 (third space), G64 (fourth line), A64 (fourth space), B64 (fifth line), C65 (first line of the next octave), D65 (first space), E65 (second line), F65 (second space), G65 (third line), A65 (third space), B65 (fourth line), C66 (fourth space), D66 (fifth line), E66 (first line of the next octave), F66 (first space), G66 (second line), A66 (second space), B66 (third line), C67 (third space), D67 (fourth line), E67 (fourth space), F67 (fifth line), G67 (first line of the next octave), A67 (first space), B67 (second line), C68 (second space), D68 (third line), E68 (third space), F68 (fourth line), G68 (fourth space), A68 (fifth line), B68 (first line of the next octave), C69 (first space), D69 (second line), E69 (second space), F69 (third line), G69 (third space), A69 (fourth line), B69 (fourth space), C70 (fifth line), D70 (first line of the next octave), E70 (first space), F70 (second line), G70 (second space), A70 (third line), B70 (third space), C71 (fourth line), D71 (fourth space), E71 (fifth line), F71 (first line of the next octave), G71 (first space), A71 (second line), B71 (second space), C72 (third line), D72 (third space), E72 (fourth line), F72 (fourth space), G72 (fifth line), A72 (first line of the next octave), B72 (first space), C73 (second line), D73 (second space), E73 (third line), F73 (third space), G73 (fourth line), A73 (fourth space), B73 (fifth line), C74 (first line of the next octave), D74 (first space), E74 (second line), F74 (second space), G74 (third line), A74 (third space), B74 (fourth line), C75 (fourth space), D75 (fifth line), E75 (first line of the next octave), F75 (first space), G75 (second line), A75 (second space), B75 (third line), C76 (third space), D76 (fourth line), E76 (fourth space), F76 (fifth line), G76 (first line of the next octave), A76 (first space), B76 (second line), C77 (second space), D77 (third line), E77 (third space), F77 (fourth line), G77 (fourth space), A77 (fifth line), B77 (first line of the next octave), C78 (first space), D78 (second line), E78 (second space), F78 (third line), G78 (third space), A78 (fourth line), B78 (fourth space), C79 (fifth line), D79 (first line of the next octave), E79 (first space), F79 (second

PRACTICE TAPE NO.7

140

1. a) b) c) d) e)

Perf. 4 min. 7 Aug. 4 min. 6 Maj. 6

2. a) b) c) d) e)

dim. 5 Perf. 4 Maj. 3 min. 7 Maj. 7

3. a) b) c) d) e)

Maj. 2 Maj. 6 Maj. 3 Maj. 7 Aug. 5 or min. 6

4. a) b) c) d) e)

min. 2 min. 3 Perf. 5 Maj. 6 min. 2

5. a) b) c) d) e)

min. 3 Maj. 7 Maj. 2 Perf. 8 min. 7

6. a) min. 3 up b) Maj. 6 down c) min. 2
d) Aug. 4 up e) Maj. 7 down f) Perf. 5 up

7. a) Maj. 2 up b) Perf. 4 down c) min. 7 up
d) min. 6 down e) dim. 5 up (or Aug. 4) f) Maj. 3 down

8. a) b)

9. a) b)

10. a)

b)

PRACTICE TAPE NO.8

141





PRACTICE TAPE NO.9

Note for note

1. Bb minor



2. E minor



3. E Major



4. C minor

Retention

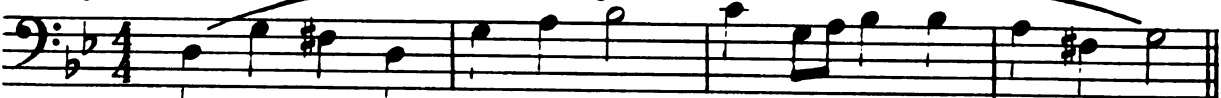
5.



6.



7.



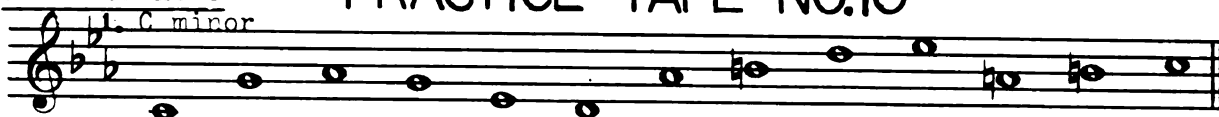
8.



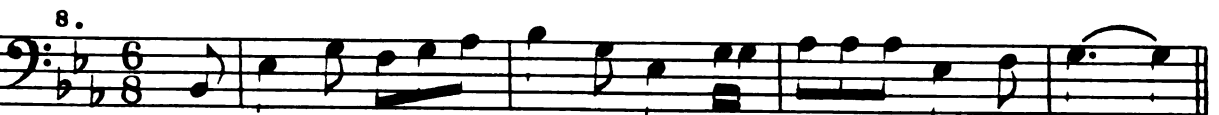
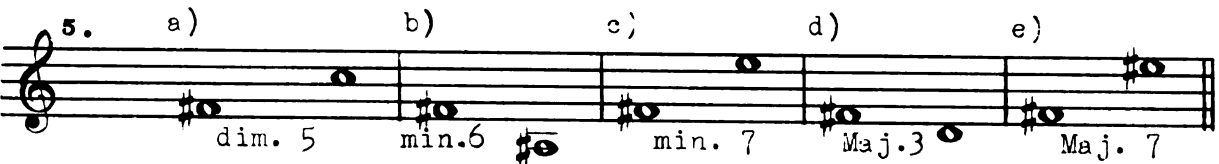


Note for note
C minor

PRACTICE TAPE NO.10



Intervals



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