

UNIVERSITY OF CINCINNATI

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*I hereby recommend that the thesis prepared under my
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CHAPTER I

INTRODUCTION

The Problem.- This study proposes to evaluate a battery of musical and psychological tests as a basis for prognosis of (1) success in a college of music, and (2) success in music as a profession. Certain minor problems in the relationships of various trait measures are also involved.

Sources of Data.- A five-year testing program was conducted at the College of Music of Cincinnati from 1930 to 1935, employing the Seashore Measures of Musical Talent, the K-D Music Tests, the Kwalwasser Tests of Melodic and Harmonic Sensitivity, the Measures of Musical Background (an original test devised for experimental purposes), and the Detroit Advanced Intelligence Test, Forms V and W. These tests constitute the total battery to be evaluated. The data used in determining the validity of the tests included grades of students in certain college courses in music, and judgments by competent persons upon the professional success of the students as musicians. In 1939 the 185 students participating in the testing program, at that time having been out of school three to seven years, were traced and additional data concerning them were gathered through questionnaires and personal contacts. Further data were secured from questionnaires administered to the students at the time of their entrance into the College

of Music, and from ratings of the students on certain traits, made at the end of the freshman year by their instructors in their major fields of applied music.

Scope.— As suggested in the preceding paragraph, the tests have been checked against two types of criterion: (1) success in college courses in music, (2) success in music as a profession. In the first instance, the grades in courses furnished the major criteria. These were supplemented by the trait ratings made by teachers of applied music (piano, voice, etc.). In the second instance, graduates and former students of the College of Music were classified by competent judges as to degree of professional success.

These two attempts to determine the validity of the various tests in the battery constitute the main part of this investigation. However, interesting supplementary data were secured, incidental to the attack upon the problem of test validity. These data made possible an investigation of certain minor problems in the following fields: (1) characteristics of students entering the College of Music of Cincinnati as freshmen from 1930 to 1935; (2) the predictive power of course grades for professional success; (3) the relationship of intelligence test scores to music test scores; (4) the relationship of intelligence test scores to professors' estimates of ability; (5) the relationship of scores on music tests in certain testing areas (such as pitch or rhythm) to scores on other tests in the same areas; (6) the intercorrelation of grades in college

courses in music; and (7) the relationship of professors' estimates of ability to grades in college courses. The problems studied will be listed in question form later in this chapter for further clarification and emphasis.

Controversial Literature on the Problem.- The validity of standardized music tests has been subject to discussion ever since their inception, psychologists and musicians having both defended and disparaged them. Brief quotations from prominent participants in this controversy may serve to indicate the need for further investigation of the subject.

James L. Mursell of Columbia University, one of the opponents of the existing battery of standardized music tests, states:

Psychologists of the highest repute, such as Ogden, Watt, Revecz, and Farnsworth, have carefully and conclusively shown that existing music tests are open to fundamental criticism, and must be used with much reserve and care.¹

Refuting an often-repeated accusation that he is essentially "hostile" to music tests of all kinds, Mursell expresses a desire for a sound prognostic measure:

It would be a research instrument which we sorely need, and also an invaluable agency for educational guidance. But I am not convinced that any such exist, although I believe that they could be developed... In many lines of educational work we can never hope for exact demonstration. But this is not so with tests. Tests are capable of exact, complete, and unanswerable analysis, and we ought to insist that they receive it before we accept them, and, still

1

James L. Mursell, "What About Music Tests?" Music Educators Journal, XXIV (October-November, 1937), 16.

more, before we apply them and proceed to offer guidance on their results. We have every right - nay, we have a positive duty - to demand stringent proof that any given test will really do what it promises. And my objection to the existing music tests is very simple. They have never been proved up. ²

Concerning the validity of existing tests of musical talent, Mursell contends:

The woods are full of published tests with dishonest titles... We think the Terman Group Test of Intelligence really does measure something - though just what it is we know not - called general intelligence not because Dr. Terman says it does, but because Dr. Terman has developed a proof of his claim, and because he has published his proof so that we can study it and form our own judgment. What then about the music tests? After a careful examination of all the research studies I have been able to find, and they are not few, I am compelled to the opinion that in the case both of the Seashore Measures of Musical Talent and the Kwalwasser-Dykema Music Tests such proof is entirely lacking. ³

Speaking further of the value of the tests, Mursell holds that the only valid method of finding whether a given test measures what it purports to measure is:

to ascertain whether persons rating high or low or medium on these tests also rate high and low and medium in what one may call 'musical behavior.' ⁴

Since the results of Stanton's Eastman Experiment and the results of other investigations of the Seashore battery fail to validate the measures, Mursell makes the following conclusion:

²
Ibid., p. 16.

³
James L. Mursell, op. cit., p. 16.

⁴
James L. Mursell, op. cit., p. 16.

The relationship of the tests to musical talent as this manifests itself in the types of musical behavior studies is not proved.⁵

Carl E. Seashore of the University of Iowa, a proponent of the tests, answered Mursell's propounded omnibus theory of "blanket rating against all musical behavior"⁶ by designating his own divergent system of thought as the theory of specific, isolated factors in measurement.

They (the tests) have been validated for what they purport to measure. This is an internal validation in terms of success in the isolation of the factor measured and the degree of control of all other factors in the measurement... They should not be validated in terms of their showing on an omnibus theory... Validation of pitch against the violinist's artistic performance in the actual musical situation would require that we correlate the sense of pitch with objective records of musical performance in pitch intonation or ability to hear artistic pitch deviation in the musical situation - not with the countless other merits or demerits that the violinist may exhibit.⁷

Thus, Seashore considers musicality to consist of a large number of isolated, limited traits, rather than to appear as one single "omnibus" factor in the musical temperament.

Another staunch supporter of the tests, Jacob Kwalwasser of the University of Syracuse, attempted to answer some of Mursell's arguments.

5

James L. Mursell, op. cit., p. 16.

6

Carl E. Seashore, "The Psychology of Music," Music Educators Journal, XXIV (December, 1937), 25-26.

7

Ibid., p. 26.

The specific weakness is the uncontrolled variable. How does Dr. Mursell know that the low correlations are due to the unreliability of the tests? The only value of great unreliability to which he closes his eyes, is contained in the column marked criterion. How did our critic prove up this column? Just how accurate are teachers' grades? ⁸

Kwalwasser points out the great need for further research in the science of music pedagogy.

To encourage testing and measuring is to encourage a problem solving attitude on the part of the music teaching profession; to discourage testing and measuring is to return to a state of empirical chaos and ignorance. Let there be more light! ⁹

Organization of the Present Report.— The data contained in this study have been organized for presentation under the following topical divisions: Chapter II, a review of testing in music, including descriptions of certain widely-known achievement and prognostic tests, accounts of some experimental uses of prognostic tests, and reports of various studies in the reliability and validity of prognostic tests; Chapter III, descriptions of the measures employed in the preparation of this study, including the battery of music tests, questionnaires, college courses, and professors' estimates; Chapter IV, characteristics of the students entering the College of Music in 1930-35, covering such items as social background, musical background, and professional status in 1939; Chapter V, validity of certain measures (scores on music

8

Jacob Kwalwasser, "From the Realm of Guess into the Realm of Reasonable Certainty," Music Educators Journal, XXIV (February, 1938), 16.

⁹ Ibid., 17.

tests and intelligence test scores) for the prognosis of success in college courses in music; Chapter VI, validity of certain measures (music test scores, grades in college courses, intelligence test scores, and professors' estimates) for the prognosis of success in music as a profession; Chapter VII, minor problems in the relationship of various trait measures.

Final Statement of Major and Minor Problems.— This study seeks to find the answer to two major questions:

(1) What are the predictive values of certain music tests for success in college courses in music?

(2) What are the predictive values of certain music tests for success in music as a profession?

In addition, the study seeks information on the following seven minor problems:

(1) What were the characteristics of the students entering the College of Music of Cincinnati from 1930 to 1935?

(2) What are the predictive powers of grades in college courses for professional success?

(3) What is the relationship of general intelligence test scores to music test scores?

(4) What is the relationship of scores on an intelligence test to professors' estimates of ability?

(5) What is the relationship of scores on music tests in certain trait areas to scores on other tests in the same trait area?

(6) What are the relationships of grades in certain college courses in music to grades in other such courses?

(7) What is the relationship of professors' estimates of ability to grades in college courses?

Answers to these questions should be of interest and value to music educators in the light of the present need for such research.

CHAPTER II

REVIEW OF TESTING IN MUSIC

Objective testing in music has trailed that in other fields, possibly due to the difficulty of the medium and to the disinclination of the artistic to accept the theory of tests. But from the beginning of the third decade of the present century to the present, the increased volume of such tests has been astonishing. A bibliography¹ issued in 1936 lists almost fifty tests, and others have appeared since that date.

Music tests are divided into two groups, achievement tests and prognostic tests, the first measuring the state of progress in some branch or branches of musical study, the second predicting performance on the basis of measured capacity. Though the present study is concerned only with prognostic tests, brief descriptions of representative measures in both fields offer an insight into the techniques thus far employed in approaching the problem. Since detailed analyses might easily constitute a complete study in themselves, and since this chapter is intended merely to review the field of testing in music, the following descriptions are of necessity brief. Those tests actually employed in the present study will receive complete descriptions in Chapter III.

¹ Cecile W. Flemming, Marion Flagg and others, A Descriptive Bibliography of Prognostic and Achievement Tests in Music. New York: Bureau of Publications, Teachers College, Columbia University, 1936. Pp. 20.

Achievement Tests

Investigators in the field of achievement have attempted to measure the results of training in music by certain common techniques which may be enumerated here: (1) knowledge of terminology and symbols (clefs, staff, notes, rests, etc.), (2) knowledge of key signatures, (3) recognition of a melody from its notation, (4) correction of rhythmic and tonal errors in notation, (5) application of syllable names to a given melody, (6) writing of tonal and rhythmic patterns from dictation, (7) knowledge of composers, and (8) recognition and naming of compositions. The tests described below which employ these techniques are representative of the type of work being done.

Beach Standardized Music Test.²- This test consists of eleven parts, each of which measures achievement in a basic musical function. The parts are: knowledge of musical symbols, recognition of measure, tone direction and similarity, pitch discrimination, application of syllables, time values; terms and symbols, correction of notation, syllables and pitch names, representation of pitches, and composers and artists. The present form, a careful revision of the original, ranks high as to validity and reliability. It may be used in grades four to twelve and in college.

² Frank A. Beach, Standardized Music Tests. Emporia, Kansas: Bureau of Educational Measurements, Kansas State Teachers College, 1930.

Gildersleeve Musical Achievement Tests.³ The two forms of this test each include five subtests, as follows: assigning titles to compositions played by the examiner; detecting changes in pitch, meter, key-signature and meter-signature; writing key-signatures, locating "la" in six different keys, the use of accidentals, knowledge of note values, knowledge of time signatures, and transposition of a G clef phrase to the F clef; a multiple response test of fifteen questions covering instrumentation, theory, history and harmony; recognition of composition from notation.

Hutchinson Music Tests.⁴ This test was designed to measure ability in "silent" reading and the recognition of musical scores from familiar songs and operas. The test consists of six groups of musical scores. Under each group a list of song titles is given, from which the pupil is to select the title of each selection presented.

Kwalwasser Test of Music Information and Appreciation.⁵ This test was designed to measure general information and appreciation in music. It is composed of subtests grouped into three

³ Glenn Gildersleeve, A Study of Educational Testing as Applied to Music. Unpublished Masters thesis, Teachers College, Columbia University, 1922.

⁴ Herbert E. Hutchinson and L. W. Pressey, Hutchinson Music Tests. Bloomington, Illinois: Public School Publishing Company, 1924.

⁵ Jacob Kwalwasser, Test of Music Information and Appreciation. Iowa City, Iowa: Bureau of Educational Research and Service, University of Iowa, 1927.

parts, as follows: history and biography, which includes classification of artists, nationality of composers, composers of famous compositions, classification of composers by types of composition, general knowledge of composers and compositions; instrumentation, which covers production of tones on orchestral instruments, classification of orchestral instruments, general knowledge of instrumentation; musical form, covering general knowledge of music structure and form.

Kwalwasser-Ruch Test of Musical Accomplishment.⁶- This test covers the following ten phases: knowledge of musical symbols and terms, recognition of syllable names, detection of pitch errors in a familiar melody, detection of time errors in a familiar melody, recognition of pitch names, knowledge of time signatures, knowledge of key signatures, knowledge of note values, knowledge of rest values, recognition of familiar melodies from notation.

Mosher Group Test.⁷- This test, constructed for the purpose of studying the relationship existing between group achievement test scores and individual sight-singing scores, consists of the following seven tests: knowledge of musical symbols and terms,

⁶ Jacob Kwalwasser and G. M. Ruch, Test of Musical Accomplishment. Iowa City, Iowa: Bureau of Educational Research and Service, University of Iowa, 1924.

⁷ Raymond M. Mosher, A Study of the Group Method of Measurement of Sight Singing, Teachers College Contribution to Education, No. 194. New York: Bureau of Publications, Teachers College, Columbia University, 1925.

recognition of scales and chords, knowledge of measure and note values, silent reading of melodies, dictation of tonal patterns and figures, dictation of melodies.

Torgerson-Fahnestock Music Test.⁸ - This test is published in two parts, A and B. Part A consists of twenty exercises testing certain theoretical knowledge. Part B measures ear training, and consists of the following four tests: writing of syllable names from aural dictation, writing time signatures and supplying bars for incomplete notation, detecting pitch and time errors in notation, writing notes on the staff from dictation.

Prognostic Tests

Prognostic testing has been concerned with measuring (1) auditory keenness by discovering the smallest differences in pitch, quality, intensity, time, etc., which an individual can hear; (2) musicianship by sensitivity to melodic and harmonic progressions, tonal sequence, tonal memory, musical taste, etc. The brief descriptions of prognostic tests which follow are representative of these types of techniques.

⁸ T. L. Torgerson and Ernest Fahnestock, Music Tests.
Bloomington, Illinois: The Public School Publishing Company,
1926.

Andrews Auditory Tests.⁹ - In these tests, Andrews attempts to measure four factors in musical perception, as follows: discrimination of single notes heard in succession, discrimination of simultaneous notes (chords) heard in succession (perception of difference in harmonic intervals and judgment of simplicity or complexity of single harmonic intervals without knowledge of their objective tonal composition), perception of rhythm (metrical analysis, involuntary rhythmisation, rhythmisation with suggestion), emotional or affective response to music (relative pleasantness of harmonic intervals, composition preference, chord comparisons for pleasantness).

Chevais, Tests D'Aptitude Musicale.¹⁰ - This test is in four parts, the first being divided into subtests as follows: perception of difference of heights of sound, perception of two similar tones, perception of the direction of intervals, recognition of interval size (comparison), examination of tonal sense (end on tonic or elsewhere), perception of simultaneous sounds (how many struck); intensity comparison (crescendo); comparison of melodic phrase; comparison of rhythms.

9

Benjamin Richard Andrews, "Auditory Tests," American Journal of Psychology, XIV (July, 1905), 302-26.

10

Maurice Chevais, "Tests D'Aptitude Musicale," Societe Alfred Binet, Bulletin No. 300-301 (Juin-Juillet, 1934), 11 - 21.

Drake Tests of Musical Talent.¹¹ - This test is in four parts, as follows: musical memory (comparison of original melodies with four variables - exact repetition, change of key, "time", or note), interval discrimination (longer or shorter), retentivity (absolute pitch), intuition (does second phrase make satisfactory answer to first).

Kwalwasser Tests of Melodic and Harmonic Sensitivity.¹² - These tests were designed for the purpose of evaluating the basic affective response upon which an appreciative attitude toward music is established. They attempt to measure one's ability to distinguish between good and bad melodic progressions, and between good and bad harmonic progressions.

Kwalwasser-Dykema Music Tests.¹³ - These tests attempt to measure musical talent by selecting traits which represent significant attributes of musicianship. They consist of the following: tonal memory, quality discrimination, intensity discrimination, feeling for tonal movement, time discrimination, rhythm discrimination,

¹¹
Raleigh M. Drake, "Four New Tests of Musical Talent," Journal of Applied Psychology, XVII (April, 1933), 136-47.

¹²
Jacob Kwalwasser, Tests of Melodic and Harmonic Sensitivity. Camden, New Jersey: The R. C. A. Victor Company, 1926.

¹³
Jacob Kwalwasser and Peter Dykema, K-D Music Tests. New York: Carl Fisher, Inc., 1930.

pitch discrimination, melodic taste, pitch imagery, rhythm imagery.

Lowery Cadence and Phrase Tests.¹⁴ These tests were devised in an attempt to measure some of the factors necessary to the appreciation and interpretation of music. The cadence test purports to measure the ability to indicate which of two pairs of chords sounds more complete. The phrase test measures the ability to distinguish whether the notes of the second sentence of a pair of melodies are phrased the same way or differently from those in the first sentence.

Lowery Musical Memory Test.¹⁵ In developing this test an attempt was made to keep it simple, to employ material of a distinctly musical character, to administer the test under conditions resembling actual hearing of a musical performance. It measures ability to remember a theme and to indicate whether or not five subsequent themes are built upon it.

Mainwaring Tests of Musical Ability.¹⁶ - These tests are in five sets, as follows: education¹⁷ of pitch differences,

¹⁴ H. Lowery, "Cadence and Phrase Tests in Music," British Journal of Psychology, XVII (October, 1926), 111-18.

¹⁵ H. Lowery, "Musical Memory," British Journal of Psychology, XIX (April, 1929), 397-404.

¹⁶ James Mainwaring, "Test of Musical Ability," British Journal of Educational Psychology, I (November, 1931), 313-21.

¹⁷ The bibliography cited in footnote 1, this chapter, erroneously reports this test as "education of pitch differences".

education of rhythmic patterns, recall of auditory experience, recall of musical experience, non-musical imagery and recall.

Ortmann Battery.¹⁸ - Ortmann seeks to measure fundamental auditory and musical capacity by the seven tests following: pitch discrimination, pitch memory, time discrimination, fusion, rhythm memory, melodic memory, and harmonic memory.

Schoen Tests of Musical Feeling and Understanding.¹⁹ - This battery of tests of general musicianship indicates one's aesthetic response to the structural material of music. The three parts are: relative pitch (differences in distances between intervals), rhythm, tonal sequence.

Seashore Measures of Musical Talent.²⁰ - These tests are designed to measure the six basic phases of musical ability listed as follows: pitch discrimination, intensity discrimination, time discrimination, consonance discrimination, tonal memory, and rhythmic discrimination.

In 1939, a revision of the Measures of Musical Talent (now

18

This description was abstracted from Max Schoen, The Psychology of Music, p. 180. New York: The Ronald Press Company, 1940.

19

Max Schoen, "Tests of Musical Feeling and Understanding," Journal of Comparative Psychology, V (February, 1925), 31-52.

20

Carl E. Seashore, Measures of Musical Talent. Iowa City, Iowa: Bureau of Educational Research and Service, 1919.

referred to as Musical Talents) was made.²¹ The new test revision consists of six parts, like the old, with a test of timbre substituted for the test of consonance, and with modifications in the tests of time and rhythm. Unlike the old tests, two series have been made, Series A, designed for use with unselected groups in general surveys; Series B, designed for the testing of musicians and prospective or actual students of music. Detailed descriptions of the original tests which were used in this study will be given in Chapter III.

Taylor Measures of Musical Background.²² This battery, unstandardized when data were gathered for the present study, consists of four parts, as follows: (1) discrimination of mode (recognition of major and minor melodies and chords in various positions and inversions), (2) rhythmic discrimination (recognition of meter), (3) discrimination of mood (choice of the phrase which most aptly describes the music heard), and (4) knowledge of musical literature (designation of title, composer or source of composition heard).

21

Joseph G. Saetveit, Don Lewis, and Carl E. Seashore, Revision of the Seashore Measures of Musical Talent. University of Iowa Studies, No. 65. Iowa City, Iowa: University of Iowa Press, 1940. Pp. 62.

22

Corwin H. Taylor, "The Construction and Validation of Certain Experimental Measures of Musical Potentiality." Unpublished Doctor's thesis, University of Cincinnati, 1941.

Experimental Applications of Prognostic Tests

The following accounts are representative of the type of research that has been carried on with prognostic tests, and the uses which they may serve. They deal with such topics as (1) the values of talent tests for the prognosis of musical ability, (2) the relation of intelligence to musical achievement, (3) the effect of musical training on test scores, (4) the effect of maturity on test scores, (5) the relation between musical capacity tests and musical performance, (6) the relationship between test scores and instructors' ratings in musical aptitude, and (7) the comparison of the performance of various test batteries. The majority of experiments have been concerned with the Seashore Measures of Musical Talent, a few with the Kwalwasser-Dykema Tests, and an occasional one with other tests.

The Prognosis of Musical Ability.- Larson²³ studied the prediction of success in instrumental music by administering the Seashore tests to four ability groups: (1) beginning instrumental classes (125 members), (2) junior high school preparatory orchestra (30 members), (3) junior high school advanced orchestra (31 members), and (4) senior high school advanced orchestra (50 members). He found that the membership of the beginning classes represented chance selection of talent, and that the capacity for achievement in music

23

W. S. Larson, "The Measurement of Musical Talent for the Prediction of Success in Instrumental Music," Psychological Monographs, XL, Whole Number 181 (1930), 32-73.

by Seashore is influential in the selection of the personnel of the more advanced groups, this influence being increasingly significant at higher levels.

After testing two hundred seventy-six students, Salisbury and Smith²⁴ found that Seashore Pitch and Tonal Memory correlated .60 and .65 with sight singing, thus indicating that both tests have definite predictive value.

Tilson,²⁵ after examining the scores of two hundred forty music students, found that it is safe to eliminate students attempting to enter the music course who score in the lowest one-fourth on the Seashore tests. Later, Tilson²⁶ gave the Seashore tests and the American Council Psychological Examinations to one hundred forty-two general students as well as to the music students. He concluded that neither test can predict success in music, but that both will predict failure, since students in the lowest one-fourth of test scores almost invariably score below the median in grades.

24

Frank S. Salisbury and Harold B. Smith, "Prognosis of Sight Singing Ability of Normal School Students," Journal of Applied Psychology, XVII (October, 1929), 425-39.

25

Lowell M. Tilson, "A Study of the Prediction Value of Music Talent Tests for Teacher-Training Purposes," Teachers College Journal, III (November, 1931), 101-27.

26

Lowell M. Tilson, "Music Talent Tests for Teacher-Training Purposes," Music Supervisors Journal, XVIII (February, 1932), 26-27.

By 1935, Tilson²⁷ had given the tests to 403 music students and to 142 general students. He found that the music students were much higher on the Seashore tests, slightly higher on the psychological test. Correlation of the Seashore test scores with sight singing and dictation grades yielded coefficients ranging from .461 to .027.

An investigation of the prognosis of achievement in sight singing was made by Dean²⁸ over a two-year period. He tested freshmen in the Eastern Mountain State Normal School with the Seashore tests and the Terman Group Mental Test. His conclusions were: (1) intelligence was not an important element in predicting success in sight singing, (2) prior musical training was of slightly greater value, (3) Seashore Pitch and Tonal Memory tests were most significant for predictive purposes, (4) a combination of Seashore Pitch and Seashore Memory tests, and musical training were found to predict from fifty-two to fifty-seven per cent of the students' grades.

Gaw²⁹ correlated scores on the Seashore tests, Sense of Pitch, Sense of Intensity, and Tonal Memory with grades on her own

27

Lowell M. Tilson, "The Music Achievement of College Students," The Teachers College Journal, VI (May, 1935), 169-76.

28

Charles D. Dean, "Predicting Sight Singing Ability in Teacher-Education," Journal of Educational Psychology, XXVIII (November, 1937), 601-8.

29

Esther Allen Gaw, "Five Studies in the Music Tests," Psychological Monographs, XXXIX, Whole Number 178 (1928), 145-56.

sight singing test and found them to be prognostic of sight singing achievement. She also suggested a modified (shortened) form of the Seashore tests, Sense of Time and Tonal Memory for use with children.

The Seashore tests (except Consonance), the American Council Psychological Examination, and the Teachers College Achievement Test were given by Chadwick³⁰ to thirty-nine students in the sight singing classes at Colorado State Teachers College. The correlation between Seashore test scores and sight singing grades was .75, between Seashore test scores and intelligence test scores, .38. Musical talent tests appear to be two and one half times as indicative as intelligence tests, twenty-five times as effective as general knowledge of school subjects, for the prediction of success in sight singing.

Stanton³¹ conducted a ten-year study at the Eastman School of Music, giving the Seashore tests and the Iowa Comprehension Test to all freshmen. On the basis of these tests, the students were classified as "discouraged, doubtful, possible, probable, safe". Records of students' achievement (recitals, scholarships, graduation, etc.) were kept and studied. Sixty per cent of the safe group

30

J. Elbert Chadwick, "Predicting Success in Sight Singing," Journal of Applied Psychology, XVII (December, 1933), 671-74.

31

Hazel M. Stanton, The Measurement of Musical Talent: The Eastman Experiment. Iowa City, Iowa: University of Iowa, 1935. Pp. 138.

graduated, as did forty-two per cent of the probable group, thirty-three per cent of the possible group, twenty-three per cent of the doubtful group, and seventeen per cent of the discouraged group. Further discussion of the Stanton experiment will occur later in this chapter.

The Relation of Intelligence to Musical Ability.- Fracker and Howard³² tested two hundred thirty University of Arkansas students with the Seashore tests, Army Alpha, and the Otis Self Administering tests (higher examination). General intelligence was found to favor a good record on Seashore, though this does not mean that intelligence and musical capacity as measured (especially on Seashore Pitch) correlate highly. These investigators concluded that individuals who are greatly talented musically may have low intellectual capacity and vice versa, though it is usually found that fine musicians have keen intellects.

In an attempt to determine the prognostic value of the Seashore tests and intelligence tests (Thurstone Psychological Examination and Terman group test of mental ability) in the North Carolina College for Women, Highsmith³³ correlated test scores with

32

George C. Fracker and Virgie M. Howard, "Correlation Between Intelligence and Musical Talent Among University Students," Psychological Monographs, XXXIX (March, 1928), 157-61.

33

J. A. Highsmith, "Selecting Musical Talent," Journal of Applied Psychology, XIII (November, 1929), 486-93.

marks in music courses. The following conclusions were reached:

(1) the validity of the Seashore battery is very low; (2) scores on the Seashore tests show practically no relationship to ability in musical performance; (3) intelligence tests give a better prediction of success in music than do the Seashore tests.

After administering the Thurstone Psychological Examination and the Iowa Placement Tests, and the Seashore tests, Farnsworth³⁴ concluded that (1) intelligence tests are more predictive than scores on Seashore Pitch and Tonal Memory for "academic" music courses, and, (2) Seashore Pitch and Tonal Memory scores are more predictive than intelligence tests for tonal courses such as sight singing.

The Effect of Musical Training and Maturity on Test Scores.-

Stanton and Koerth³⁵ studied the effect of musical training on Seashore test scores, examining the records of 157 adults and 645 children who took the tests two to four times over a period of three years. Correlations of original scores with retest scores were calculated for four groups, pre-adolescent, adolescent, and post-adolescent children, and adults. These coefficients were found to

34

Paul R. Farnsworth, "Are 'Music Capacity' Tests More Important than 'Intelligence' Tests in the Prediction of Several Types of Music Grades?" Journal of Applied Psychology, XIX (June, 1938), 347-50.

35

Hazel M. Stanton and W. Koerth, Musical Capacity Measures of Children Repeated After Training. Iowa City, Iowa: University of Iowa, 1930. Pp. 48.

be between .40 and .70 for the Seashore tests, Sense of Pitch, Sense of Time, Sense of Intensity (except for adults for whom the coefficient was above .70), and Sense of Consonance (except for the pre-adolescent group, for whom the coefficients were between .20 and .40). Coefficients for Tonal Memory scores were high for all four groups. The authors concluded that the effect of musical training on Seashore test scores was negligible.

An experiment by Barnard,³⁶ who gave the K-D Tests to 393 grade school children in Moscow, Idaho, yielded the following results: eighty-seven children with no musical training scored above the standard median of the test; older pupils made higher scores (perhaps due to additional training and experience); musical training seemed to aid pupils in obtaining higher scores, as the trained group made a nine point higher average.

Manzer and Marowitz³⁷ studied the scores of a group of college students on the K-D tests. By comparison, college students score higher and are less variable than school children. Statistical results are as follows: r's computed between original scores and scores on retests ranged from .0511 on Intensity to .7268 on Memory;

36

Berenice Barnard, "An Experiment in Testing Music Capacity," Music Supervisors Journal, XVIII (May, 1932), 54-56.

37

Charles W. Manzer and Samuel Marowitz, "The Performance of a Group of College Students on the Kwalwasser-Dykema Music Tests," Journal of Applied Psychology, XIX (June, 1935), 331-41.

intercorrelations ranged from .00 on Pitch and Pitch Imagery to .3675 on Memory and Tonal Movement. It was evident, also, that the mean differences favored the women on Tonal Movement, Pitch Imagery, and Rhythm Imagery, but it is possible that training and motivation influenced the result.

Emerick³⁸ studied the prediction of success in music education for two hundred forty-eight adults by means of questionnaire data and the statistical devices of mean differences, partial and multiple correlations, and regression equations. She concluded that although age has little or no influence on chances for success in the theoretical side of music, the value of intelligence scores for this is high. Age is influential for success in performance (younger group seems superior, though the evidence is not conclusive). In intelligence, there are greater differences between average and low groups than between high and average groups.

In general, the Seashore tests of musical talent fail to indicate reliable differences in the performance ability of adults when grouped according to high, average, and low sections.³⁹

There is some indication of differences in performance ability with reference to the low group, but accurate discrimination for the purpose of prognosis is not recommended.

38

Lucille M. Emerick, "Predicting Success in Music Education for Adults," Unpublished doctor's thesis, New York University, 1938.

39

Ibid., p. 221.

The data indicate that probable success in either music achievement as measured by the Gildersleeve Music Achievement Test or performance as estimated on the basis of point scores by competent judges, nay, to a certain extent, be forecast for adults who wish to study music. ...⁴⁰

The evidence points to a present lack of adequate techniques for the measurement of a music achievement and performance ability of adults. The fact that only fifty-one per cent of the contributory factors determining success for such adult groups is represented by the team of age, intelligence scores and music talent scores, suggests the need for more extensive instruments.⁴¹

Tests of intelligence and Seashore Time and Tonal Memory tests proved to be the most worthy instruments for prediction. The remaining Seashore tests, taken separately, seemed to correlate fairly well with achievement and performance, but when combined in a team with age and tests of intelligence, they failed to show any large amount of significance in prediction. Forty-nine per cent of the factors influencing success in this field can be traced to elements of motivation, application, background, and outside interest.

The Seashore battery was given to eighty college juniors and seniors, and to one hundred two ninth-grade students by Broom.⁴² He concluded that (1) maturity is a factor which tends to aid in securing a high score in pitch, intensity and time, and (2) the

⁴⁰

Ibid., p. 224.

⁴¹

Lucille M. Emerick, op. cit., p. 225.

⁴²

M. E. Broom, "A Note Concerning the Seashore Measures of Musical Talent," School and Society, XXX (August 24, 1929), 274-75.

tests measure different variables at the adult level, but do not at the junior high school level.

The Relation Between Musical Capacity Tests and Musical Performance.- Brennan⁴³ attempted to establish procedures for the investigation of relationships between musical capacity tests and musical ability in performance. Twenty students from the seventh grade through college were tested with the six Seashore tests plus other tests of auditory imagery, control of intensity, pursuit, motility, simple reaction, and serial action. The musical performance of these students was judged on a rating scale by four competent musicians. Conclusions of the study may be summarized as follows: (1) students of superior capacity tended to rate high, (2) tests of tonal memory, intensity, control, motility, simple reaction, and rhythm gave the highest index to performance ability, (3) musical training played a greater part in performance than in capacity tests, (4) closer relation existed between hours of instruction and scores on tests than between scores on tests and performance (thus not substantiating Seashore's claims).

An investigation by Gaw⁴⁴ took the form of a survey of twenty-six girls in the music school of Northwestern University by

43

Flora Mercer Brennan, "The Relation Between Musical Capacity and Performance," Psychological Monographs, XXXVI, Whole Number 167 (1929), 190-248.

44

Esther Allen Gaw, "A Survey of Musical Talent in a Music School," Psychological Monographs, XXXI, Whole Number 140 (1922), 128-56.

a great variety of measurements with laboratory equipment, and a systematic inquiry for general information. She found that (1) those students who by measurement are superior are also superior in achievement, (2) those students who are superior in sensory capacity but average in motor capacity may or may not become superior performers, depending on environment.

The Relation Between Test Scores and Instructors' Ratings in Musical Aptitude.- The Seashore battery was administered by Mursell⁴⁵ to 176 junior and senior students at Lawrence College. When grades (in piano and voice) of the music students (about half the group) and their teachers' estimates of talent were correlated with scores on the Seashore tests, the coefficients were found to be so low as to indicate that there is little relationship between the test scores and musical capacity. Music students were superior to Liberal Arts students on most of the tests, but not markedly so.

Bogen⁴⁶ tested one hundred forty elementary and one hundred twenty high school pupils on Seashore Tonal Memory and Seashore Sense of Pitch. Scores of the elementary pupils were correlated with a special individual test of singing ability;

45

James L. Mursell, "Measuring Musical Ability and Achievement: A Study of Correlation of Seashore Test Scores and Other Variables," Journal of Educational Research, XXV (February, 1932), 116-26.

46

David Bogen, "The Significance of Tonal Memory and Sense of Pitch in Musical Talent," Psychological Bulletin, XXX (October, 1933), 599.

scores of the high school pupils were correlated with the instructors' ratings in musical aptitude. In both calculations the coefficients found were too low to justify the use of the tests for individual diagnosis.

Comparison of the Performance of Various Test Batteries.-

A comparison of the performance of eight hundred individuals on the Seashore and Kwalwasser-Dykema tests was made by Whitely.⁴⁷ She found that the K-D tests were less discriminative, less reliable but more interesting than the Seashore tests. Low reliability may be one reason for the low coefficients of correlation calculated between the tests of these two batteries supposedly measuring common traits (such as Seashore Pitch, K-D Pitch tests). She notes, also, that the K-D composite score is not statistically sound.

An experiment conducted by More⁴⁸ with two hundred students at the North Carolina College for Women over a period of four years, employed an impressive battery of tests: McCall Multi-Mental Test, Ohio State Psychological Examination, Seashore Measures of Musical Talent, Kwalwasser Tests of Melodic and Harmonic Sensitivity, Schoen Test of Relative Pitch, Hutchinson Silent Reading Test,

47

M. L. Whitely, "A Comparison of the Seashore and the Kwalwasser-Dykema Tests," Teachers College Record, VIII (May, 1932), 731-751.

48

Grace Van Dyke More, "Prognostic Testing in Music," Journal of Educational Research, XXVI (November, 1932), 199-212.

and the More Tests of Aural and Visual Discrimination of Pitch Errors and Time Errors. When correlated with grades in music, the pitch tests of Schoen and More were found to be best. It was concluded that the best prediction tests are those which present a general problem in music rather than those which attempt to measure any one factor of musical ability.

The Relation of Interest to Ability in Music.- Loudon⁴⁹

reported an unusual experiment in which one hundred twenty-five junior high school pupils were given the Seashore tests. The scores of the forty-two pupils who had elected music and of the eighty-three who had rejected it disclosed that the percentage of those electing music who had average ability or better was much higher than the percentage of those rejecting it.

The Use of the Seashore Tests With Children.- After much experiment, McGinnis⁵⁰ concluded that the Seashore tests might be used with young children if they were shortened and the intervals between judgments were increased.

49

M. V. Loudon, "The Required Music Course in the Light of the Pupil's Ability," Elementary School Journal, XXXV (October, 1934), 103-06.

50

Esther McGinnis, "Seashore's Measures of Musical Ability Applied to Children of Pre-School Age," American Journal of Psychology, XL (October, 1928), 620-23.

Trait Differences as Related to Success and Failure in Music Students.— C. H. Taylor⁵¹ studied trait differences among successful and unsuccessful music students. He found that (1) certain of the traits measured by the Seashore and K-D tests (sense of consonance, sense of intensity, sense of time, sense of pitch, pitch imagery, sense of rhythm, and rhythm imagery) bore considerable relationship to success or failure in music; (2) that other traits (quality discrimination and tonal memory), ascendance-submission (A-S Reaction Test and anxiety tendency (Pressey X-0) were of doubtful significance for success or failure; (3) that intelligence and melodic taste had little relationship to success or failure; and (4) that ethical discrimination (Pressey X-0) bore an inverse relationship to success, (the validity of the Pressey test of ethical discrimination is in doubt). In general, the author concluded that the successful music student is superior in background, musical talent, and interest and enthusiasm for the work. He further suggested that a fair standing in two of the following three requirements be prerequisite to matriculation in a music school: (1) social and musical background, (2) musical talent, and (3) personality.

51

Corwin H. Taylor, "A Study in Trait Differences as Related to Success and Failure in Music Students". Unpublished Master's thesis, University of Cincinnati, 1935.

A Critical Evaluation of Prognostic Tests

Attitude of the Musical Profession.- The musical profession as a whole has been inclined to regard musical talent tests unfavorably, perhaps because of prejudice, perhaps because of failure to realize that

their sole purpose is to discover, by an examination of the nature of musical experience, whether certain basic characteristics of music are sufficiently susceptible of psychological measurement to be used as reliable indicators of the degree of musical ability which a given individual possesses.⁵²

In the words of another author,

"The interest of the musician is not so much in the reliability of the tests offered to him as measures of musical talent, as in their validity for predicting accomplishment."⁵³

Test authors have utilized what they considered to be their "certain basic characteristics," and have thereby become targets for the attacks of those musicians who contend that isolated factors cannot be correlated with general musical behavior. As one author puts it,

We are not particularly interested in responses to isolated tones, intervals, chords, etc. Such reactions do not correspond to the genuine musical situations in which we are interested. These simple elements are no more music than the letters of the alphabet are literature; than a miscellaneous medley of words is poetry, or an accumulation of building materials is architecture.⁵⁴

52

Carroll C. Pratt, The Meaning of Music, p. 130. New York: The McGraw-Hill Book Company, Inc., 1931.

53

Max Schoen, The Psychology of Music, p. 181. New York: The Ronald Press Company, 1940.

54

Charles M. Diserens and Harry Fine, A Psychology of Music, p. 14. Cincinnati, Ohio: College of Music, 1939.

Reliability and Validity.- Any discussion of tests invariably raises questions regarding their reliability and validity. A reliable test performs consistently, and a valid test measures what it purports to measure.

Investigators have employed various techniques in seeking the reliability of musical talent tests, the common ones being (1) retesting, i.e., correlating original test scores with those of the same individuals on a second testing; (2) split halves, i.e., computing a correlation coefficient between scores on the odd numbered items and scores on the even numbered items of a test*; and (3) the correlation between two parallel forms of the same test. The validity of music tests has been studied by correlating test scores with criteria of musicality such as teachers' estimates of ability, and grades in the college subjects, sight singing and ear training, which are conceded to give a reliable index of musical ability. That not a few experiments have been aimed at the reliability and validity of musical talent tests is not surprising. That the Seashore tests have received the greatest attention is evident. The following studies give indication of the type of research being done.

Reliability and Length.- In working with the Spearman-Brown formula, Lanier⁵⁵ found that Seashore tests of Pitch, Consonance,

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Lyle H. Lanier, "Prediction of the Reliability of Mental Tests and Tests of Special Ability," Journal of Experimental Psychology, X (April, 1927), 69-113.

* This procedure gives the reliability of a test one half as long as the entire test. It is necessary to employ the Spearman-Brown formula to estimate the reliability of the whole test.

and Rhythm might be reduced to half their length without loss of reliability.

A General Investigation.- McCarthy⁵⁶ conducted an elaborate statistical study of the Seashore tests based on scores of ninety-three university students and seventy-one fifth and sixth grade children, with the following results: (1) a marked age difference was evidenced; (2) the tests may measure intelligence, or, musical talent and intelligence are parallel; (3) by split halves, the reliability of Pitch, Intensity, and Memory test is high; (4) by retest, the Memory test is highest in reliability, the Intensity test is lowest.

A Study of High School Students.- Brown⁵⁷ employed a common technique for reliability by giving the Seashore tests twice at four month intervals to about one hundred junior and senior high school students. Instructors ranked these students on musical ability twice at four month intervals. Brown found that reliability coefficients for all tests except Pitch and Intensity, and perhaps Memory, were low. Validity of individual tests in terms of teacher ratings of musical ability were low (range from .11 to .38). The

56

Dorothea McCarthy, "A Study of the Seashore Measures of Musical Talent," Journal of Applied Psychology, XIV (October, 1930), 437-55.

57

Andrew W. Brown, "The Reliability and Validity of the Seashore Measures of Musical Talent," Journal of Applied Psychology, XII (October, 1928), 468-76.

average of all the tests showed a moderate degree of relationship to musical ability. There was little relationship between intelligence, as measured by Army Alpha and Otis Advanced Intelligence Examination, and musical ability, as measured by the Seashore tests. Age and intelligence had little effect on the scores. Intercorrelations between the tests were low, perhaps indicating that they measure different functions.

Comparative Studies.- Farnsworth,⁵⁸ after studying the data from the Seashore tests and the Kwalwasser Tests of Melodic and Harmonic Sensitivity, concluded that Seashore Pitch and Memory tests possess sufficient reliability for certain diagnostic purposes; that the remainder of the Seashore battery should be employed with extreme caution; that for classification purposes, the use of the entire battery (Seashore and Kwalwasser) is justified by the reliability coefficients found; the reliability for the Kwalwasser tests is low despite the author's claims.

Individuals from five London schools were tested by Drake⁵⁹ with an elaborate battery of tests: Seashore, Kwalwasser-Dykema, Drake, Lowery (Cadence Test), and Schoen (Tonal Sequence). The

58

Paul R. Farnsworth, "An Historical, Critical, and Experimental Study of the Seashore-Kwalwasser Test Battery," Genetic Psychology Monographs, IX (May, 1931), 201-393.

59

Raleight M. Drake, "The Validity and Reliability of Tests of Musical Talent," Journal of Applied Psychology, XVII (August, 1933), 382-391.

only tests showing satisfactory reliability and validity were the Drake Memory Test, Seashore Pitch, and Seashore Tonal Memory, only the first giving satisfactory results under all conditions.

E. M. Taylor⁶⁰ investigated the relative values of the Seashore, K-D, and Kwalwasser tests and the Measures of Musical Background for the prognosis of achievement in sight singing and dictation. Scores on the complete battery of tests were correlated with grades in sight singing and dictation. She found that the Background Discrimination of Mode and K-D Pitch Imagery tests possessed the highest predictive value for grades in both sight singing and dictation, and that certain tests having common or nearly common titles showed so little relationship to each other as to indicate that they may not be measuring the same thing. In certain respects, this study was a starting point for the present investigation. It involved, however, relatively few individuals and a short time span, and was concerned with prognosis of ability in two college courses only. The present investigation, in addition to including many more cases and a longer time span, studied the prognostic power of the tests for success in four college courses in music and for success in music as a profession, as well as various minor problems arising from an examination of the data gathered for the study.

60

Elizabeth M. Taylor, "The Relative Values of Certain Tests for the Prognosis of Achievement in Sight Singing and Dictation." Unpublished Master's thesis, University of Cincinnati, 1935.

Technical Criticism.- Gilliland and Jensen⁶¹ demonstrated experimentally that the Seashore records themselves are not reliable, due to phonographic distortion.

Psychological Criticism.- Heinlein⁶² criticized especially the Seashore Tonal Memory Test, saying that Tonal memory of the identification type is of little value in the diagnosis of musical talent, since a musician thinks in patterns, not in unrelated tones. In a later report Heinlein⁶³ stated that a sense of consonance has not been proved to be either inborn or an essential capacity of the musical mind, nor has Seashore's view of consonance as static rather than dynamic been borne out by music history or results of experimental investigation.

Larson⁶⁴ refuted Heinlein's criticism of the Consonance Test, saying that the critic had neglected to give preliminary practice, and that when instructions are followed the test is reliable.

61

A. K. Gilliland and C. R. Jensen, "The Reliability of the Seashore Phonograph Record for the Measurement of Pitch Discrimination," Journal of Experimental Psychology, V (June, 1922), 214-22.

62

Christian Paul Heinlein, "A Brief Discussion of the Nature and Function of Melodic Configuration in Tonal Memory with Critical Reference to the Seashore Tonal Memory Test," Journal of Genetic Psychology, XXXV (March, 1928), 45-61.

63

Christian Paul Heinlein, "Critique of the Seashore Consonance Test: A Reply to Dr. Larson," Psychological Review, XXXVI (November, 1929), 524-42.

64

Delia Louise Larson, "An Experimental Critique of the Seashore Consonance Test," Psychological Monographs, XXXVIII, Whole Number 176 (1928), 49-81.

In reply to Dr. Heinlein, Seashore,⁶⁵ himself, stated that Heinlein is biased, that unbiased experimenters get higher reliabilities, that Heinlein assumes that all musicians have a good sense of consonance, that all practical tests, from Binet down, are devices for short-cut, snapshot samplings. He proposed changing the directions for the consonance test, checking for smoothness on one side of the disc, blending on the other (the consonance test has been replaced by a test of timbre). He admitted that his tests are not reliable for children and should be used sparingly.

The Eastman Study.— Stanton,⁶⁶ in the Eastman Experiment, conducted a most elaborate validation of the Seashore tests. As her study was discussed earlier in this chapter, a detailed description of the experiment will not be included here. Mursell has advanced several criticisms of the study. He states

But we cannot regard the results as in any way an adequate validation of the Seashore Measures of Musical Talent. It should be clearly understood that the groupings were formed not on the Seashore tests alone, but on those tests combined with an intelligence test... We have no means of knowing the comparative predictive efficiency of the Seashore Measures as a whole without the Iowa Comprehension Test, still less the predictive efficiency of the separate measures for pitch, intensity, consonance, time, and tonal memory.⁶⁷

⁶⁵ Carl E. Seashore, "Measures of Musical Talent: A Reply to Dr. C. P. Heinlein," Psychological Review, XXXVII (April, 1930), 178-83.

⁶⁶ Hazel M. Stanton, The Measurement of Musical Talent: The Eastman Experiment. Iowa City, Iowa: University of Iowa, 1935. Pp. 138.

⁶⁷ James L. Mursell, The Psychology of Music, p. 298. New York: W. W. Norton and Company, Inc., 1937.

Of the audition at the time of admission Mursell says

Here we have another factor, admittedly of great value, about whose individual predictive efficiency we know nothing. It is evident from results so presented we can draw no conclusions whatsoever as to the predictive value or validity of the Seashore battery. For all we know, quite as good or indeed better results might have been attained by using merely the intelligence test and the audition.⁶⁸

Mursell objects, also, to the method of scoring which was adopted.

Neither raw nor centile scores on the five music tests were employed in arriving at the classification of students.... The final classification into discouraged, doubtful, possible, probable, and safe depended on a combination of the talent letter grade with the intelligence letter grade. Thus the test scores were put through a long series of transformations before the final result was attained.... They furnish no proof whatever that the Seashore tests given independently of any other measures will yield a valid index of musical capacity.⁶⁹

Mursell's Conclusions.- Mursell has constructed an excellent summary table⁷⁰ of reliability coefficients. From this table he concludes that Pitch and Tonal Memory are most satisfactory, Intensity and Time considerably lower, and Consonance and Rhythm so low as to be useless.

Even the reliabilities of the two best tests, Pitch and Tonal Memory, are significantly smaller than those yielded by our most satisfactory and accurate group of intelligence tests, where coefficients of more than .90 are often obtained.⁷¹

⁶⁸ Ibid., p. 298.

⁶⁹ James L. Mursell, op. cit., p. 299.

⁷⁰ Ibid., p. 292.

⁷¹ Ibid., p. 293.

Proponents of the Seashore tests have suggested that all the lower reliabilities are due simply to incompetence on the part of the examiners..... If the giving of these tests is so difficult technically that trained professional psychologists working with all ordinary precautions find it impossible to obtain proper results, the practicality of the instrument in the hands of teachers and supervisors without any special competence in such matters, and relying only on the instruction book, would seem called in question.⁷²

Mursell presents a similar table⁷³ for validity, pointing out that

It is evident that the correlations tabulated in Figure 24 are strikingly and even startlingly low. Only a very few exceed .50..... Surely if the Seashore tests measured musicality with any accuracy comparable to that which a good intelligence test measures general intelligence, the correlations would be consistently much higher..... Any unprejudiced student surveying such figures is forced to conclude that centile scores on the Seashore tests cannot be relied upon as an index of musicality.⁷⁴

Seashore has called Mursell's viewpoint on talent tests the "omnibus theory", his own, the "theory of specifics". He states

They (the tests) represent the theory of specific measurements insofar as they conform to the two universal scientific sanctions, on the basis of which they were designed; namely, that (1) the factor under consideration must be isolated in order that we may know exactly what it is that we are measuring, and that (2) the conclusion must be limited to the factors under control.⁷⁵

⁷²

Ibid., p. 294.

⁷³

James L. Mursell, op. cit., p. 298.

⁷⁴

Ibid., p. 297

⁷⁵

Carl E. Seashore, Psychology of Music, p. 383. New York: McGraw-Hill Book Company, Inc., 1938.

The Kwalwasser-Dykema Tests.- Although the Kwalwasser-Dykema tests have not received attention compared with that given the Seashore tests, several studies of them have been made. Those of Farnsworth and Tilson were reported earlier in this chapter. Reliability coefficients have been so small that "with the possible exception of tonal movement, the Kwalwasser-Dykema tests are too unreliable for individual prognostication."⁷⁶

Summary

Summary.- Cognizant of the humble beginnings of objective testing in music and of the steadily growing interest in it, this chapter has sought to review briefly the important findings to date. The profusion of inconclusive data presents a challenge to the investigator who is genuinely interested in the problem of the validation of musical talent tests.

The following paragraphs summarize the findings:

(1) Seven major tests in the field of musical achievement have been developed. These attempt to measure technical knowledge of music, knowledge of composers and compositions, and ability in silent reading. The seven tests may be listed as follows:
Beach Standardized Music Test, Gildersleeve Musical Achievement Tests, Hutchinson Music Tests, Kwalwasser Test of Music Information

⁷⁶ Max Schoen, The Psychology of Music, p. 188. New York: The Ronald Press Company, 1940.

and Appreciation, Kwalwasser-Ruch Test of Musical Accomplishment, Mosher Group Test, and the Torgerson-Fahnestock Music Test.

(2) Twelve prognostic tests in music have been developed. They attempt to measure musical talent in terms of sensory elements. Two of them (Seashore Measures of Musical Talent and Kwalwasser-Dykema Tests) have received major attention in the work of investigators. The other prognostic tests are: Andrews Auditory Tests, Chevais Tests D'Aptitude Musicale, Drake Tests of Musical Talent, Kwalwasser Tests of Melodic and Harmonic Sensitivity, Lowery Cadence and Phrase Test, Lowery Musical Memory Test, Mainwaring Tests of Musical Ability, Ortmann Battery, Schoen Tests of Musical Feeling and Understanding, and the Taylor Measures of Musical Background.

(3) Experimental studies involving the tests mentioned above, and particularly the Seashore and K-D Tests, are numerous. These studies have investigated the uses of tests for prognosis of musical ability, the relation of intelligence to musical achievement, relationship of test scores to teachers' ratings, and other topics. Such experiments have been carried on by Bogen, Brennan, Broom, Chadwick, Dean, Emerick, Farnsworth, Fracker and Howard, Gaw, Highsmith, Lanier, Larson, Loudon, McGinnis, Mursell, Salisbury and Smith, Stanton, Tilson, More, Whitely, Manzer and Marowitz, Barnard, and C. H. Taylor.

(4) Numerous investigators have reported on the reliability and validity of prognostic tests. In most cases they have estimated both reliability and validity to be low. These studies have been

made by Brown, Farnsworth, Drake, Gilliland and Jensen, Heinlein, Larson, Stanton, Mursell, and E. M. Taylor.

Justification of the Present Study in the Light of Earlier Investigation.- It is evident from examination of section four that the need for additional investigation into the validation of musical talent tests is an acute one. The present study seeks to meet this need. Specifically, the present study evaluates as to prognostic worth the most widely used and carefully standardized of available tests, together with certain new and promising tests, a total of twenty-two music tests in all; compares the prognostic values of these tests with those of certain other measures, including an intelligence test, ratings by instructors on various traits, and grades in certain college courses; utilizes as criteria both grades in college courses in music and professional success; covers a time span of five years of testing and four additional years of elapsed time during which students might demonstrate their professional success; involves sufficient cases to yield significant results (185 as a total); and analyzes prognostic values in terms both of individual tests and of test batteries.

Earlier studies have failed to bring conviction that their results are scientifically sound and conclusive. The present study marks the end of a period of controversy as to the validity of musical talent tests. The data are such as to make this in certain respects a definitive investigation. The measures employed in this study and the criteria against which they are validated will be described in Chapter III.

CHAPTER III

THE MEASURES EMPLOYED IN THIS STUDY

It is the purpose of this chapter to describe the various measures employed in this investigation. The chapter deals in turn with the following: the music tests, the intelligence test, the College of Music courses, professors' estimates, and the questionnaires. All discussion of the grading system of the College of Music, the grade distributions for the courses against which the tests were checked, and the ratings for professional success have been omitted from this chapter. These topics will be considered in detail in the chapters dealing with correlations of the various tests and other measures with the criteria (Chapters V and VI).

The Music Tests

Since the reliability and validity of the music batteries in general have been discussed in Chapter II, the present section will be confined to a description of the individual tests of each battery employed in the present investigation.

The Seashore Measures of Musical Talent.¹- Although a recent revision of the Seashore Measures of Musical Talent has been made, the older form used in this study is here described.

¹ Carl E. Seashore, Manual of Instructions and Interpretations for Measures of Musical Talent. Iowa City: Bureau of Educational Research and Service, 1919.

The Sense of Pitch Test, found on Columbia Record No. A7536,² measures discrimination of pitch in terms of least perceptible difference. The subject is asked to listen to pairs of tones (produced by amplified tuning forks), and to judge whether the second tone is higher or lower than the first.

The Sense of Intensity Test, found on Columbia Record No. A7537, measures intensity discrimination in terms of least perceptible difference. The subject is instructed to listen to pairs of sounds and to judge whether the second is stronger or weaker than the first. The sounds were produced for recording by electrical current passing through coils of varying length.

The Sense of Time Test, found on Columbia Record No. A7538, measures the ability to discriminate between durations of paired time intervals in terms of least perceptible difference. These intervals are marked off by clicks.

The Sense of Consonance Test is found on Columbia Record No. A7539. In it the subject is asked to judge whether the second interval (pair of tones) is better or worse than the first, basing his decision upon blending, smoothness, and purity. This test has since been replaced by a test of quality discrimination.

The Tonal Memory Test, found on Columbia Record No. A7540, measures memory span for tones. Five degrees of difficulty are represented in patterns ranging from two to six tones. The subject

is asked to identify by number the changed tone in the pattern repetition.

The Sense of Rhythm Test, found on Columbia Record No. 53005D, measures ability to detect differences in pairs of rhythmic patterns. The subject is asked to judge whether the paired patterns are the same or different.

The K-D Music Tests.³- The K-D Music Tests are composed of the following ten parts.

The Tonal Memory Test, found on Victor Record No. 302A,⁴ measures ability to retain and compare tonal patterns of varying lengths. It consists of twenty-five pairs of patterns, beginning with four and ending with nine tones each. The subject is asked to listen to these paired patterns and to judge whether the pair consists of the same or different halves.

The Quality Discrimination Test, found on Victor Record No. 302B, measures power to detect sameness or difference in quality of tone as produced by different orchestral instruments. Half of the thirty items of the test, arranged in chance order, require that the motive be played by two different orchestral instruments, producing different tone quality, while the other half requires a

3

Jacob Kwalwasser and Peter Dykema, Manual of Directions, K-D Music Tests. New York: Carl Fischer, Inc., 1930.

4

Camden, New Jersey: The R.C.A. Victor Company, 1930.

single instrument to play the motive twice. The subject is asked to indicate whether the two motives are the same or different.

The Intensity Discrimination Test, found on Victor Record No. 303A, measures capacity to perceive variations in the loudness or strength of tones and chords. There are fifteen pairs of tones followed by fifteen pairs of chords in the test. All are sounded without change in pitch or length, only the intensity being variable. The subject is asked to indicate whether the second sound is weaker or stronger than the first.

The Tonal Movement Test, found on Victor Record No. 303B, measures ability to judge the tendency of a succession of tones to proceed to a point of rest. Thirty patterns are employed, each consisting of four tones. Each pattern is an incomplete melodic idea requiring another tone - a fifth tone - to complete it in such a way as to satisfy in tendency the tonal movement suggested by the first four tones. The fifth tone must be supplied by the listener, and must be located with reference to the last of the four tones actually heard, as being up above the fourth tone, or down below it in direction.

The Time Discrimination Test, found on Victor Record No. 304A, measures the acuity of time sense. It contains twenty-five items of three consecutive tones each. The first and third tones are equal in duration, being sustained for a period of approximately three quarters of a second (.74). The second tone constitutes the variable under control. The subject is asked to judge whether the

three intervals of every item are the same or different in length.

The Rhythm Discrimination Test, found on Victor Record No. 304B, measures the capacity to detect the presence or absence of variation in a series of paired rhythmic patterns. The easiest trials contain only four tones, which are repeated identically or with some change. As the test progresses the number of tones increases. The subject is asked to judge whether the paired rhythm are the same or different.

The Pitch Discrimination Test, found on Victor Record No. 305A, measures capacity for detecting variation in the pitch of tones. It consists of forty items, in each of which a tone with or without change in pitch is sustained for approximately three seconds. The beginning and end of every item are the same in pitch, the change, if there is one, occurring in the second or middle part. The subject is asked to judge whether the pitch is the same or different.

The Melodic Taste Test, found on Victor Record No. 306B, measures, on the basis of general musical appeal, sensitiveness to structure, balance, and phrase compatability. It consists of ten items, which are to be repeated again, making a total of twenty trials. Each item consists of two short melodies of two phrases each. In each item the first phrases of the two melodies are identical, while the second phrases are different. The subject is asked to judge which of the two unlike (second) phrases make the

better concluding phrase.

The Pitch Imagery Test, found on Victor Record No. 306A, measures ability to form images of various tonal effects from music notation (printed music). The subject is given the notation of twenty-five tonal patterns on a test blank and asked to indicate whether the pitches, as they are reproduced by the record, are the same as, or different from those called for on the printed page before him.

The Rhythm Imagery Test, found on Victor Record No. 306B, measures ability to form images of various rhythmic effects from music notation (printed music). The subject is given the notation of twenty-five items on a test blank, and asked to indicate whether the rhythmic patterns, as they are reproduced by the record, are the same as, or different from those called for on the printed page before him.

The Kwalwasser Tests.⁵— The Kwalwasser Tests of Melodic and Harmonic Sensitivity may be described as follows:

The Test of Melodic Sensitivity, found on Victor Record No. 35573,⁶ consists of thirty-five different two-measure melodic progressions, about equally divided as to merit, and played upon

5

Jacob Kwalwasser, Tests of Melodic and Harmonic Sensitivity, Manual of Directions, p. 1. Camden, New Jersey: The R.C.A. Victor Company, 1926.

6

Camden, New Jersey: The R.C.A. Victor Company, 1926.

the organ. It attempts to measure the ability to distinguish the good melodic progressions from the bad. The melodies are arranged in chance order as to merit, and increase in difficulty of discrimination from beginning to end. All of the melodies are unaccompanied.

The Test of Harmonic Sensitivity, found on Victor Record No. 35573, is made up of thirty-five harmonic progressions employing the conventional four part harmonization. Each progression consists of three chords, with the movement of the upper voice limited to a major second. Frequently the upper voice remains stationary. It attempts to measure the ability to distinguish good harmonic progressions from bad.

The Measures of Musical Background.- This is a group of four tests devised by Corwin H. Taylor for experimental purposes at the College of Music of Cincinnati. The description which follows is of the original form which was used in this study, rather than of the more recently made revision.⁷

In the Discrimination of Mode Test the student is asked to determine the mode (major or minor) of harmonized and unharmonized melodies, and chords in various positions and inversions, played upon the pianoforte.

7

For further information regarding the revised test, see the study correlative with the present one, "The Construction and Validation of Certain Experimental Measures of Musical Potentiality," by Corwin H. Taylor. Unpublished Doctor's thesis, University of Cincinnati, 1941.

In the Detection of Rhythm Test the student is asked to determine the number of beats in a measure in twenty selections played upon the pianoforte.

In the Discrimination of Mood Test the student is given twenty sets of five words, each set describing a feeling or emotion. A selection is then played upon the pianoforte and the student is asked to determine which word most adequately describes the mood of the selection.

In the Recognition of Themes Test, twenty selections are played upon the pianoforte. The student is asked to give the complete name, and the composer or source of each selection.

The Intelligence Test

The Detroit Advanced Intelligence Test.⁸ - This group test contains eight parts: information, opposites, categorical discrimination, number sequence, blocks, spelling analogies, and sentence construction. The author presents the following special features:

1. Ease of administration and scoring.
2. Simple instructions.
3. Many items, with long work time for separate tests.
4. Constant stimulation.
5. Differentiation of items throughout the entire test, the sub-parts, and among the items themselves.

⁸ Harry J. Baker, Manual of Directions, Detroit Advanced Intelligence Test, Forms V and W., pp. 13-15. Bloomington, Illinois: Public School Publishing Company, 1924.

6. Qualitative aspect of test results.

7. High correlation with other intelligence tests.

Baker reports that the Detroit Advanced Intelligence Test, Form W, correlated .655 with Army Alpha, Form 9, on one hundred fifty cases. It correlates .652 with the Miller Mental Ability Test on the same cases, and .744 with the composite score of Army Alpha and Miller for the same one hundred fifty cases. It correlates .82 with scores on the Stanford Achievement Test for a group of two hundred college freshmen.⁹

Boynton¹⁰ suggests, relative to this last correlation, that either the Detroit test is a general achievement test or the Stanford test is an intelligence test; therefore the child with greater educational opportunity is likely to rate an undeservedly high I.Q. on the Detroit test.

Description of College Courses

This section presents descriptions of the courses offered by the College of Music of Cincinnati in dictation, sight singing, harmony, and history of music. Grades in these courses furnish one of the types of criterion used in checking the validity of the

9

Harry J. Baker, op. cit., p. 16.

10

Paul L. Boynton, Intelligence - Its Manifestations and Measurement, pp. 213-14. New York: D. Appleton and Company, 1933.

various music tests. The grading system of the College of Music and the distribution of grades in the following courses will be described in detail in Chapter V. Only descriptions of the courses are included in this chapter.

Dictation.- Dictation is the written reproduction of music symbols from an auditory presentation. In practice, the student is given the tonic chord (do, mi, so, do), the beat note (kind of note which receives one beat), and the speed of the beat. He is asked to listen to the melody or harmonic progression (series of chords), to discover the meter (number of beats in a measure), and to write the music as quickly as possible. The number of hearings allowed is dependent upon the difficulty of the music dictated.

Sight Singing.- Sight singing is the vocal reproduction of music symbols from an eye representation. The individuals involved in this study were taught what is known as the "movable do" system. This system maintains a definite pitch relation between the scale syllables, do, re, mi, fa, do, la, ti, do, with their sharp and flat chromatics, regardless of the key in which they appear. Do, therefore, may be any pitch, depending on the key signature, the other syllables then having fixed positions in relation to it. In practice, the student, after hearing the tonic chord (do, mi, so, do), or only the key tone (do), must discover the meter, establish a definite tempo (speed), and sing without stopping, if possible. In harmonic singing (two or more parts) the tempo as well as the key must be established by the teacher.

Harmony.- Harmony is the musical combination of sounds of different pitch. There are two general types of harmony, vertical and horizontal, the latter, ordinarily termed counterpoint, being technically advanced work and therefore not included in the calculations of this study. The student learns the correct vertical arrangement of tones into chords, and their movement or progression one to another, writing them from a given bass or soprano part.

History of Music.- History of music, as its name implies, is the study of the chronological development of music. Classes whose grades are reported in this study were given opportunity to hear music as well as to learn about it.

Professors' Estimates of Ability

Professors' estimates of ability, collected for this study from the records of the College of Music of Cincinnati, were made at the end of the freshman year. For each student, the ratings were made by the professor under whom he had worked in his major field of applied music (piano, voice, etc.). These estimates were never made by the teachers of any of the courses discussed in the preceding section. Students were rated on a six-point scale (Superior - A, Very Good - B, High Average - C⁺, Low Average - C-, Poor - D, Very Poor - E). Items on which students were rated are: Musical Talent (inborn capacity for musical achievement); Musical Feeling (artistic temperament, creative imagination, initiative in interpretation); Technique (mechanical ability in performance); Rhythmic Action

(ability for rhythmic expression in playing or singing); Quality of Tone (in playing or singing); Application (effort, faithfulness in practice, sustained interest and attention); and Achievement (progress in technique and musical expression). A copy of the form is included in Appendix A.

Questionnaires

A questionnaire, required of every student at the beginning of his freshman year, asked pertinent questions regarding: socio-economic background (nationality of parents, occupation of parents, number of children in the family, etc.); musical background (musical instruments studied, where and when studied, and other previous musical training and experience); status at entrance (outside occupation other than music; degree, diploma, or certificate intentions). Complete data from the questionnaire will be presented in Chapter IV. A copy of the form is included in Appendix A.

A second questionnaire, devoted primarily to professional or other career after leaving the College of Music, was sent in October, 1939, to the subjects of this investigation. This questionnaire will be discussed in detail in Chapter VI. A copy is included in Appendix A.

Summary

The following measures are employed in the present study:

1. Tests:

- a. Music Tests: Seashore Measures of Musical Talent, Kwalwasser-Dykema Tests, Kwalwasser Tests of Melodic and Harmonic Sensitivity, and Measures of Musical Background.
- b. Intelligence Test (Detroit Advanced Intelligence Test Forms V and W)

2. Grades in College Courses:

- a. Dictation
- b. Sight singing
- c. Harmony
- d. History of Music

3. Professors' estimates of ability

4. Questionnaire on social and musical background

5. Questionnaire on professional career

The data resulting from the correlation of the tests with the college studies and reports will be presented and evaluated in the ensuing chapters. Consideration of the grading system of the College of Music, the grade distributions for the college courses, and the ratings for professional success has been deferred until Chapters V and VI. These topics are given full treatment in these later chapters, where they are pertinent to the interpretation of the correlations between the various tests and other measures.

CHAPTER IV

CHARACTERISTICS OF 150 STUDENTS ACHIEVING FRESHMAN STATUS AT THE COLLEGE OF MUSIC OF CINCINNATI FROM 1930 TO 1935

Introduction.- The present chapter provides a general background of information as to the subjects of this study. It is of importance chiefly because of the need for an adequate description of the students whose achievement in college and in the field of music furnishes the criteria for evaluating the tests studied.

From the inception of a testing program in 1930, all regularly enrolled freshmen at the College of Music of Cincinnati were required at the beginning of their freshman year to answer a questionnaire regarding social background, musical background, and status as to outside work and program elected. In 1939 further investigation of the same individuals seemed desirable (all now having had opportunity, in point of time, to graduate). Accordingly, a letter and a second questionnaire were sent out in October, 1939. The content of the letter and copies of the two questionnaires are included in Appendix A. The complete data from the two forms have been compiled into the tables which make up the body of this chapter.

Socio-Economic Background.- In interpreting the tables, it must be remembered that the period of time covered by the statistics includes the so-called "depression years." This is

significant in the light of general economic conditions which affected the artistic professions even more acutely than they affected industry. At the time of the economic collapse, the granting of degrees in a music school was a comparatively recent innovation. Even during the "boom" period of high pressure salesmanship and superficial prosperity, money was not spent on intensive music study. Many students attended the College of Music merely to "take lessons" in applied music, without any thought of matriculating for the purpose of obtaining a degree. It is not surprising, therefore, that during the unstable time following the panic, the study of music was relegated more and more to the "luxury" category when the young people were struggling to earn subsistence wages. The prolonged, regular study needed to satisfy degree requirements proved too great a financial hardship to a majority of the students. Men had to obtain immediate employment, providing for the present rather than for the future; hence, their music study had to be of the part-time variety. Many of them, therefore, never achieved freshman status at the College of Music. There was, furthermore, during the years covered by the testing program, a large ratio of girls to boys, a proportion which does not exist at the present time. These factors must be recognized in any interpretation of the data derived from the testing program, because the results as they stand, record the performances of only the one hundred fifty students who matriculated as freshmen at the

College of Music of Cincinnati from 1930 to 1935. With these facts clearly stated, it is pertinent, nevertheless, to proceed to a presentation of Tables I-XIV, inclusive, which give an accurate cross section of the student body as it then existed.

Age and Marital Status.- Table I presents the ages and marital status of the one hundred fifty College of Music freshmen. Men students tend to be, on the average, about three years older than women students, though the age range of the latter is greater by eighteen years. There are over twice as many women as men, but an equal number of each are married. As was stated before, the unusual ratio of men to women does not exist at the present time.

National Descent.- Data on national descent of the students is tabulated in Table II. It appears that sixty-eight per cent of the group are of native American stock; that fourteen per cent are of German descent (a not unexpected finding in view of the large German population of Cincinnati), and that other minorities are negligible.

Occupational Status.- Table III, indicative of the occupational status of the students' parents, reveals that the great majority of students (probably around ninety per cent) come from middle and upper-middle class homes, their fathers being professional men, business executives, owners of private businesses, craftsmen and clerks; and their mothers being housewives except in ten

TABLE I
AGE AND MARITAL STATUS
OF 150 FRESHMEN AT ENTRANCE TO COLLEGE

	Men	Women
Age Range.....	17 to 34 yrs.	15 to 50 yrs.
Median Age.....	20 yrs. 10 mo.	18 yrs. 8 mo.
Mean Age.....	22 yrs. 2 mo.	18 yrs. 9 mo.
Students Married.....	6	6
Students Single.....	37	101

TABLE II
NATIONAL DESCENT*
OF 150 FRESHMEN

Nationality	Father	Mother
American**.....	101	104
Canadian.....		1
Danish.....		1
Dutch.....	1	
English.....	5	5
French.....	1	1
German.....	19	23
Hungarian.....	1	
Irish.....	2	
Italian.....	5	4
Lithuanian.....	1	1
Russian.....		1
Scotch.....	4	6
Swedish.....		1
Welsh.....	1	

*Includes living parents only.

**Includes individuals of the second or higher generation born in the United States.

TABLE III
OCCUPATIONAL STATUS OF PARENTS
OF 150 FRESHMEN

Occupation	Father	Mother
Business Executive.....	17	
Clerical.....	16	
Craft.....	16	1
Farmer or Rancher.....	5	1
Foreman or Inspector.....	7	1
Housewife.....	..	132
Private Business.....	23	1
Profession.....	28	5
Retired.....	4	
Salesperson.....	2	1
Semi-skilled Labor.....	5	
Unskilled Labor.....	2	
Unspecified.....	16	6

instances. Very few parents are deceased (nine fathers and two mothers), a fact which may indicate that students who have lost their parents can ill afford during a depression to expend time and money for a musical education.

Family Size.- Family size of the freshmen is shown in the data of Table IV. One student in five is an only child, and many have several brothers and sisters. The average family size of 2.8 probably means that parents of large families are unable to give their children so costly an education as music.

College Graduates, Music Teachers, and Professional Musicians Among Near Relatives.- Thirty-five per cent of the group have no college graduates, professional musicians, or music teachers in their immediate families; thirty-five per cent have college graduates, but neither of the other categories; it appears, therefore, that if there was any great degree of musical talent in seventy per cent of the families of the group, it remained undeveloped or found but amateur expression. These facts are shown in Table V.

Years Between High School Graduation and Entrance to College.- Table VI shows that approximately three-fourths of the students were out of high school a year or more before they achieved freshmen standing. More than one half of these were out two to three years.

This does not imply that the intervening time was spent in idleness; most probably it was spent in study, and freshman standing was achieved by the election of subjects that suddenly assumed

TABLE IV
FAMILY SIZE
OF 150 FRESHMEN

No. of Children	No. of Families
1	30
2	44
3	33
4	15
5	13
6	6
7	2
10	1
Mean No. of Children.	2.8

TABLE V
COLLEGE GRADUATES, MUSIC TEACHERS, AND
PROFESSIONAL MUSICIANS AMONG NEAR RELATIVES
OF 150 FRESHMEN

Near Relatives	Students
Music Teachers only.....	3
College Graduates only.....	52
Professional Musicians only.....	2
Music Teachers and Professional Musicians....	2
Music Teachers and College Graduates.....	11
College Graduates and Professional Musicians.	8
All Three.....	15
None.....	52
Unknown.....	6

TABLE VI
 NUMBER OF FRESHMEN
 SPENDING VARIOUS AMOUNTS OF TIME
 BETWEEN HIGH SCHOOL GRADUATION
 AND ENTRANCE TO COLLEGE

Years	Students
0	43
1	18
2	23
3	22
4	9
5	7
6	2
7	2
8	2
10	1
11	1
12	1
13	1
15	1
16	2
22	1
32	1
Not graduated	4
Unspecified	10
Median	1 yr. 4 mo.
Mean	2 yrs. 11 mo.

value because they were necessary for certificate or diploma. Irregularity of study and an informal attitude toward degree curricula also are responsible in large measure for the relatively high age of many of the men. The distribution shown in this table is highly skewed negatively, since less than ten students had been out of high school from ten to thirty-two years.

Academic and Musical Study Previous to College Entrance.-

Tables VII to XII, inclusive, present data on the previous study of the student. From these tables come the following pertinent facts:

From Table VII, it is evident that more than three-fourths of the students possessed no previous academic training. Of the remainder, almost thirty-five per cent had training of one year, one-fifth had two years, and one-seventh had four years.

The data from Table VIII indicate that a majority of students did not study voice before coming to college. One-fifth of the total of one hundred fifty students had studied from one to two years. Two individuals had studied seven and eight years respectively.

The average instrumental student, according to Table IX, achieves freshman standing with from five to six years of previous study. One-fifth of the students studied from ten to seventeen years. Only one individual received no previous instrumental training. The difference in amount of previous vocal and instrumental training is, on the surface, surprising. However, it

should be pointed out that instrumental study begins relatively early, vocal study relatively late, that many vocalists confine their study to voice, thus never achieving freshman standing because of lack of theoretical work, and hence are excluded from this study.

TABLE VII
NUMBER OF STUDENTS
HAVING VARIOUS AMOUNTS OF ACADEMIC
COLLEGE WORK PREVIOUS TO COLLEGE ENTRANCE

Years	Students
0	114
$\frac{1}{2}$	3
1	10
$1\frac{1}{2}$	2
2	7
$2\frac{1}{2}$	2
3	3
$3\frac{1}{2}$	1
4	5
5	1
Unknown.....	2

TABLE VIII
 NUMBER OF STUDENTS
 HAVING VARIOUS AMOUNTS OF VOCAL STUDY
 PREVIOUS TO COLLEGE ENTRANCE

Years of Study	Students*
0.....	105
1	15
2	15
3	6
4	5
7	1
8	1
Median*	1 yr. 6 $\frac{1}{2}$ mo.
Mean*	2 yrs. 5 mo.

*Of those who studied

TABLE IX
 NUMBER OF STUDENTS
 HAVING VARIOUS AMOUNTS OF INSTRUMENTAL STUDY
 PREVIOUS TO COLLEGE ENTRANCE

Years of Study	Students
0	1
1	8
2	11
3	12
4	20
5	20
6	17
7	12
8	16
9	6
10	8
11	9
12	4
13	3
14	2
17	1
Median*	5 yrs. 2 mo.
Mean*	6 yrs. 2 mo.

*Of those who studied

Table X shows that piano is the favorite instrument, almost four-fifths having studied it before coming to college. This large proportion may be due to the fact that piano is the usual secondary (minor) instrument. There are three to four times as many organists and violinists as there are performers upon any other instrument (except the piano).

From Table XI it is clear that almost one-half of the students played one instrument only; forty per cent of the total played two instruments, ten per cent played three or more instruments.

According to Table XII, more than one-third of the freshmen had other musical training (such as harmony in high school), more than three-fourths had other musical experience (such as choir, glee club, etc.) Almost one-fourth pursued some occupation other than music. This other occupation required on the average twenty-three hours per week.

Tables XIII and XIV indicate the status of the students since leaving the College of Music. Almost a third of those achieving freshman standing never received an honor or a degree; thirty per cent received a certificate or diploma; more than a third received as a minimum, a bachelor's degree; ten per cent received two bachelor's or a master's degree. Only thirteen per cent became full time professional performers; an equal number ended their musical careers with marriage; more than one-third became teachers; approximately two-thirds continued to regard music as their major interest.

TABLE X
 NUMBER OF STUDENTS
 PLAYING VARIOUS INSTRUMENTS, (CUMULATIVE LIST)
 AT COLLEGE ENTRANCE

Instrument	Incidence
Clarinet.....	10
Doublebass.....	3
Drums;.....	1
Flute.....	8
Harp.....	4
Organ.....	34
Piano.....	116
Saxophone.....	9
Trombone.....	2
Trumpet.....	9
Tympani.....	1
Viola.....	5
Violin.....	42
Violoncello.....	9

TABLE XI
NUMBER OF INSTRUMENTS PLAYED PER STUDENT
BY 150 FRESHMEN

Number of Instruments	Students
0	2
1	70
2	58
3	17
4	2
5	1

TABLE XII
OTHER INFORMAL MUSICAL TRAINING AND EXPERIENCE
AND OTHER OCCUPATION
OF 150 FRESHMEN

Status	Students
Other musical training.....	52
No other musical training.....	98
Other musical experience.....	116
No other musical experience.....	34
Other occupation.....	35
No other occupation.....	115
Range of hours per week in other occupation.....	4-70
Mean of hours per week in other occupation.....	23

TABLE XIII
HONORS AND DEGREES RECEIVED THROUGH 1939*
BY 150 STUDENTS WHO WERE FRESHMEN IN
1930-1935

Honors	Students
No honors (including withdrawals).....	44
Transfers.....	5
Certificate.....	28
Diploma.....	14
Post-Graduate Diploma.....	2
Bachelor of Music.....	23
Bachelor of Science.....	19
Bachelor of Arts.....	1
Bachelor of Music and Bachelor of Science	4
Bachelor of Music and Bachelor of Arts...	1
Bachelor of Arts and Bachelor of Science.	1
Master of Music.....	7
Master of Arts.....	1

*Only highest honor or degree received is listed

TABLE XIV
OCCUPATIONAL STATUS IN 1939
OF 150 STUDENTS WHO WERE FRESHMEN IN
1930-1935

Occupational Status	Students
Professional performer.....	19
Private teacher.....	20
School music teacher.....	19
College teacher.....	6
Private teacher and professional performer....	3
Housewife, musically inactive.....	19
Housewife and private teacher.....	4
Housewife and school music teacher.....	1
Housewife and professional performer.....	4
Housewife, studying.....	1
Advanced student.....	13
Advanced student and private teacher.....	2
Advanced student and professional performer...	3
Non-musical occupation*.....	12
Non-musical occupation, private teacher.....	2
Non-musical occupation, advanced student.....	1
Retired or inactive.....	2
Invalid.....	1
Deceased.....	1
Unknown.....	17

*Including three sisters in religious orders

Summary

This chapter has reported the data derived from questionnaires answered by students of the College of Music of Cincinnati at the beginning of their freshman year, and three to seven years after their departure from college. From the tables compiled, the following one paragraph description of a typical College of Music freshman during the period 1930-35 is presented.

The typical first-year student was a young, unmarried woman of an upper-middle class American family. Her father was a professional man, her mother a housewife whose life was occupied with caring for her home and her three children. Her parents exhibited only an amateur interest in music, but provided piano lessons for her over a period of five or six years. One year after her high school graduation, they sent her to the College of Music. At the close of her period of study she received either a bachelor's degree, or a certificate or diploma. After she left college, music continued to be her major interest.

From the tables in the main body of this chapter, the fact becomes apparent that the student body of the College of Music from 1930 to 1935 displayed a notable lack of uniformity in many characteristics, and a marked similarity in a few others. In order to suggest the range of individual differences in social background, musical background, and occupational status, the following statements have been prepared:

(1) Sixty-eight per cent of the students stated the nationality of their parents as American, fourteen per cent stated it as German. The remainder mentioned various other nationalities.

(2) Around ninety per cent of the students came from middle and upper-middle class homes in which the father was a professional man, the mother, a housewife. The typical family included three children, although eight per cent had more than five children, and twenty per cent of the students were only children.

(3) Thirty-five per cent of the group had no college graduates, professional musicians, or music teachers in their immediate families; thirty-five per cent had college graduates but no one in either of the other categories.

(4) Thirty per cent of the students came to college the year following their graduation from high school; more than half of the remainder were out of high school two to three years before achieving freshman status; eight per cent of the entire group were out more than ten years.

(5) Three-fourths of the students possessed no previous academic training; of the remainder, almost thirty-five per cent had training of one year, one-fifth had two years, and one-ninth had four years.

(6) One-fifth of the students had studied voice one to two years before coming to college; almost all of the remainder had had no vocal training.

(7) Almost one third of the instrumental students had studied five to six years; one-fifth had studied from ten to seventeen years; one individual had no previous instrumental training.

(8) Four-fifths of the students studied piano before coming to college; one-fifth had studied organ; more than one-fourth studied violin; tympani, drums, trombone and double bass were least frequently studied.

(9) Almost one-half of the students played one instrument only; forty per cent played two instruments; ten per cent played three or more instruments.

(10) More than one-third of the students had other musical training; more than three-fourths had other musical experience; one-fourth pursued occupations other than music.

(11) Almost one-third of the students never received an honor or degree; more than one-third received a bachelor's degree; thirty per cent received a certificate or diploma; ten per cent received two bachelor's or a master's degree.

(12) Thirteen per cent of the students became full time professional performers; an equal number ended their musical careers with marriage; more than one-third became teachers; approximately two-thirds continued to regard music as their major interest.

The general picture of the student body of the College of Music of Cincinnati, as presented in this chapter, serves as an introduction to a discussion of the performance of the same individuals upon the tests taken and of their relationship to college and professional success.

CHAPTER V

THE VALIDITY OF CERTAIN MEASURES FOR PROGNOSIS OF COLLEGE SUCCESS

Introduction

Purpose and Plan of the Present Chapter.-- This chapter is concerned with the problem of the validity of four batteries of music tests and of an intelligence test for the prognosis of success in a college of music. The criterion of college success was considered to be the ability to succeed in the college courses, dictation, sight singing, harmony, and history of music. These courses were selected on the grounds that dictation and sight singing may be classified as purely musical studies, harmony as a musical-intellectual study, and history of music as a purely intellectual study. The fundamental data consist of coefficients of correlation, computed by the Pearson product-moment method, between grades in these courses and scores on the music and intelligence tests. Complete descriptions of the college courses and of the tests were given in Chapter III.

The major subdivisions of this chapter are as follows: the criteria for college success, the predictive value of test scores for specific college courses, the predictive value of

various test batteries, the predictive value of tests falling in various test areas, and the predictive value of general intelligence test scores.

The Criteria for College Success

College Courses.— The college courses, dictation, sight singing, harmony, and history of music were described in Chapter III. Therefore, only a discussion of their use as criteria will be included here.

Dictation and sight singing, taught in some schools as a combined class called ear training, are taught as separate subjects at the College of Music of Cincinnati, and their grades are recorded separately. Ability in dictation and sight singing generally is considered to be most indicative of musicality (more studies have used these subjects as criteria than any other subject). Mursell quotes from Vidor:

Musicality ... expresses itself in the ability to apprehend coordinated musical structures and to reproduce or produce them.¹

He adds, on his own account:

A higher level of musicality manifests itself with the

¹

James L. Mursell, The Psychology of Music, p. 325. New York: W. W. Norton and Company, Inc., 1937.

power to perceive and respond to pitch and interval relationship. It should be observed that the essential factor here is not pitch discrimination...but rather the awareness of relatedness among tones - a perceptive, not a sensory ability. Such an awareness can be carried to an almost unlimited degree of refinement and precision, and is probably the most characteristic mark of the supremely musical individual.²

The study of harmony has long been a basic one in every branch of musical endeavor. Since it has held, and holds now, this important place in the curricula of all music schools, it seems safe to assume that music educators consider the ability to write harmony well, as an index of musical ability. Certainly, the student who is unable to pass successfully this introductory theoretical course has little chance of graduation. Since it is known that some students can, and do, write harmony by rule, and with complete lack of auditory imagery which is so necessary in writing dictation, it is probably true that ability in harmony is much less indicative of musicality than is ability in dictation. However, success in harmony should provide one significant criterion of musical ability.

Since history of music has been classified earlier in this chapter as an intellectual subject, its use as a criterion of musicality may seem somewhat doubtful on the surface. Its inclusion may be justified by the fact that, like harmony, it

2

Ibid., p. 326.

forms a part of the curricula of every music school. Granted that ability in history of music has little direct connection with ability in music in general, it nevertheless seems worthwhile to discover what correlation may exist between achievement in history of music and the various measures employed in this study.

Two factors which materially affect the results of the computations, and consequently their interpretations, should be considered in the use of these college subjects as criteria for college success in music. These factors are the grading system and the distribution of grades.

Grading System.-- In order to make clear the significance of the marks in the school subjects, there follows a description of the grading system of the College of Music. Letter grades are assigned as follows: 94-100 (A), 90-93 (A-), 87-89 (B~~/~~), 84-86 (B), 80-83 (B-), 77-79 (C~~/~~), 74-76 (C), 70-73 (C-), 67-69 (D~~/~~), 64-66 (D), 60-63 (D-), 50-59 (E, Condition), below 50 (F, Failure). Grades in sight singing, harmony, history of music, and the professors' estimates are given in letters. For computation, it was necessary, therefore, arbitrarily to assign numerical values to these letters: A(95), A- (92), B~~/~~ (88), B (85), B- (82), C~~/~~ (78), C (75), C- (72), D~~/~~ (68), D (65), D- (62), F (50).

Grade Distributions.-- Figure 1 presents graphically the distribution of grades in dictation and sight singing, Figure 2, the distribution of grades in harmony and history of music. It may easily be seen that the grade distributions of the four college subjects vary greatly. The distribution for dictation ranges from zero to one hundred. Nineteen scores fall below sixty (the passing grade); the rest are well distributed over the A, B, C, and D grade ranges, with an approximately equal number in the A, B, and C groups. The grades in sight singing range from fifty-five to ninety-six, a smaller range with no low extremities, since number grades were transmuted from letter grades as described above. As is the case with the distribution for dictation, the sight singing grades are well distributed, but with the greatest number at B or eighty-five. The distribution for harmony presents quite a different picture, the range being from sixty-two to ninety-six with all but twenty-one of the grades being eighty-five or above. The history of music distribution is similar to that for harmony, only eleven scores falling below eighty-five.

In general, the grades in sight singing and dictation are distributed widely, those in harmony and history of music, narrowly. It does not seem probable that abilities in these four subjects are distributed in such varying fashion. Dictation and sight singing are taught by one teacher, harmony and

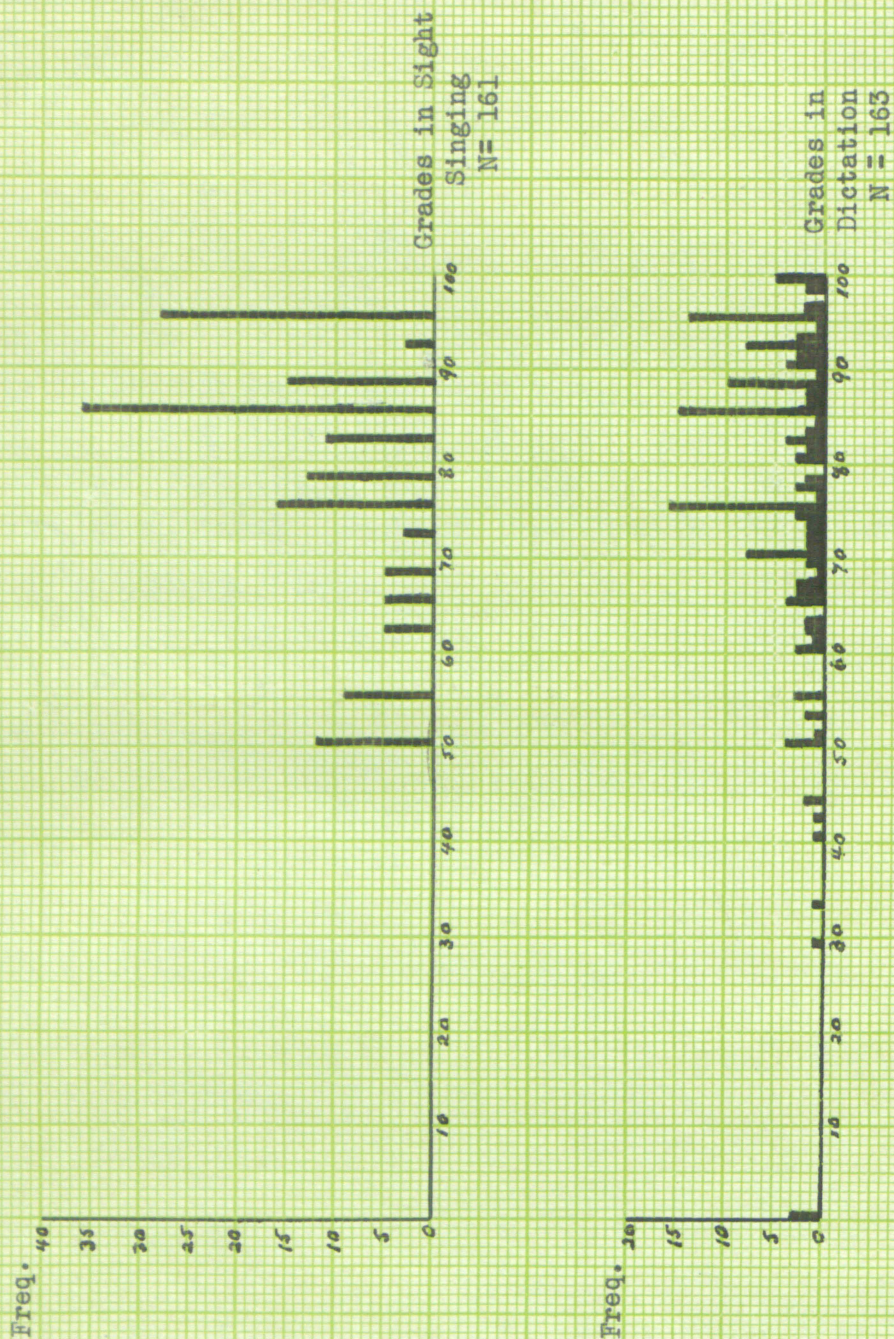


Fig. 1. Distribution of Grades in Two Courses, for Subjects Whose Grades Served as Criteria of College Success

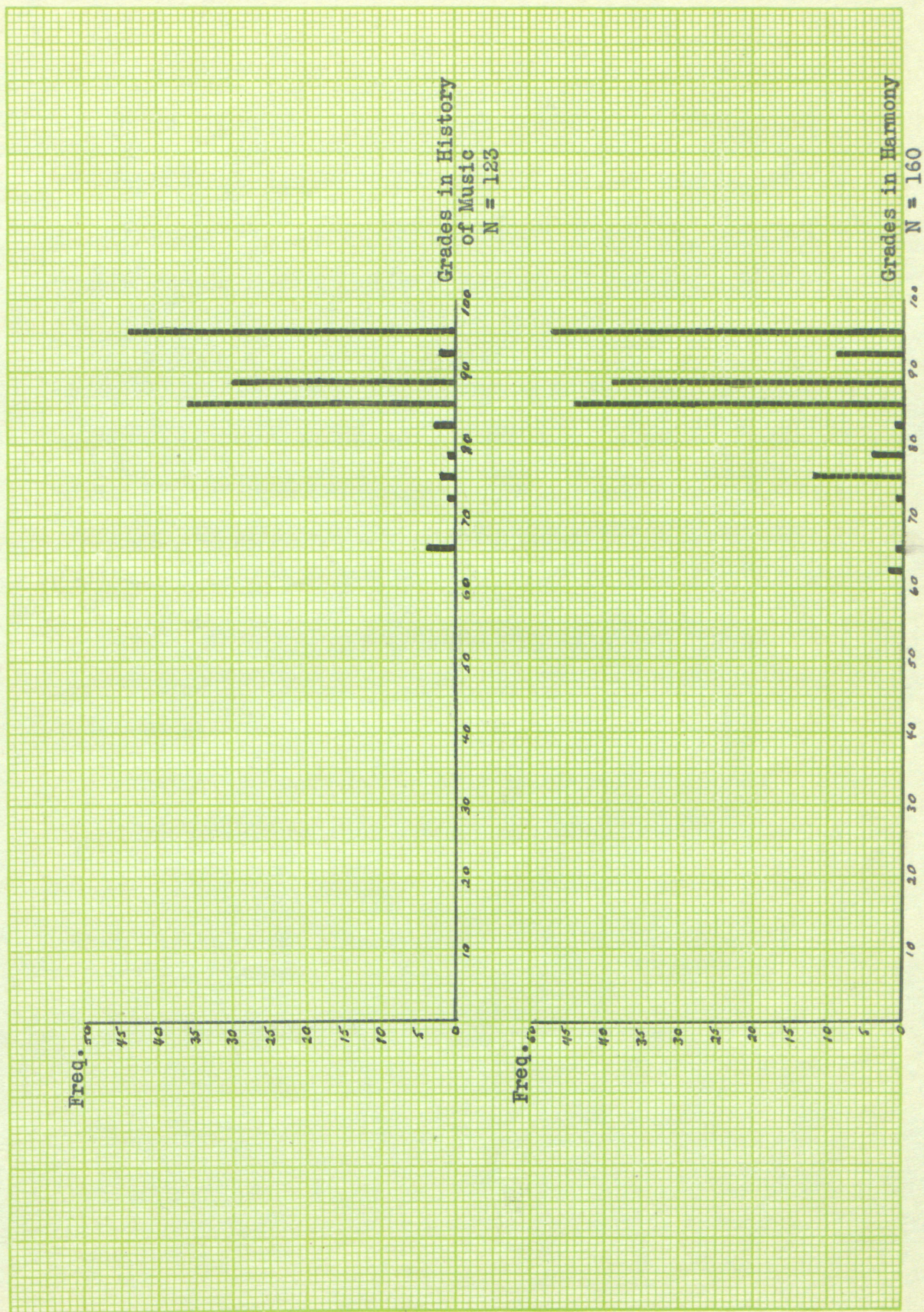


Fig. 2. Distribution of Grades in Two Subjects, for Subjects Whose Grades Served as Criteria of College Success

history of music by another. These facts are noted, not in criticism of the grading in any particular subjects, but because the correlation coefficients undoubtedly are affected in size by the variability of the data from which they are computed. When variability in one or both measures becomes very small, the coefficient will approach zero.

In the following section of this chapter, the college courses, dictation, sight singing, harmony, and history of music will be discussed in turn.

The Predictive Value of Test Scores for Specific College Courses

In determining the value of scores on tests for the prediction of success in college courses, coefficients of correlation were computed between the test scores and course grades by the Pearson product-moment method.

Interpretation of Coefficients of Correlation.- In order to assist in the interpretation of coefficients of correlation, the following statement is quoted from Garrett:

In the field of mental measurement it is customary to describe the correlation between two tests in a general way as being high, marked or substantial, low, or negligible. While the descriptive label applied will vary somewhat in meaning with the author using it, there is fairly good agreement among workers with psychological and educational tests that an

r from .00 to $\angle .20$ denotes indifferent or negligible relationship;
 r from $\angle .20$ to $\angle .40$ denotes low correlation; present but slight;

r from $\frac{.40}{.70}$ to $\frac{.70}{1.00}$ denotes substantial or marked relationship; r from $\frac{.70}{1.00}$ denotes high to very high relation.

This classification is broad and somewhat tentative, and can be accepted as a general guide only in the light of various qualifications. A coefficient of correlation should always be evaluated with regard to (1) the nature of the material dealt with; (2) P_E ; (3) the size and variability of the group...; (4) the reliability coefficients of the tests...; and (5) the purpose for which the r was computed... . In the field of vocational testing, the r 's between test batteries and measures of aptitude represented by various criteria are rarely above .50..., and r 's above this figure would be considered surprisingly high.³

Correlation Between Grades in Dictation and Scores on

Music Tests.— Table XV presents the data resulting from the correlation of dictation grades with test scores. The coefficients are arranged in order of size, from the largest to the smallest without regard to sign. Since all students did not take all of the tests, N is variable.

Coefficients Denoting Substantial Relationship.— Of

the twenty tests correlated with dictation, the following three fall in Garrett's third category, indicating substantial or marked relationship; Background Discrimination of Mode, K-D Pitch Imagery, and K-D Tonal Memory.

The Background Discrimination of Mode Test measures an ability which, to the knowledge of the writer, has not been

3

Henry E. Garrett, Statistics in Psychology and Education, p. 342-343. New York: Longmans, Green, and Company, 1937.

TABLE XV
COEFFICIENTS OF CORRELATION
BETWEEN GRADES IN DICTATION
AND SCORES ON MUSIC TESTS

Measures	r	PE	N
Background Discrimination of Mode.....	.645	.033	145
K-D Pitch Imagery.....	.593	.036	144
K-D Tonal Memory.....	.445	.044	147
Background Rhythmic Discrimination.....	.387	.047	146
Seashore Sense of Intensity.....	.298	.047	151
K-D Intensity Discrimination.....	.293	.051	147
Seashore Sense of Time.....	.272	.051	151
Seashore Sense of Memory.....	.268	.051	147
Seashore Sense of Consonance.....	.257	.051	147
K-D Rhythm Imagery.....	.256	.053	145
Seashore Sense of Rhythm.....	.214*	.057	147
K-D Quality Discrimination.....	.211*	.059	147
Kwalwasser Harmonic Sensitivity.....	.208*	.053	147
K-D Melodic Taste.....	-.127*	.055	147
K-D Tonal Movement.....	.102*	.055	147
K-D Rhythm Discrimination.....	.094*	.055	147
K-D Time Discrimination.....	.064*	.056	148
K-D Pitch Discrimination.....	.064*	.056	148
Kwalwasser Melodic Sensitivity.....	.058*	.055	149
Seashore Sense of Pitch.....	.027*	.055	150

* Coefficients less than four times their probable error.

utilized up to this time. The ability to distinguish a major melody from a minor one, and a major chord in various positions and pitches from a minor one, may not, in itself, be fundamental to dictation; yet the individual with sufficient keenness of ear to score high on such a test possesses the perceptual ability mentioned by Mursell to a high degree, and is, therefore, the one who is able to apply it in dictation.

Since dictation requires auditory imagery, it seems not illogical that scores on the K-D Pitch Imagery Test should correlate highly with scores in dictation. Although Mursell in his discussion of the K-D tests doubts the value of the technique, the evidence points conclusively to the intrinsic relationship.

There is a marked decrease in the size of the third coefficient, that between scores in K-D Tonal Memory and grades in dictation. The relatively high coefficient for this test, which has been proved in other studies to be the best of the K-D group,⁴ bears out the obvious close relationship between dictation and tonal memory.

Coefficients Denoting Slight Relationship.— A middle group of tests indicating but slight relationship to ability in

4

Max Schoen, The Psychology of Music, p. 188. New York: The Ronald Press Company, 1940.

dictation includes the following: Background Rhythmic Discrimination, Seashore Sense of Intensity, K-D Intensity Discrimination, Seashore Sense of Time, Seashore Tonal Memory, Seashore Sense of Consonance, K-D Rhythm Imagery, Seashore Sense of Rhythm, K-D Quality Discrimination, and Kwalwasser Harmonic Sensitivity.

Since K-D Pitch Imagery scores yielded the relatively high coefficient of .593 when correlated with dictation grades, it seems inconsistent that scores in K-D Rhythm Imagery, also essential to skill in taking dictation, should yield a coefficient of only .256. It may be that the test, itself, is inferior rather than that rhythm is less important in taking dictation than is pitch.

Other tests which should correlate highly with dictation because of the abilities they ostensibly measure are: Background Rhythmic Discrimination (this coefficient is higher than that of any other rhythm test and ranks first in the middle group), Seashore Sense of Time, Sense of Rhythm, and Tonal Memory, the latter being especially conspicuous in view of the fact that K-D Tonal Memory stood third in the high group.

The coefficients of the three tests which are lowest in the group are found to be less than four times their probable error, and, therefore, are not significant. In Garrett's terms:

To be reasonably sure that at least some degree of correlation greater than zero is present, an obtained $\underline{r}$ should be four times its $\underline{P.E.}$ ⁵

Coefficients Denoting Negligible Relationship.— The remaining seven tests denote negligible relationship to dictation grades, since they, like the three mentioned in the preceding paragraph, have $\underline{P.E.}$'s too large to yield significant $\underline{r}$'s. These tests are: K-D Tonal Movement, K-D Rhythm Discrimination, K-D Time Discrimination, K-D Pitch Discrimination, Kwalwasser Melodic Sensitivity, Seashore Sense of Pitch, and K-D Melodic Taste. That such requisites of dictation ability as pitch, time, and rhythm should produce low coefficients can mean only that, though the tests may measure discrimination, it is through artificial techniques. Certainly, it is not of the type which functions in dictation. The last named test, K-D Melodic Taste, appears to correlate negatively with dictation, yet it also gives a coefficient too low to be reliable. The normal expectation is for a low $\underline{r}$ since ability to distinguish the better of two melodies is hardly necessary to ability in writing them.

Summary for Dictation.— Of the twenty tests, one half are statistically reliable and indicate some degree of predictive power. Only three offer substantial prediction of success in dictation. These three, in order of the size of their coefficients,

5

Henry E. Garrett, op. cit., p. 281.

are: Background Discrimination of Mode, K-D Pitch Imagery, and K-D Tonal Memory.

Correlation Between Grades in Sight Singing and Scores on Music Tests.-- Table XVI lists the coefficients of correlation between scores on various parts of the test battery, and those in sight singing. A general comparison of this distribution with that for dictation reveals that the majority of measures fall in the same relative position, although the entire range is lower.

Coefficients Denoting Substantial Relationship.-- Only one test indicates marked relationship with sight singing grades, Background Discrimination of Mode. The coefficient, in this case, is lower than that for dictation, showing that keenness of perception for tones is also required for sight singing, but to a lesser degree.

Coefficients Denoting Slight Relationship.-- The middle group denoting slight relationship includes: K-D Pitch Imagery, Seashore Sense of Intensity, K-D Tonal Memory, and Seashore Tonal Memory. With the exception of Seashore Sense of Intensity and Seashore Tonal Memory, these measures fall in the high group for dictation. This would seem to indicate that although the same abilities are desirable or are as necessary to sight singing as they are to dictation, their function is minimized in the former.

Coefficients Denoting Negligible Relationship.-- Fifteen

TABLE XVI
COEFFICIENTS OF CORRELATION
BETWEEN GRADES IN SIGHT SINGING
AND SCORES ON MUSIC TESTS

Measures	r	PE	N
Background Discrimination of Mode	.507	.043	144
K-D Pitch Imagery	.348	.049	142
Seashore Sense of Intensity	.331	.049	149
K-D Tonal Memory	.286	.052	145
Seashore Memory	.233	.053	146
K-D Pitch Discrimination	-.184*	.054	145
Seashore Sense of Time	.171*	.054	148
K-D Rhythm Discrimination	.166*	.055	145
K-D Intensity Discrimination	.143*	.057	145
Seashore Sense of Rhythm	.142*	.054	147
Seashore Sense of Pitch	.121*	.055	147
K-D Quality Discrimination	.109*	.056	145
K-D Rhythm Imagery	.089*	.057	145
K-D Time Discrimination	-.076*	.056	145
K-D Melodic Taste	.065*	.056	145
K-D Tonal Movement	.064*	.056	145
Kwalwasser Melodic Sensitivity	.064*	.055	148
Background Rhythmic Discrimination	-.029*	.056	145
Seashore Sense of Consonance	-.053*	.055	146
Kwalwasser Harmonic Sensitivity	-.045*	.055	146

*Coefficients less than four times their probable errors

measures of the total of twenty show negligible relationship to sight singing: K-D Pitch Discrimination, Seashore Sense of Time, K-D Rhythm Discrimination, K-D Intensity Discrimination, Seashore Sense of Rhythm, Seashore Sense of Pitch, K-D Quality Discrimination, K-D Rhythm Imagery, K-D Time Discrimination, K-D Melodic Taste, K-D Tonal Movement, Kwalwasser Melodic Sensitivity, Background Rhythmic Discrimination, Seashore Sense of Consonance, and Kwalwasser Harmonic Sensitivity. The probable errors computed for these coefficients reveal that it is possible that no correlation greater than zero exists. As it was stated in the discussion of dictation, these tests must not be measuring the type of pitch, rhythm, etc., which actually functions in a true musical situation such as exists in sight singing. Furthermore, this indication of low validity substantiates the findings of other investigators.

One other comparison of coefficients is worthy of note. Background Rhythmic Discrimination scores correlate .387 with dictation grades, and $-.029$ with sight singing grades. On the surface, this seems a serious discrepancy. However, when analyzed, it is clear that aural recognition of meter is a necessity in taking dictation, but that the reproduction of the written symbols of meter which functions in sight singing may be quite another and more easily acquired ability.

A further reason, entirely apart from those stated above,

for the decrease in size of the coefficients for sight singing may be connected with the grading system. For purposes of calculation, numbers were assigned to the letter grades as described earlier in this chapter, thus causing the scores to pile up around certain points; e.g., A (95), B (85), etc. Dictation grades, however, having been recorded originally in numbers (grades which students actually earned), are spread more evenly throughout the range than are the sight singing grades. Examination of the distributions which appear in Figure 1, p. 86, will clarify this point.

Summary for Sight Singing.- Only one test, Background Discrimination of Mode, indicates substantial relationship to sight singing, but its value for prediction of success in sight singing is much less than its prediction of success in dictation. Tests in the distribution for sight singing retain the same approximate relative position as for dictation, though the coefficients in every case are smaller.

Correlation Between Grades in Harmony and Scores on Music Tests.- Table XVII contains the data from the correlation of harmony grades with test scores. It is immediately obvious that the total range of r 's is less than half the ranges of the dictation coefficients and of the sight singing coefficients. There is little to comment upon when all coefficients are so low as to be almost insignificant.

TABLE XVII
COEFFICIENTS OF CORRELATION
BETWEEN GRADES IN HARMONY
AND SCORES ON MUSIC TESTS

Measures	r	PE	N
Seashore Sense of Rhythm	.269	.052	149
Kwalwasser Melodic Sensitivity	.178*	.054	149
Seashore Tonal Memory	.157*	.054	148
Background Discrimination of Mode	.139*	.055	145
Seashore Sense of Consonance	.101*	.055	148
Seashore Sense of Pitch	-.076*	.050	149
K-D Intensity Discrimination	-.075*	.055	147
Seashore Sense of Time	-.057*	.055	150
Kwalwasser Harmonic Sensitivity	.056*	.056	147
K-D Rhythm Discrimination	-.040*	.055	147
K-D Melodic Taste	-.033*	.056	147
Seashore Sense of Intensity	.021*	.055	150
K-D Pitch Discrimination	.021*	.056	147
K-D Tonal Memory	.020*	.056	146
Background Rhythmic Discrimination	-.019*	.056	146
K-D Rhythm Imagery	.017*	.057	144
K-D Pitch Imagery	-.008*	.057	144
K-D Quality Discrimination	-.008*	.056	147
K-D Time Discrimination	.007*	.056	147
K-D Tonal Movement	.004*	.056	147

*Coefficients less than four times their probable error

One measure, Seashore Sense of Rhythm, falls in the slight relationship group, none in the marked. The remainder evidence negligible relationship, judged both by Garrett's characterization and by the P.E.'s calculated. Examination of the whole distribution indicates that if the Seashore tests possess any predictive value for grades in harmony, the K-D tests reveal less. While part of the cause for the low correlations with harmony may be the inability of the tests to measure ability as it actually functions in harmony, nevertheless, the computation must be severely affected by the fact, mentioned earlier, that the variability of the grades in harmony is small (see Figure 2, p. 87). Certainly, it appears that some tests having relationship to harmony, judging at least by their designated titles, should yield higher r 's. It seems reasonable to assume, in the light of the general evidence on individual differences, that the grades in harmony are not distributed in accordance with the actual distribution of abilities. Hence, the correlations, while accurate as far as the data go, are not the same as would be obtained for a true distribution of abilities.

Correlation Between Grades in the History of Music and Scores on Music Tests.— Table XVIII presents the coefficients of correlation between history of music grades and test scores. Many tests of the battery obviously have no direct connection with history

TABLE XVIII
COEFFICIENTS OF CORRELATION
BETWEEN GRADES IN HISTORY OF MUSIC
AND SCORES ON MUSIC TESTS

Measures	r	PE	N
K-D Rhythm Imagery	-.416	.054	108
K-D Time Discrimination	.277	.059	110
K-D Melodic Taste	.254	.060	110
Kwalwasser Harmonic Sensitivity	.238*	.061	110
K-D Tonal Memory	.213*	.062	110
Seashore Sense of Time	.128*	.063	113
K-D Quality Discrimination	-.126*	.063	110
K-D Intensity Discrimination	.119*	.063	110
Seashore Sense of Rhythm	.095*	.064	112
K-D Pitch Discrimination	-.076*	.064	110
Background Rhythmic Discrimination	-.067*	.064	110
Seashore Sense of Memory	-.066*	.064	111
Seashore Sense of Pitch	-.063*	.063	112
K-D Rhythm Discrimination	-.061*	.064	110
Seashore Sense of Consonance	-.055*	.064	111
Kwalwasser Melodic Sensitivity	.053*	.064	111
Seashore Sense of Intensity	.048*	.063	113
Background Recognition of Themes	.047*	.064	111
Background Discrimination of Mode	.046*	.064	111
K-D Tonal Movement	-.024*	.064	110
K-D Pitch Imagery	-.014*	.064	107

* Coefficients less than four times their probable error

of music, but it was felt that in order to make the records complete,, computations should be made for all of them.

It is evident that the low correlation coefficients can not be attributed entirely to the inadequacy of the measures employed, but rather, at least partially, to the narrowed distribution of grades (see Figure 2, p. 87). Three coefficients, only, are four times their probable error; namely, K-D Time Discrimination, K-D Melodic Taste, and K-D Rhythm Imagery.

The unusual r of $-.416$ for K-D Rhythm Imagery is impossible to explain logically. It seems probable that its size, at least, is due to chance. The original data and the computations have been checked and re-checked with the same results. The r for K-D Melodic Taste scores and history of music grades is markedly higher than the same test and any other subject. Perhaps the student who has the superior background to make the kind of judgment required for this test is the one who, because of that background, is eager to learn more about music and to hear more of it; therefore, he is able more easily to earn high marks in history of music.

One test not used in other computations and therefore not mentioned before, is the Background Recognition of Themes. This was included because it was felt that the student with broad background might have interests that would aid in learning history of music. The negligible r of $.047$, however, does not bear out this

hypothesis, although it does not disprove it. As can easily be seen by the simple examination of many of the test titles, there is no obvious reason for expecting high correlations with history of music.

The Predictive Value of Various Test Batteries

In order to compare the students' performance on each music test battery with grades in college courses, Table XIX was compiled. This table merely rearranges the data already presented in Tables XV to XVIII inclusive.

The Seashore Tests.— As a group, the Seashore Tests indicate highest relationship with dictation, lowest relationship with history of music. Sense of Intensity ranks highest for dictation and sight singing; Sense of Rhythm ranks highest for harmony; Sense of Time ranks highest (the r is very low, however) for history of music. The best test for all four criteria is Sense of Intensity; the poorest test is Sense of Pitch. It is evident that none of the coefficients is high enough to warrant the expectation that this battery can predict success in any of these subjects, at least as they are presented and graded in the College of Music of Cincinnati.

The Kwalwasser Tests.— The Kwalwasser Tests of Melodic and Harmonic Sensitivity yield consistently low coefficients in all calculations. Harmonic Sensitivity scores correlate highest with

TABLE XIX
COEFFICIENTS OF CORRELATION BETWEEN
SCORES IN FOUR BATTERIES OF MUSIC TESTS
WITH GRADES IN COLLEGE COURSES

Measures	Dict.	S.Sing.	Harm.	Hist.
Seashore Sense of Pitch	.027*	.121*	.076*	-.063*
Seashore Sense of Intensity	.298	.331	.021*	.048*
Seashore Sense of Time	.272	.171*	-.057*	.128*
Seashore Sense of Rhythm	.214*	.142*	.269	.095*
Seashore Sense of Consonance	.257	-.053*	.101*	-.055*
Seashore Tonal Memory	.268	.233	.157*	-.066*
Kwalwasser Melodic Sensitivity	.058*	.064*	.178*	.053*
Kwalwasser Harmonic Sensitivity ...	.208*	-.045*	.056*	.238*
K-D Pitch Discrimination	.064*	-.184*	.021*	-.076*
K-D Intensity Discrimination	.293	.143*	-.075*	.199*
K-D Time Discrimination	.064*	-.076*	.007*	.277
K-D Quality Discrimination	.211*	.109*	-.008*	.126*
K-D Tonal Movement	.102*	.064*	.004*	-.024*
K-D Tonal Memory	.445	.286	.020*	.213*
K-D Melodic Taste	-.127*	.065*	.033*	.254
K-D Rhythm Discrimination	.094*	.166*	-.040*	-.061*
K-D Pitch Imagery	.593	.348	-.008*	-.014*
K-D Rhythm Imagery	.256	.089*	.017*	-.416
Background Discrimination of Mode .	.645	.507	.139*	.046*
Background Rhythmic Discrimination.	.387	-.029*	-.019*	-.067*
Background Recognition of Themes ..	---	---	---	.047*

Key: Dict., Dictation; S.Sing., Sight Singing; Harm., Harmony;
Hist., History of Music;

* Coefficients less than four times their probable errors.

history of music grades, with the insignificantly low r of .238.

The K-D Tests.- As a whole, the K-D Tests show negligible relationship with grades in college courses, but correlate highest with dictation, lowest with harmony. Pitch Imagery ranks highest for dictation and sight singing; Time Discrimination for history of music; none is high enough to be of any value for harmony. The best single test for all four variables is Tonal Memory; the poorest is Pitch Discrimination.

The Measures of Musical Background.- Only two of the four Background Tests were correlated with all four criteria. These two, Discrimination of Mode and Rhythmic Discrimination, give the best prediction for dictation, the poorest for history of music. Discrimination of Mode correlates highest with every variable. According to the evidence of the coefficients computed, the Discrimination of Mode Test is outstanding in predictive power and the Rhythmic Discrimination Test possesses enough value to be used for the prediction of dictation ability.

The Predictive Value of Tests Falling in Various Test Areas

The data which were discussed in preceding sections of this chapter have been rearranged according to test areas for comparison. Table XX presents these coefficients of correlation.

Within each area, some test reveals at least a small

TABLE XX

COEFFICIENTS OF CORRELATION CALCULATED BETWEEN
 GRADES IN COLLEGE COURSES AND SCORES ON MUSIC TESTS
 ARRANGED ACCORDING TO TEST AREAS

Test Areas	Tests	Dict.	S.Sing.	Harm.	Hist.
Pitch	Seashore Sense of Pitch.....	.027*	.121*	.076*	-.063*
	K-D Pitch Discrimination.....	.064*	-.184*	.021*	-.076*
	K-D Pitch Imagery.....	.593	.348	-.008*	-.014*
Rhythm	Seashore Sense of Rhythm.....	.214*	.142*	.269	.095*
	K-D Rhythm Discrimination.....	.094*	.166*	-.040*	-.061*
	K-D Rhythm Imagery.....	.256	.089*	.017*	-.416
	Background Rhythmic Discrimination..	.387	-.029*	-.019*	-.067*
Intensity	Seashore Sense of Intensity.....	.298	.331	.021*	-.048*
	K-D Intensity Discrimination.....	.293	.143*	-.075*	.199*
Time	Seashore Sense of Time.....	.272	.171*	-.057*	.128*
	K-D Time Discrimination.....	.064*	-.076*	.007*	.277
Memory	Seashore Tonal Memory.....	.263	.233	.157*	-.066*
	K-D Tonal Memory	.445	.286	.020*	.213*
Harmonic Progression	Seashore Sense of Consonance.....	.257	-.053*	.101*	-.055*
	Kwalwasser Harmonic Sensitivity.....	.208*	-.045*	.056*	.238*
Melodic Progression	Kwalwasser Melodic Sensitivity.....	.058*	.064*	.178*	.063*
	K-D Melodic Taste.....	-.127*	.065*	.033*	.254

* Coefficients less than four times their probable errors

degree of relationship to grades in college courses. The highest coefficient shown in the table is that between dictation grades and K-D Pitch Imagery scores, yet the scores on the other pitch tests have a negligible relationship to course grades. Each of the test areas possesses more predictive value for dictation and sight singing than for either harmony or history of music. It must be concluded, from these data, that no particular trait area is in itself, and in terms of all tests seeming to fall within its boundaries, of outstanding value for prognosis of college success. At the same time, at least one test within each area does indicate some relationship, though small, to ability in college courses.

The Predictive Value of General Intelligence Test Scores

In Table XXI, the data are presented resulting from the correlation of course grades with intelligence test scores.

Many studies have been made of the relationship between musical ability and intelligence. Although the public, in general, seems to be of the opinion that the two do not occur together, a substantial relationship actually has been found.⁶ Mursell states in this connection:

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James L. Mursell, The Psychology of Music, p. 337.
New York: W. W. Norton and Company, Inc., 1937.

TABLE XXI
COEFFICIENTS CALCULATED BETWEEN
GRADES IN COLLEGE COURSES AND
SCORES ON THE DETROIT INTELLIGENCE TEST

Courses	r	PE	N
Dictation	.585	.039	128
Sight Singing	.430	.048	131
Harmony	.299	.054	130
History of Music	.021*	.008	97

* Coefficient less than four times its probable error.

...when functional criteria of musicality are employed, musical ability is found to be positively associated with intelligence.⁷

It is interesting to note, then, that grades in dictation correlate .585 with scores in intelligence, and that grades in sight singing correlate .430 with scores in intelligence. The r 's computed between intelligence test scores and grades in these two subjects, which probably may be regarded as significant criteria of musicality, substantiates the claim that

the possession of musical capacities above the average carries with it a high degree of general intelligence. It is a fortunate provision of nature that those she endows with musical powers shall also possess sufficient intelligence to develop these powers to the utmost point of perfection.⁸

It is expected that the relationship between harmony grades and intelligence test scores should be more than slight, since harmony has been classified earlier as a musical-intellectual subject. It is true that many individuals write harmony by rule as a purely intellectual process, yet the coefficient calculated between harmony grades and intelligence is .299, indicating that relationship is present, but in slight degree. That history of

7

Ibid., p. 339.

8

Max Schoen, The Psychology of Music, p. 165. New York: The Ronald Press Company, 1940.

music grades and intelligence test scores should yield a correlation coefficient of .021 hardly seems consistent with the fact that history of music has been described as an intellectual subject.

From the data of the present study, it is evident that general intelligence is of predictive value for only two of the four courses, dictation and sight singing. The slight or negligible relationship of intelligence to harmony and history of music probably is due to the type of grade distribution, which apparently is not representative of the abilities measured.

Summary

This chapter reports the data on twenty music tests and an intelligence test in terms of the criterion of success in four college subjects, dictation, sight singing, harmony, and history of music. The findings are limited in significance by the fact that the distributions of grades for two subjects, harmony and history of music, are unusually narrow, and possibly do not represent accurately the abilities of students in these fields. The conclusions reached may be listed as follows:

1. Correlation of the tests with each of the four college courses:
 - a. Success in dictation is best predicted by three tests:
Background Discrimination of Mode (.645), K-D Pitch Imagery (.593), and K-D Tonal Memory (.445); seven

tests indicate slight predictive value for dictation; the r's of the remainder are less than four times their probable errors and therefore are negligible.

- b. Success in sight singing is best predicted by one test only, Background Discrimination of Mode (.507); four other tests show slight predictive value; the remainder, because of their large P.E.'s, indicate little or no predictive value.
 - c. Success in harmony (as grades are distributed in this study) can not be predicted by the music tests since all r's except one (Seashore Sense of Rhythm) are less than four times their P.E.'s.
 - d. Success in history of music, as in harmony, cannot be predicted by any of the tests on the basis of the present data.
2. The predictive value of the four batteries of music tests:
- a. The Seashore Tests correlate highest with dictation grades, lowest with history of music grades, but no coefficient is higher than .30.
 - b. The Kwalwasser Tests indicate little relationship with all criteria.
 - c. The K-D Tests correlate highest with dictation grades,

lowest with harmony grades, at least two of the coefficients being well within the marked relationship group.

- d. The Background Tests correlate highest with dictation grades, lowest with history of music grades, one of the coefficients being the highest of the whole battery of tests.

3. The predictive value of trait areas:

- a. No particular trait area is in itself, and in terms of all tests seeming to fall within its boundaries, of outstanding value for prognosis of college success.
- b. At least one test within each area does indicate some relationship, though small, to ability in college courses.

4. The predictive value of individual tests:

- a. The Background Discrimination of Mode Test offers the best prediction of success in dictation and sight singing.
- b. The Seashore Sense of Rhythm Test offers the best prediction of success in harmony (slight relationship).
- c. The K-D Time Discrimination Test offers the best prediction of success in history of music (slight relationship).

d. The K-D Pitch Imagery and K-D Tonal Memory Tests
give high prediction of success in dictation, slight
prediction of success in sight singing.

5. The predictive value of the intelligence test:

- a. General intelligence (as here measured) indicates
substantial predictive value for success in dictation
(.585) and in sight singing (.430).
- b. General intelligence possesses slight predictive value
for success in harmony (.299 from the present data).
- c. General intelligence possesses negligible predictive
value for success in history of music (.021 from the
present data).

On the basis of these data, it is safe to conclude that
no single measure should be used to predict success in college; a
combination of music tests (Background Discrimination of Mode, K-D
Pitch Imagery and K-D Tonal Memory) with an intelligence test
(Detroit Advanced Intelligence Test), may offer a prediction
sufficiently accurate to be practical.

CHAPTER VI

THE VALIDITY OF CERTAIN MEASURES FOR PROGNOSIS OF PROFESSIONAL SUCCESS

Introduction

Chapter V has reported an investigation of the validity of the test battery in terms of the criterion, success in college courses in music. A number of similar studies have been made by other investigators, as reported in Chapter II. However, few investigations have dealt with the validity of musical talent tests in terms of the criterion, success in music as a profession. Seashore suggests a need for such research in the following statement:

If, instead of measuring in terms of success in graduation from college, we should be able to measure the progress of music in the life of these people, either in a professional career or in avocational or social value, we should get a much stronger picture.¹

The present chapter, devoted to a report of such a study, is developed under the following topics: definition and discussion of the criteria for professional success; procedure for compiling the data; statistical treatment of the data; the predictive value of scores on music tests for professional success; the predictive value of college course grades, intelligence test scores, and professors' estimates for professional success; coefficients of contingency for the complete battery.

¹ Carl E. Seashore, Psychology of Music, p. 320. New York: The McGraw-Hill Book Company, Inc., 1938.

Definition and Discussion of the
Criteria for Professional Success

General Statements.- Professional success is a term used in this study to indicate a general degree of attainment in pursuit of some vocation in which musical talent* is the major essential. The following paragraph indicates certain assumptions on which the work to be described in this chapter is based. These assumptions seem reasonable in the light of the literature on musical traits and abilities. Much of this literature is reviewed in Chapter II.

This fundamental musical talent, which various psychologists and musicians have attempted to measure with some degree of success, manifests itself in varying ways in different individuals. High attainment as a performer is not, of necessity, of greater importance than is success in college teaching. The performer who becomes an eminently successful concert artist may lack almost completely the special attributes and personal characteristics which make an excellent teacher; yet both may be fine musicians. Unless the professional performer with extraordinary technique seems to possess the fine qualities of the progressive student, he is not apt to enjoy continued success; hence, he needs to be judged on more than a meteoric rise to musical prominence. Musicianship is more fundamental and comprehensive than technique. The concert master of a symphony orchestra, eminent in his field, may be a fine musician, yet wholly

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This term is used in a general sense. It seems likely that the plural form "musical talents," is more accurate.

unable to teach a student to play the violin. A successful voice teacher at the college level may be a complete failure if expected to teach singing in a public school, although both positions require unusual talent and attainment. The vocal or instrumental teacher in the public schools who is judged successful in that work may be exceptionally competent as a musician, yet may lack the qualities necessary to handle a position requiring supervisory or administrative duties. Some musicians in both the performing and the teaching fields are content with their level of attainment, and have no ambition toward further study. The student who is pursuing or who has pursued very advanced study, while possessing superior musical excellence of the theoretical type necessary for the attainment of high academic honors, may, nevertheless, lack the attributes needed for either teaching or professional performance. It is evident, then, that professional success in music may take several definite directions; yet, in each division of the professional music field, there is a place at the top only for those musicians who have an abundance of what is known as musical talent, a term which indicates fundamental musical excellence of the kind that has been treated elsewhere in this study.

Criteria for Five Levels of Professional Attainment.- On the assumption that professional success probably is distributed in linear fashion, as the traits which constitute musical talent seem to be, five categories or levels of success are defined in this

section, for the classification of former College of Music students. Students to be classified were those whose school records formed the basis of the investigation in prognosis of college success which has been reported in Chapter V. The criteria were set up with the assistance of various members of the faculty of the College of Music of Cincinnati (including the director of the College, director of studies, and a member of the department of school music), and of Teachers College, University of Cincinnati, (including a specialist in educational measurement and a psychologist with special training in the psychology of music).

Since the criteria embrace all the types of musical endeavor discussed earlier in this section, it is not expected that any one individual will meet all of the requirements within a given category. The various requirements may be regarded as alternatives, considered approximately equal in significance.

Group I

- a. Teacher in college
 - 1. An expert in the teaching of applied or theoretical music
 - 2. An expert in the teacher training field (position gained by a succession of advancements)
- b. Director of music in city school system (supervising staff of music teachers)
- c. Performer
 - 1. Concert or operatic artist
 - 2. Eminent conductor
 - 3. Member of a ranking symphony orchestra
- d. Composer of works performed by recognized organizations
- e. Musical director of a large radio station

- f. Advanced student
 - 1. Winner of scholarship for study abroad
 - 2. Holder of advanced degree

Group II

- a. Teacher in elementary or secondary school
 - 1. Quality of work resulting in repeated reengagement
 - 2. Quality of work resulting in promotion to larger school system
- b. Private teacher of applied music, producing very advanced pupils
- c. Performer
 - 1. Radio staff artist
 - 2. Outstanding member of a "name" band
 - 3. Organist and director of music in a large church
- d. Possessor of bachelor's degree plus some graduate study

Group III

- a. Teacher in elementary or secondary school (mediocre quality of work resulting in no promotion)
- b. Private teacher of applied music producing pupils of average attainment (the pupil possessing unusual ability will have transferred to another teacher)
- c. Performers
 - 1. Player or singer on "spot" radio programs
 - 2. Person filling occasional professional engagements
 - 3. Paid soloist in average church choir
- d. Possessor of bachelor's degree plus sporadic graduate study

Group IV

- a. Teacher in elementary or secondary school with just sufficient success to remain in teaching through frequent transfers
- b. Private teacher of applied music unable to establish and maintain a regular class of pupils

- c. Performer failing to hold a steady engagement
- d. Student with some success in college work in music and continuing study or practice of music as an avocation, but not with the objective of a career

Group V

- a. Teacher or performer changing to another profession after failing completely in musical pursuits
- b. Student changing to another occupation before failing in musical pursuits (evidence that the probability of failure was recognized)
- c. Student failing completely in college work in music

Procedure for Compiling the Data

Procedure Used in Tracing Former Students.- Having defined the five levels of success for the classification of former College of Music students, it was necessary to locate as many as possible of the students who had participated in the testing program from 1930 to 1935. In many instances the investigator was able to locate former students through the records in the College of Music business office, or through personal contacts. In other cases, the records were incomplete.

In October, 1939, a letter was sent out to all students entering the College of Music from 1930 to 1935 who had participated in the testing program, and for whom the records were incomplete. The letter was sent in each case to the latest available address of the student. This letter stated the intention of the College of Music to ascertain the present status of its former students. An

enclosed questionnaire requested information regarding marital status, honors received since leaving the College of Music of Cincinnati (diploma, degree), and occupation (teaching privately, teaching in the public schools, teaching in college, playing or singing professionally, pursuing advanced study, pursuing another occupation). Copies of the letter and of the questionnaire are contained in Appendix A.

Classification Into Groups.- The information gained from the questionnaire was merely a starting point for the making of contacts with persons qualified to judge the level of professional success of the former College of Music students. (The data compiled from the questionnaire were also used however, as the basis for Tables XIII and XIV of Chapter IV.)

No decision as to classification was based solely upon information obtained from the person classified. In fact, the individuals under consideration were totally ignorant of this procedure. In all instances, more than one person competent to judge was consulted. Authorities questioned included administrative officers, professional colleagues, employers, and other individuals who were qualified to pass opinion, or who possessed authoritative information. In the case of a teacher, the investigator sought the judgment of the principal or principals of schools in which the teacher worked, of room teachers who observed his professional ability, and, if possible, of a colleague. Obviously, such careful investigation of each individual was impossible. Therefore, when a

case seemed dubious and when only uncertain and fragmentary information was available, no assignment to one group or another was made. Because of the nature of the information divulged, all sources, of course, must be confidential.

In the course of this procedure, a total of one hundred fifty individuals were considered. Of these, ninety-three were finally classified in one or the other of the various groups. In each of these cases, sufficient data were available to justify a definite assignment to one of the groups. From three to five judges participated in the decisions basic to this classification.

Typical Cases and Their Classification.- A detailed description of one or two cases may clarify the type of group assignment made. Case A, a young woman, possessor of an extraordinarily beautiful mezzo-soprano voice and an unusual pianistic ability (a rare combination), became, almost immediately upon her graduation, a member of the musical staff of an average size radio station. After a very successful period (tenure in a radio station is notoriously brief and insecure), she was asked to become a teacher of piano and voice in a small northern college. A steady increase of interest in her department led to a higher salary. During her teaching period, she continued to sing and play professionally, giving recitals, taking minor roles in a well-known opera company, and singing leading roles in local operatic productions. In addition, she did not neglect further study in academic and applied music fields. As a result of her accomplishments, she was asked to become a teacher of piano and

voice in a large state teachers college. Refusing a higher salary from her administrator, she decided to accept, and began another period of successful work. Now, although she has married, she has acquired another degree, is teaching, giving recitals, and is gaining recognition in the field of choral conducting. This young woman was assigned to Group I.

Case B, also a young woman, after leaving the College of Music, began to teach before receiving a university degree. Her first position was in a village school where she taught vocal music. Although apparently she was liked very well personally (it was her home community), there was general dissatisfaction with her work; her classes did not sing well, even in performance, and she displayed complete inability to play the piano accompaniments for them. Even at commencement, her music was badly prepared. A continued account of her work would tell something of the same story. She secured a position in a county system, moving from one school to another at the end of each year. Apparently, her personal attributes, alone, have kept her teaching, not her musical aptitude. It is highly possible that she might have been successful in the teaching of dramatic art for which she originally prepared herself. She was placed in Group IV.

Statistical Treatment of the Data

General Purpose.— The general purpose of the procedure was to discover the relationship between classification by professional

success in one or the other of the five groups, and the degree of attainment in the various tests and measures considered as having possible prognostic value.

Technique.- An appropriate technique for handling group comparisons of this kind is the coefficient of mean square contingency, C , developed by Pearson.² This statistical device may be used when it is desirable to calculate the relationship between two characteristics which are unordered, or two characteristics, only one of which is ordered.³ The term "ordered" is used to signify that individual cases can be identified by position on a numerical scale. The term "unordered" signifies that classification of cases is in terms of independent categories identified apart from any possible quantitative values. The contingency technique as used in this study, involves turning ordered series into grouping by categories. For purposes of prediction of success, the procedure which would seem most natural, in the light of psychologists' reports on individual differences, is to divide students taking a given prognostic test into a limited number of groups based on their scores, one group being that from which the least professional success is expected, one that from which the greatest success is expected, others, those including intermediate levels of success. From the

² Henry E. Garrett, Statistics in Psychology and Education, p. 387. New York: Longmans, Green and Co., 1937.

³ Karl J. Holzinger, Statistical Methods for Students in Education, p. 273. Boston, Mass.: Ginn and Co., 1928.

standpoint of the functional utility of prognostic tests, these groups should be divided from each other at points so chosen as to yield the most accurate prediction possible (ideally, there should exist a one-to-one correspondence between classification by the test and classification in terms of the criterion). For purposes of statistical computation of C the divisions may be made anywhere.

As the students were classified for professional success, Group I contained eleven graduates, Group II, twenty-five, Group III, thirty-five, Group IV, twelve, and Group V, ten. The investigator assumed that the abilities measured by the tests were distributed in a similar fashion. Therefore, the test distributions were subdivided arbitrarily in such a manner that the number of cases in the categories corresponded approximately to those in the distribution for professional attainment.

To test the results of a change in the points of subdivision, the ranges of the scores on each test were divided into five equal parts, and coefficients of contingency were calculated on this basis. It was found that some coefficients were higher, some were lower, some few were approximately the same, in comparison with the coefficients computed on the basis indicated in the preceding paragraph. Complete data for these calculations will be found in Table XXII, Appendix B. Were the test results to be used for guidance purposes, the scores should be classified in such a way as to yield the most

accurate prediction possible. The evidence shows that the points of subdivision of the distribution of scores do affect the size of C.

The following interpretation, however, is based upon data obtained on the basis of the arbitrary classification first described, with the number of cases in the various groups corresponding approximately to the number of cases in the various categories for professional success. For purposes of discovering and analyzing general relationships, this procedure seems likely to be as significant as any other that would employ the contingency coefficient.

Predictive Value of Scores on Music Tests for Professional Success

Table XXIII lists according to batteries the coefficients of contingency calculated for ratings on professional success and scores on music tests. Each battery will be discussed separately and summary statements will be drawn. No probable errors or corrections have been computed, since

For 5 x 5 fold or finer classifications, this correction is so small that for practical purposes it may be disregarded.⁴

The highest possible C is .894 for the five-fold classification, according to Yule's table as quoted by Holzinger.⁵

⁴ Henry E. Garrett, op. cit., p. 391.

⁵ Karl J. Holzinger, op. cit., p. 277.

TABLE XXIII
COEFFICIENTS OF CONTINGENCY
CALCULATED FOR RATINGS ON PROFESSIONAL
SUCCESS AND SCORES ON MUSIC TESTS

Tests	C
Seashore Sense of Pitch	.341
Seashore Sense of Intensity.....	.372
Seashore Sense of Time.....	.473
Seashore Sense of Rhythm.....	.452
Seashore Sense of Consonance.....	.473
Seashore Tonal Memory.....	.467
Kwalwasser Melodic Sensitivity.....	.481
Kwalwasser Harmonic Sensitivity.....	.206
K-D Pitch Discrimination.....	.362
K-D Intensity Discrimination.....	.457
K-D Time Discrimination.....	.232
K-D Quality Discrimination.....	.356
K-D Tonal Movement.....	.409
K-D Tonal Memory.....	.406
K-D Melodic Taste.....	.471
K-D Rhythm Discrimination.....	.454
K-D Pitch Imagery.....	.619
K-D Rhythm Imagery.....	.444
Background Discrimination of Mode.....	.525
Background Rhythmic Discrimination.....	.371
Background Discrimination of Mood.....	.411
Background Recognition of Themes.....	.206

The Seashore Tests.— The coefficients range from .341 to .473, a relatively small range, indicating that no test will give prediction of professional success either to a very high degree or to a very low degree, yet some amount of prediction does exist. Sense of Consonance and Sense of Time rank highest, with Tonal Memory and Sense of Rhythm so close that practically no differentiation is evident. It is interesting that Sense of Consonance, which is known to be the least reliable test of the six, and which has been replaced in the 1939 revision by a test of timbre, gives the highest coefficient of the group. It would seem, then, that the arrangement of coefficients from high to low is purely one of chance, and that another order easily might be obtained.

The Seashore tests measure sensory capacities, the possession of which is regarded as essential to the really great musician. However, the four elements of musicality which Seashore describes as the tonal, the dynamic, the temporal, and the qualitative,⁶ rarely occur in equal amounts in any one individual; rather, one element usually tends to dominate another, thus leading different persons into the various fields of musical endeavor referred to earlier in this chapter. Certainly, the individual who possesses a defective sense of pitch could never successfully

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Carl E. Seashore, Psychology of Music, p. 4. New York: McGraw-Hill Book Company, Inc., 1938.

play a stringed instrument, but might win a name for himself as a pianist. An individual lacking the temporal element might never become a good conductor, but might have the ability to compose music for another to conduct.

It is evident that success in music as a profession requires much more than the possession of a few sensory capacities. As Seashore himself puts it,

For high rating in music, numerous other factors must be considered, such as resources, conflicting interests, the will to achieve, and especially the power of application, and of hard and continuous work.⁷

The Kwalwasser Tests and the Kwalwasser-Dykema Tests.-

The range of the coefficients of contingency for these tests is somewhat larger than that for the Seashore tests, the lowest being .206, for Kwalwasser Harmonic Sensitivity, the highest being .619, for K-D Pitch Imagery. With the exclusion of the latter coefficient, the upper limit of the range is .471, substantially the same as the upper limit for the Seashore tests. The fact that the K-D Pitch Imagery test indicates a somewhat marked relationship to professional success is not altogether unexpected, since the same test revealed relatively high relationship to college success. Seashore's statement is pertinent:

Success or failure in music depends upon the capacity for living in a tonal world through productive and reproductive imagination..... his (the musician's) memory and imagination are rich and

strong in power of concrete, faithful and vivid tonal imagery; this imagery is so fully at his command that he can build the most complex musical structures and hear and feel all the effects of every detailed element before he has written down a note or sounded it out by voice or instrument. This capacity, I should say, is the outstanding mark of a musical mind at the representation level - the capacity of living in a representative tonal world Take the image from the musical mind and you take out its very essence.⁸

The authors of these tests have, like Seashore, attempted to measure, with a few exceptions, elements such as pitch, time, and rhythm which in themselves are obviously limited indices of musical ability. A test which is highly prognostic probably must be of another type, and at best an extremely high coefficient hardly can be hoped for because of the factors other than musical ability which are involved in professional success.

The Measures of Musical Background.- The contingency coefficients of the four tests of this group are spread from .206 to .525. It appears that a freshman's knowledge of musical literature as measured by the Recognition of Themes test has little relationship to his subsequent professional success, although it is to be expected that the accomplished musician will be able to identify the well-known compositions of the masters. Apparently, the musically talented and the musically untalented do not differ greatly in their knowledge of musical literature when they enter as freshmen. On the other hand, the Discrimination of Mode test must require an ability which the musically superior persons are

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Carl E. Seashore, op. cit., p. 5-6.

more likely to possess, the coefficient calculated being .525 indicating higher predictive value than any test of any battery except K-D Pitch Imagery. This Discrimination of Mode test also revealed high relationship to college success. This group of tests measures perceptual capacities rather than purely sensory capacities. On the whole, they predict professional success about as well as the other batteries. It should be remembered that the Measures of Musical Background were administered in their original form, without benefit of the recording, revision, and standardization which now has been done.⁹ It seems reasonable to suppose that the revised battery possesses prognostic power at least as great as that revealed in these data, and, in probability, greater.

Analysis of Data Classified in Terms of Test Areas.— The data which were discussed in an earlier section have been rearranged in Table XXIV in terms of test areas of musical talent rather than the arrangement of tests into batteries.

Almost all of the tests within a given area indicate similar degrees of relationship to professional success. Exceptions to this are: K-D Pitch Imagery which yields a coefficient much higher than the other two pitch tests, K-D Time Discrimination which reveals a coefficient considerably lower than Seashore Sense of Time;

TABLE XXIV
COEFFICIENTS OF CONTINGENCY
CLASSIFIED IN TERMS OF TEST AREAS

Test Areas	Tests	C
Pitch	Seashore Sense of Pitch.....	.341
	K-D Pitch Discrimination.....	.382
	K-D Pitch Imagery.....	.619
Rhythm	Seashore Sense of Rhythm.....	.452
	K-D Rhythm Discrimination.....	.454
	K-D Rhythm Imagery.....	.444
	Background Rhythmic Discrimination.....	.371
Intensity	K-D Intensity Discrimination.....	.457
	Seashore Sense of Intensity.....	.372
Time	Seashore Sense of Time.....	.473
	K-D Time Discrimination.....	.232
Memory	Seashore Tonal Memory.....	.467
	K-D Tonal Memory.....	.408
Harmonic Progression	Seashore Sense of Consonance.....	.473
	Kwalwasser Harmonic Sensitivity.....	.206
Melodic Progression	K-D Melodic Taste.....	.471
	Kwalwasser Melodic Sensitivity.....	.481

Kwalwasser Harmonic Sensitivity which shows a coefficient much lower than Seashore Sense of Consonance. The rhythm tests, melodic progression tests, and the memory tests are most consistent. There is no evidence that any one trait area is valuable, yet within each, some trait does show predictive value.

Summary.- The coefficients of contingency between ratings on professional success and scores on music tests reveal that each of the batteries of tests tried out will predict professional success to a certain degree. All batteries evidence some amount of prediction, though insufficient to warrant any accurate guidance on the basis of test scores alone. Two tests only, K-D Pitch Imagery and Background Discrimination of Mode, indicate a more than moderate amount of prediction for professional success. The various trait areas in which the tests fall seem to be about equally significant in relationship to professional success.

The Predictive Value of College Course Grades, Intelligence Test Scores, and Professors' Estimates for Professional Success

Introduction.- The primary concern of this investigation is with the predictive power of the various music tests. However, it is also of interest to discover the predictive significance of certain other data: the grades earned in certain college courses, intelligence test scores, and professors' estimates. It may be noted that from this point of view, grades in college courses,

which were treated in Chapter V as criteria of success, are here treated as the basis of prediction, and are evaluated against the criterion of professional success.

So that the distributions of grades in the four college subjects may be compared, Figure 3 has been constructed. Since only part of the students whose grades were employed as criteria of college success, were assigned to attainment levels, there are fewer cases involved in the calculation of the contingency coefficients than of the correlation coefficients. It is evident that the general spread of the grades in the first instance is similar to that in the second (compare Figures 1 and 2 with Figure 3). Tables XXV to XXVIII (inclusive) in Appendix C present the same data in complete form, including the subdivisions of the distributions into groups.

Table XXIX presents the coefficients of contingency between ratings on professional success and college course grades, intelligence test scores, and professors' estimates.

The College Subjects.— Of the four college subjects, success in sight singing shows the greatest amount of relationship to professional success with a coefficient of .582, while success in dictation follows with a coefficient of .538. In previous discussion of these two subjects, it was emphasized that ability in "ear training," as these subjects sometimes are called, generally is recognized as a reliable index of musicality. It is to be

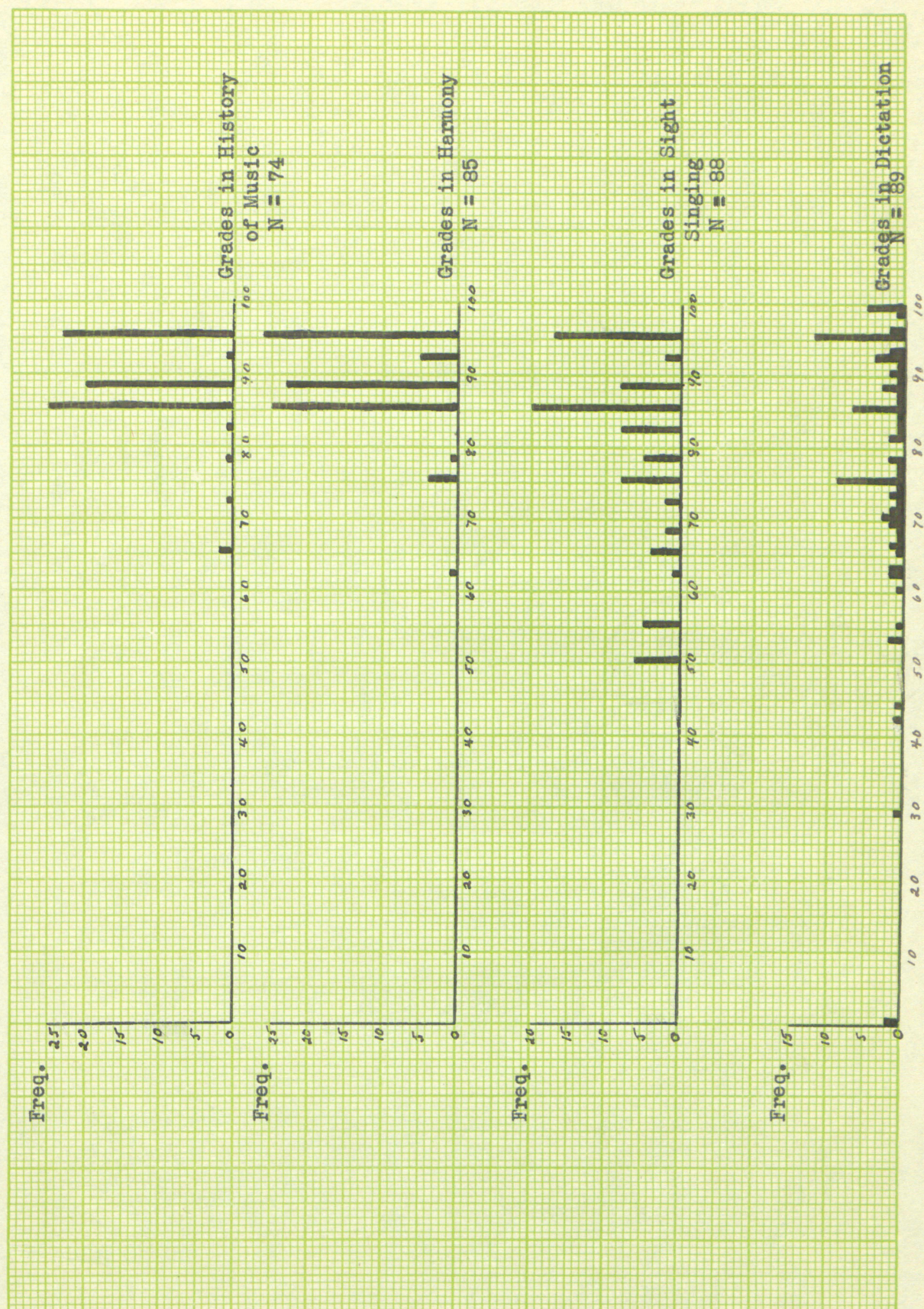


Fig. 3. Distribution of Grades in Four Courses, for Subjects Whose Grades Were Correlated with Ratings on Professional Success

TABLE XXIX

COEFFICIENTS OF CONTINGENCY
 CALCULATED FOR RATINGS ON PROFESSIONAL
 SUCCESS AND COLLEGE COURSE GRADES, INTELLIGENCE
 TEST SCORES, AND PROFESSORS' ESTIMATES

Courses	C
Dictation.....	.538
Sight Singing.....	.582
Harmony.....	.341
History of Music.....	.349
Intelligence.....	.501
Professors' Estimate of Talent.....	.501
Professors' Estimate of Application.....	.541
Professors' Estimate of Achievement.....	.518

expected, then, that grades in these subjects will show at least a moderate amount of predictive value for professional success.

While there are some branches of the musical profession in which an individual may achieve success without having his powers of auditory imagery developed to a high degree, the person who does possess this latter ability is likely to be found at the top of the ladder of success.

The subjects, harmony and history of music, yield coefficients of .341 and .349 respectively. On the basis of size of coefficient, the predictive value of these grades for professional success is less than that of grades in dictation and sight singing. Although the unusual form of the distributions probably affects the size of the coefficient, the arbitrary grouping of the grades for the calculations may have minimized this effect.

It is clear that success in college subjects has a moderate amount of predictive power for subsequent professional success. Those subjects evidencing the largest amount of relationship are sight singing and dictation.

Intelligence.- The importance of intelligence to the truly musical person has been discussed earlier in this study and will not be elaborated here. As the relationship of intelligence to college success is relatively high, it is to be expected that intelligence test scores will show not a little predictive value for professional success. This expectation is borne out by the coefficient of .501. Seashore says in this connection,

It is a common observation that a person's status in life is determined in large part by the degree and kind of intelligence... the musical profession makes as high a demand upon the intelligence as any other profession. Rating on intelligence as a supplement to measurement of musical talent is one of the best indices for the prediction of success in musical education or a musical career.¹⁰

Professors' Estimates.- Three sets of estimates by professors were correlated with ratings of professional success by the contingency method. The coefficients are .501 for estimates of talent, .518 for estimates of achievement, and .541 for estimates of application. These estimates appear to be about as valuable for the prediction of professional success as are grades in two college subjects, sight singing and dictation, and scores on the Detroit Advanced Intelligence Test.

Coefficients of Contingency
for the Complete Battery

Table XXX shows the complete list of coefficients of contingency from the largest to the smallest. The coefficients range from .201 to .619, Background Recognition of Themes being at the lower extremity, K-D Pitch Imagery at the upper. This table is included merely as a matter of interest and needs no elaborate discussion. In the complete list, two college subjects are notably high, two low; professors' estimates and intelligence are high; the music tests are scattered throughout the entire range.

¹⁰ Carl E. Seashore, "Musical Intelligence," Music Educators Journal, XXIV (March, 1938), 33.

TABLE XXX
COEFFICIENTS OF CONTINGENCY
FOR THE COMPLETE BATTERY

Measures	C
K-D Pitch Imagery.....	.619
Sight Singing.....	.582
Professors' Estimate of Application.....	.541
Dictation.....	.538
Background Discrimination of Mode.....	.525
Professors' Estimate of Achievement.....	.518
Professors' Estimate of Talent.....	.501
Intelligence.....	.501
Kwalwasser Melodic Sensitivity.....	.481
Seashore Sense of Consonance.....	.473
Seashore Sense of Time.....	.473
K-D Melodic Taste.....	.471
Seashore Tonal Memory.....	.467
K-D Intensity Discrimination.....	.457
K-D Rhythm Discrimination.....	.454
Seashore Sense of Rhythm.....	.452
K-D Rhythm Imagery.....	.444
Background Discrimination of Mood.....	.411
K-D Tonal Movement.....	.409
K-D Tonal Memory.....	.408
Seashore Sense of Intensity.....	.372
Background Rhythmic Discrimination.....	.371
K-D Pitch Discrimination.....	.362
K-D Quality Discrimination.....	.356
History of Music.....	.349
Harmony.....	.341
Seashore Sense of Pitch.....	.341
K-D Time Discrimination.....	.232
Kwalwasser Harmonic Sensitivity.....	.206
Background Recognition of Themes.....	.206

Summary and Conclusions

This chapter has been devoted to a discussion of the validity of certain measures for prognosis of success in music as a profession. The College of Music of Cincinnati entered into this investigation as a follow-up of the elaborate testing program described in Chapter V.

Procedure.— The study in the prognosis of professional success in music was organized and carried out according to the following plan:

(1) A general definitive description of the attributes which constitute professional success was developed. It was assumed that musical talent takes varying forms in different individuals, and that a musician may be judged successful in any one of many branches of musical endeavor.

(2) Criteria for five levels of professional success were set up. In brief, the requirements were as follows: Group I, teacher in college, director of music in a city school system, recognized composer, performer of note, musical director of radio station, or advanced student; Group II, school music teacher earning promotion or tenure, private teacher producing advanced pupils, performer (such as radio staff artist), or holder of degree, plus some graduate work; Group III, school music teacher earning no promotion, average private teacher, performer earning occasional engagements, or holder of bachelor's degree with possible sporadic

graduate study; Group IV, teacher or performer unable to hold a steady engagement, but successful enough to stay in music as a profession, or student continuing work in music as an avocation; Group V, teacher or performer changing to another profession after failure in musical pursuits, or student failing in college work in music.

(3) Information was gathered, through personal contacts and through questionnaires, concerning the professional status in 1939 of those former College of Music students who had participated in the testing program from 1930-1935.

(4) Using the criteria developed, ninety-three of these students were classified as to degree of professional attainment. This classification was made by consensus of from three to five judges, on the basis of information furnished by qualified persons (such as administrative officers, employers, and professional colleagues). In no case was the judgment made from information furnished by the person to be classified.

(5) In order to compare the students' levels of professional success with their performance on various measures while they were students in the College of Music, coefficients of mean square contingency were calculated.

Results.- The results may be summarized as follows:

1. The predictive value of the music tests:

a. All of the batteries of tests will predict professional success to a degree, but not sufficiently to warrant accurate guidance on the basis of test scores alone.

- b. Two tests, K-D Pitch Imagery and Background Discrimination of Mode, show substantial predictive power for professional success, the coefficients being .619 and .525, respectively.
 - c. No one trait area is of more value than another for prediction of professional success.
- 2. The predictive value of college course grades, intelligence test scores, and professors' estimates for professional success:
 - a. Success in sight singing and success in dictation indicate substantial predictive power for professional success, the coefficients being .582 and .538 respectively.
 - b. Success in harmony and success in history of music evidence much less predictive value than success in sight singing and success in dictation, the coefficients for the former being .341 and .349 respectively.
 - c. Intelligence test scores show marked relationship to professional success, the coefficient being .501.
 - d. Professors' estimates of talent, achievement and application evidence about as much predictive value as grades in the courses, sight singing and dictation, and scores on the Detroit Intelligence Test, the coefficient for the estimates being .501, .518, .541, respectively.

Conclusion.- The best prediction of success in music as a profession is probably given by a combination of two music tests (K-D Pitch Imagery and Background Discrimination of Mode), two college courses (dictation and sight singing), an intelligence test (Detroit Advanced Intelligence Test), and professors' estimates of ability (Talent, Achievement, and Application).

CHAPTER VII

MINOR PROBLEMS IN THE RELATIONSHIP OF VARIOUS TRAIT MEASURES

The data gathered in the study of the prognosis of college success and of professional success, which have been reported in Chapters V and VI, have made possible the investigation of several minor problems in the relationship of various trait measures. These problems, in the order in which they will be discussed in this chapter, may be listed as follows: the relationship of intelligence to music test scores, the relationship of intelligence to professors' estimates, the correlation of certain measures which appear to be related, the intercorrelation of grades in college courses, and the relationship of professors' estimates to grades in college courses.

The Relationship of Intelligence to Music Test Scores

Table XXXI presents the coefficients of correlation computed between intelligence test scores and music test scores. These r 's are arranged according to music test batteries.

The Seashore tests have had perhaps more than their share of attention, at least they have formed a part of many more investi-

gations than have the Kwalwasser or K-D tests. While coefficients found in the past range from .01 to .58 (Mursell's summary table),¹ the majority of the r 's are less than four times their probable error, and are therefore of negligible value.

The findings of the present investigation are consistent with these earlier studies. Only one of the six coefficients for the Seashore battery (Table XXXI) is as large as four times its P.E. This is the coefficient for Sense of Consonance (r , $-.271$), which is considered the least reliable test of the group. These low coefficients substantiate Mursell's conclusions:

On the whole, the results seem amply to justify the frequently repeated assertion that performance on the Seashore tests is not significantly related to general intelligence and is not affected, within wide limits, by the intelligence of the subjects.²

The general picture of the coefficients in Table XXX for the K-D and Kwalwasser test scores is similar to that for the Seashore tests. Only two tests, K-D Tonal Memory (.378) and K-D Tonal Movement (.368), evidence a slight relationship to intelligence. The others indicate a negligible relationship. It will be recalled that K-D Tonal Memory bore substantial relationship to ability in the college subject, dictation. The relatively high correlation between K-D Tonal Memory and intelligence thus bears out the relation-

1

James L. Mursell, The Psychology of Music, p. 337.
New York: W. W. Norton and Company, Inc., 1937.

2

James L. Mursell, op. cit., p. 336.

TABLE XXXI
COEFFICIENTS OF CORRELATION
BETWEEN INTELLIGENCE TEST
SCORES AND MUSIC TEST SCORES

Tests	r	P.E.	N
Seashore Sense of Pitch	-.026*	.058	136
Seashore Sense of Intensity.....	.103*	.060	138
Seashore Sense of Time.....	.097*	.056	138
Seashore Sense of Rhythm.....	.189*	.055	136
Seashore Sense of Consonance.....	-.271	.054	135
Seashore Tonal Memory.....	.063*	.058	136
Kwalwasser Melodic Sensitivity.....	-.071*	.057	139
Kwalwasser Harmonic Sensitivity.....	.019*	.057	138
K-D Pitch Discrimination.....	-.074*	.056	139
K-D Intensity Discrimination.....	.153*	.057	139
K-D Time Discrimination.....	-.047*	.057	139
K-D Quality Discrimination.....	.368	.049	139
K-D Tonal Movement.....	.036*	.068	139
K-D Tonal Memory.....	.378	.050	138
K-D Melodic Taste.....	.210*	.055	139
K-D Rhythm Discrimination.....	-.021*	.057	139
K-D Pitch Imagery.....	.172*	.156	136
K-D Rhythm Imagery.....	.070*	.058	136
Background Discrimination of Mode.....	.088*	.060	126
Background Rhythmic Discrimination.....	.256	.056	128
Background Discrimination of Mood.....	.295	.054	127
Background Recognition of Themes.....	.144*	.058	127

* Coefficients less than four times their probable errors

ship of intelligence to dictation ability.

Two of the four Measures of Musical Background, Discrimination of Mood and Rhythmic Discrimination evidence slight relationship to intelligence, the coefficients being .295 and .256 respectively. The first of these measures employs a technique little used in the field of music testing, although this type of discrimination has become an increasingly important phase of school music activity. The two remaining tests of this group show negligible relationship to intelligence.

In summary, it seems evident that only five of the twenty-two music tests which were correlated with the intelligence test show even a slight relationship to intelligence, the others indicating negligible relationship. The conclusion to be drawn is that there is little or no relationship between intelligence and musical talent as measured by the existing so-called tests of musical talent. Various explanations may be suggested for the small size of the coefficients here reported; e.g., unreliability of the tests, or lack of actual relationship between intelligence and the tests. No claim is made that intelligence and musicality are related only to the degree suggested by these data. The evidence is merely presented for what it may be worth, in comparison with other evidence.

The Relationship of Intelligence Test Scores
to Professors' Estimates of Ability

In Table XXXII, coefficients of correlation between intelligence test scores and professors' estimates of ability are presented. According to these data, the estimates of achievement and of application show slight relationship to intelligence, while the other estimates show negligible relationship. It has been stated earlier that musical ability is positively associated with intelligence when true musical criteria are used. Investigators have employed teacher ratings as criteria of musical ability with some success. Mursell states his opinion of the value of teachers' estimates in the following:

Since teacher ratings on musical aptitude furnish a very obvious validation criterion for music tests, and in fact are often used as determiners of talent levels by various research workers, it is very desirable to form some opinion as to their correctness.³

Of his own investigation in which certain pupils were rated by as many as five teachers, he says:

In general the extent of agreement was strikingly high, the correlations being over .90. This would seem to be evidence for objectivity, and to a less degree for validity, though it is by no means conclusive.⁴

Although some other studies have met with less favorable results, Mursell contends:

³
James L. Mursell, op. cit., p. 315.

⁴
Ibid., p. 315.

TABLE XXXII
COEFFICIENTS OF CORRELATION
BETWEEN INTELLIGENCE TEST
SCORES AND PROFESSORS'
ESTIMATES

Professors' Estimate	r	P.E.	N
Talent	.138*	.060	126
Application	.259	.057	126
Achievement	.262	.056	126
Rhythmic Action	.122*	.060	126
Tone Quality	.231*	.058	126
Technique	.065*	.062	126
Feeling	.102*	.060	126

* Coefficients less than four times their probable error

On the whole, we may tentatively conclude that teacher-ratings of musicality furnish an important and tolerably diagnostic sign.⁵

If teachers' estimates are considered reliable indices of ability, and if ability shows substantial relationship to intelligence, it is to be expected that the coefficients calculated for this study will be substantial in size. The fact that two only of seven estimates are significant in size (more than four times their probable error) seems to indicate that the estimates themselves may be unreliable, that perhaps some teachers do not thoroughly understand the traits to be estimated, and therefore are not able to judge them accurately.

The Correlation of Certain Measures Which Appear to be Related

Tests Purporting to Measure the Same Trait.- Certain tests, which, according to their titles, purport to measure the same trait, have been correlated and the data compiled in Table XXXIII. The low coefficients obtained can indicate only one thing, namely, that regardless of their titles, the tests cannot be measuring the same trait. However, this may be due in part to a difference in approach and technique. Whitley, in a similar investigation of the Seashore and K-D Tests, discovered extremely low correlations,

⁵
Ibid., pp. 315-16.

TABLE XXXIII
COEFFICIENTS OF CORRELATION
BETWEEN TESTS PURPORTING TO MEASURE THE SAME TRAIT

Tests	r	P.E.	N
Seashore Sense of Rhythm Background Rhythmic Discrimination	.206*	.053	152
K-D Rhythm Discrimination Seashore Sense of Rhythm	.182*	.057	157
Seashore Sense of Pitch K-D Pitch Imagery	.165*	.053	155
Background Rhythmic Discrimination K-D Rhythm Imagery	.111*	.055	148
Seashore Sense of Time K-D Time Discrimination	.110*	.053	158
Seashore Sense of Consonance Kwalwasser Harmonic Sensitivity	-.056*	.053	162
K-D Rhythm Discrimination Background Rhythmic Discrimination.....	.052*	.055	149
Seashore Sense of Intensity K-D Intensity Discrimination.....	-.032*	.053	159
Seashore Tonal Memory K-D Tonal Memory	..029*	.054	155
Seashore Sense of Rhythm K-D Rhythm Imagery	.026*	.054	154
Seashore Sense of Pitch K-D Pitch Discrimination	-.025*	.053	158
K-D Rhythm Discrimination K-D Rhythm Imagery	-.013*	.054	160
K-D Pitch Discrimination K-D Pitch Imagery	.009*	.053	160
Kwalwasser Melodic Sensitivity K-D Melodic Taste	.005*	.053	159

* Coefficients less than four times their probable errors

and suggested low reliability of the tests as a possible reason.⁶

Other Measures Which Appear to be Related.— Table XXXIV presents the data from the correlation of measures which appear to be closely related. The highest r computed during this study, is that of Professors' Estimate of Talent with Professors' Estimate of Achievement (.69). This may mean that the actual accomplishment of the students in applied music tends to be in proportion to their talent. On the other hand, the relatively high r may be due to the fact that many teachers are unable to distinguish sharply between talent and achievement. It was felt that a comparison between Professors' Estimate of Feeling and Background Discrimination of Mood would be an interesting one; the resulting r is .400, indicating some degree of relationship, although not a highly marked one. Professors' Estimate of Rhythmic Action and scores on the Seashore Sense of Rhythm test correlated .335, evidencing but slight relationship. The two remaining coefficients are so low as to be not at all significant.

Intercorrelation of Grades in College Courses

Table XXXV presents the data from the intercorrelation of grades in college courses. Coefficients for these subjects

6

M. L. Whitley, "A Comparison of the Seashore and Kwalwasser-Dykema Tests," Teachers College Record, XXXIII (May, 1932), pp. 731-51.

TABLE XXXIV
COEFFICIENTS OF CORRELATION
BETWEEN RELATED MEASURES

Measures	r	P.E.	N
Professors' Estimate of Talent Professors' Estimate of Achievement.....	.690	.027	109
Professors' Estimate of Feeling Background Discrimination of Mood.....	.400	.048	142
Professors' Estimate of Rhythmic Action. Seashore Sense of Rhythm.....	.335	.050	146
Professors' Estimate of Rhythmic Action K-D Rhythm Discrimination.....	.191*	.054	145
Professors' Estimate of Rhythmic Action. Background Rhythmic Discrimination.....	.103*	.056	143

* Coefficients less than four times their probable errors

TABLE XXXV
INTERCORRELATIONS BETWEEN
GRADES IN COLLEGE COURSES

	Dictation	S.Singing	Harmony	History
Dictation		.569	.255	.365
S.Singing	.569		.141*	.058*
Harmony	.255	.141*		.239
History	.365	.058*	.239	

* Coefficients less than four times their probable errors

are listed as follows in order of size: dictation and sight singing (.569), dictation and history of music (.365), dictation and harmony (.255), harmony and history of music (.239), sight singing and harmony (.141), and sight singing and history of music (.058). Since dictation has been used in many of the tests described in Chapter III as the indirect measure of sight singing, a relatively high correlation between grades in the two subjects (taught by the same teacher) is to be expected. The other correlations in this table are low. It seems probable that their size is affected by the low variability of the grade distributions in harmony and history of music.

The Relationship of Professors' Estimates to Grades in College Courses

In Table XXXVI are contained coefficients of correlation between Professors' Estimates of students' ability, and grades in college courses. It should be noted that the estimates here referred to were made by teachers of applied music, in no case by the instructors in the four college courses. As a group, the Professors' Estimates show the highest relationship to dictation, second to sight singing, third to history of music, fourth to harmony. The Estimate of Rhythmic Action ranks higher than any other, being very little higher for sight singing than for dictation. Two others, Estimate of Talent and Estimate of Application, show

TABLE XXXVI

COEFFICIENTS OF CORRELATION
BETWEEN PROFESSORS' ESTIMATES
AND GRADES IN COLLEGE COURSES

	P.Talent	P.Appl.	P.Ach.	P.Rhythmic Action
Dictation	.418	.413	.387	.453
Sight Singing	.396	.329	.389	.463
Harmony	.166*	.169*	.197*	
History	.256	.352	.402	

Key: P.Talent, Professors' Estimate of Talent; P.Appl. Professors' Estimate of Application; P.Ach., Professors' Estimate of Achievement; P.Rhythmic Action, Professors' Estimate of Rhythmic Action.

* Coefficients less than four times their probable errors

marked relationship to dictation. The Estimate of Achievement correlates highest with history of music grades, although the r 's for dictation and sight singing are nearly as large. Five measures of the entire group of fourteen appear to indicate a marked relationship to ability in college courses. These figures seem to indicate that the teacher is able to make significant predictions concerning his students' achievement in at least two of the criteria: namely, dictation and sight singing.

Regarding the role of the teacher in determining musical ability, Pratt says:

One can reasonably suppose that only the most incompetent teachers would be unable to do as well as the tests in estimating whether a pupil was good enough in his perception of pitch, intensity, rhythm, etc., to profit by private lessons. And the better teachers, since they could estimate these traits in five minutes and would then proceed to find out whether the pupil had any genuine musical ability, would do far more than the tests in their present state can possibly accomplish.⁷

Correlation Coefficients for the Complete Study

The 152 correlation coefficients computed in this study have been combined into Table XXXVII. They are listed in order of size, from the largest to the smallest without regard to signs. Table XXXVII will be found in Appendix D.

7

Carroll C. Pratt, The Meaning of Music, p. 147.
New York: McGraw-Hill Book Company, Inc., 1931.

Summary

This chapter has dealt with minor problems in the relationship of various trait measures. The findings may be summarized as follows:

1. The coefficients of correlation computed between intelligence test scores and music test scores substantiate the findings of other investigators, that there is little relationship between intelligence and musical talent as measured by the existing tests of musical talent.

2. Estimates by professors on two traits, achievement and application, show slight relationship to intelligence. Estimates on five other traits indicate a negligible relationship.

3. Certain tests which purport to measure the same trait yield such low r 's when scores are correlated, that it appears that they are not actually measuring the same trait. Other apparently related measures, however, indicate some degree of relationship. These are: Professors' Estimate of Talent and Estimate of Achievement (.690), Professors' Estimate of Feeling and Background Discrimination of Mood (.400), and Professors' Estimate of Rhythmic Action and Seashore Sense of Rhythm (.335, denoting slight relationship).

4. When the intercorrelation of grades in four college courses in music are computed, the highest coefficient is that

for dictation and sight singing (.569); the others show slight or negligible relationship, probably because of the narrow spread of the grades in harmony and history of music.

5. Professors' estimates show marked relationship to grades in dictation and sight singing, slight relationship to grades in history of music, and negligible relationship to grades in harmony.

Chapter VIII will contain the summary and conclusions of the complete study.

CHAPTER VIII

SUMMARY AND CONCLUSION

Introduction.- The major problem of this study was to evaluate a battery of musical and psychological tests as a basis for prognosis of (1) success in a college of music, and (2) success in music as a profession. The data were drawn from the records of a five-year testing program conducted at the College of Music of Cincinnati from 1930 to 1935, employing the Seashore Measures of Musical Talent, the K-D Music Tests, the Kwalwasser Tests of Melodic and Harmonic Sensitivity, the Measures of Musical Background (an original test devised for experimental purposes), and the Detroit Advanced Intelligence Test Forms V and W. These tests constituted the total battery to be evaluated.

Data were secured also from questionnaires administered to the students at the time of their entrance into the College of Music; from ratings of the students on certain traits made at the end of the freshman year by their instructors in their major fields of applied music; and from the grade records of the College of Music office. Further information concerning the students participating in the testing program was gathered in 1939 by questionnaires and by personal contacts. Judgments by competent persons of the level of professional success attained by these students afforded additional data.

These data made possible an investigation both of the major problem stated in the first paragraph of this chapter, and of certain minor problems, as follows: (1) characteristics of students entering the College of Music of Cincinnati as freshmen from 1930 to 1935; (2) the predictive power of course grades for professional success; (3) the relationship of intelligence test scores to music test scores; (4) the relationship of intelligence test scores to professors' estimates of ability; (5) the relationship of scores on music tests in certain testing areas (such as pitch or rhythm) to scores on other tests in the same area; (6) the intercorrelation of grades in college courses in music, and (7) the relationship of professors' estimates of ability to grades in college courses.

Review of Testing in Music.- Seven major tests in the field of musical achievement have been developed. These attempt to measure technical knowledge of music, knowledge of composers and compositions, and ability in silent reading. The seven tests may be listed as follows: Beach Standardized Music Test, Gildersleeve Musical Achievement Tests, Hutchinson Music Tests, Kwalwasser Test of Music Information and Appreciation, Kwalwasser-Ruch Test of Musical Accomplishment, Mosher Group Test, and the Torgerson-Fahnestock Music Test.

Twelve prognostic tests in music have been developed. Many of these tests attempt to measure musical talent in terms of

purely auditory rather than true musical capacities. Two tests in particular (Seashore Measures of Musical Talent and Kwalwasser-Dykema Tests) have received major attention in the work of investigators. The other prognostic tests are: Andrews Auditory Test, Chevais Tests D'Aptitude Musicale, Drake Tests of Musical Talent, Kwalwasser Tests of Melodic and Harmonic Sensitivity, Lowery Cadence and Phrase Tests, Lowery Musical Memory Test, Mainwaring Tests of Musical Ability, Ortmann Battery, the Schoen Tests of Musical Feeling and Understanding, and the Taylor Measures of Musical Background.

Experimental studies involving the tests mentioned above, and particularly the Seashore and K-D Tests, are numerous. These studies have investigated the uses of tests for prognosis of musical ability, the relationship of intelligence to musical achievement, the relationship of test scores to teachers' ratings, and other topics, with varying results. Such experiments have been carried on by Bogen, Brennan, Broom, Chadwick, Dean, Emerick, Farnsworth, Fracker and Howard, Gaw, Highsmith, Lanier, Larson, Loudon, McGinnis, Mursell, Salisbury and Smith, Stanton, Tilson, More, Whitley, Manzer and Marowitz, Barnard, and C. H. Taylor.

Numerous investigators have reported on the reliability and validity of prognostic tests, and, with few exceptions, have estimated both to be low. Studies have been made by Brown, Farnsworth, Drake, Gilliland and Jensen, Heinlein, Larson, Stanton, Mursell, and E. M. Taylor.

The profusion of inconclusive data resulting from all the investigations indicates a need for further examination and evaluation of the existing musical talent tests. The present study has attempted to meet this need.

The Measures Employed in This Study.— The following measures were employed in the present study: the Seashore Measures of Musical Talent, the Kwalwasser-Dykema Tests, the Kwalwasser Tests of Melodic and Harmonic Sensitivity, the Measures of Musical Background, and the Detroit Advanced Intelligence Test, Forms V and W; grades in four college courses, namely sight singing, dictation, harmony, and history of music; professors' estimates of ability. Data were also secured from questionnaires on social and musical background at college entrance, and questionnaires on professional status three to seven years after leaving college.

Characteristics of Students Achieving Freshman Status at the College of Music of Cincinnati from 1930-1935:— From data derived from questionnaires answered by students of the College of music of Cincinnati at the beginning of their freshman year, and three to seven years after their departure from college, the following descriptive statements were compiled.

(1) Sixty-eight per cent of the students stated the nationality of their parents as American, fourteen per cent stated it as German. The remainder named various other nationalities.

(2) Around ninety per cent of the students came from middle or upper-middle class homes in which the father was a professional man, the mother, a housewife. The typical family included three children although eight per cent had more than five children; twenty per cent of the students were only children.

(3) Thirty-five per cent of the group had no college graduates, professional musicians, or music teachers in their immediate families, thirty-five per cent had college graduates, but no one in either of the other categories.

(4) Thirty per cent of the students came to college the year following high school graduation; more than half of the remainder were out of high school two to three years before achieving freshman status; eight per cent of the entire group were out more than ten years.

(5) Three-fourths of the students possessed no previous academic training; of the remainder, almost thirty-five per cent had training of one year, one-fifth had two years, and one-ninth had four years.

(6) One-fifth of the students had studied voice one to two years before coming to college; almost all of the remainder had had no vocal training.

(7) Almost one-third of the instrumental students had studied five to six years; one-fifth had studied from ten to seventeen years; one individual had no previous instrumental training.

(8) Four-fifths of the students studied piano before coming to college; one-fifth studied organ; more than one-fourth studied violin; tympani, drums, trombone and double bass were least frequently studied.

(9) Almost one-half of the students played one instrument only; forty per cent played two instruments; ten per cent played three or more instruments.

(10) More than one-third of the students had other musical training; more than three-fourths had other musical experience; one-fourth pursued occupations other than music.

(11) Almost one-third of the students never received an honor or degree; more than one-third received a bachelor's degree; thirty per cent received a certificate or diploma; ten per cent received a bachelor's or a master's degree.

(12) Thirteen per cent became full time professional performers; an equal number ended their musical careers with marriage; more than one-third became teachers; approximately two-thirds continued to regard music as their major interest.

The Validity of Certain Measures For Prognosis of College Success.- The criterion of college success was considered to be the ability to succeed in the college courses, dictation, sight

singing, harmony, and history of music. Accordingly, grades in these subjects were correlated with scores on the music tests and intelligence test. The findings are limited in significance by the fact that the distributions of grades for two subjects, harmony and history of music, are unusually narrow, and possibly do not represent accurately the abilities of students in these fields. The conclusions reached as a result of these computations are summarized in the following paragraphs.

Success in dictation is best predicted by three tests, Background Discrimination of Mode, K-D Pitch Imagery, and K-D Tonal Memory. The first of these tests, Background Discrimination of Mode also has substantial predictive power for success in sight singing. Ability in harmony and history of music, however, seems to bear little relationship to scores on the music tests since only one r (between harmony and Seashore Sense of Rhythm) is more than four times its probable error.

The batteries of music tests vary in predictive value, but whatever the degree of relationship evidenced, each one except the Kwalwasser tests (these are consistently low in predictive power) shows greatest predictive power for dictation, least for history of music or harmony. No particular trait area is in itself, and in terms of all tests seeming to fall within its boundaries, of outstanding value for prognosis of college success. At least one test within each area does indicate some relationship, though small, to ability in college courses.

The individual test giving the highest prediction is Background Discrimination of Mode; two others, K-D Pitch Imagery and K-D Tonal Memory, possess a little less value. These three

have the greatest value for prediction of success in dictation and sight singing.

The intelligence test shows substantial relationship to success in dictation and sight singing, slight relationship to success in harmony, and negligible relationship to success in history of music. It is assumed that the unusual distribution of grades is responsible for the small r 's for the latter two subjects.

On the basis of these data, it is safe to conclude that no single measure should be used to predict success in college; a combination of music tests (Background Discrimination of Mode, K-D Pitch Imagery, and K-D Tonal Memory) with an intelligence test (Detroit Advanced Intelligence Test), may offer a prediction sufficiently accurate to be practical.

The Validity of Certain Measures for Prognosis of Professional Success.— Although many investigators have studied the validity of test scores for prognosis of college success, few have dealt with the problem of their validity for prognosis of success in music as a profession.

This study was organized and carried out according to the following plan: (1) criteria for five levels of professional success were developed; (2) information was gathered through personal contacts and through questionnaires concerning the professional status in 1939 of former College of Music students who had participated in the testing program from 1930 to 1935; (3) using the criteria developed, each of these students was classified, as to

degree of professional attainment, by persons well qualified to judge; (4) in order to compare the students' levels of professional success with their performance on various measures while they were students in the College of Music, coefficients of mean square contingency were calculated.

The results may be summarized as follows:

All of the batteries of music tests will predict professional success to a degree, but not sufficiently to warrant accurate guidance on the basis of test scores alone. Two tests, K-D Pitch Imagery and Background Discrimination of Mode, show substantial predictive power for professional success. No one trait area is of more value than another for prediction of professional success.

Success in sight singing and dictation indicates substantial predictive power for professional success, while success in the other two college courses, harmony and history of music, on the basis of the present data, has much less predictive value.

Intelligence test scores, as was the case in their relationship to success in college courses, show marked relationship to professional success.

Professors' estimates of talent, achievement, and application evidence about as much predictive value as do grades in the courses, sight singing and dictation, and scores on the Detroit Intelligence Test.

The best prediction, then, of success in music as a profession is probably given by a combination of two music tests (K-D Pitch Imagery and Background Discrimination of Mode), two college courses (dictation and sight singing), an intelligence test (Detroit Advanced Intelligence Test), and professors' estimates of ability (Talent, Achievement, and Application).

Minor Problems in the Relationship of Various Trait Measures.- The data gathered in the study of the prognosis of college success and of professional success made possible the investigation of several minor problems listed in the first section of this summary chapter. The results are summarized in the following paragraphs.

The coefficients of correlation computed between intelligence test scores and music test scores substantiate the findings of other investigators, that there is little relationship between intelligence and musical talent as measured by the existing tests of musical talent.

Estimates by professors on two traits, achievement and application, show slight relationship to intelligence. Estimates on five other traits indicate a negligible relationship.

Certain tests which purport to measure the same trait yield such low r 's when scores are correlated, that it appears that they are not actually measuring the same trait. Other apparently related measures, however, indicate higher relationship. These are: Professors' Estimates of Talent and Achievement, Professors' Estimate of Feeling and Background Discrimination of Mood, and Professors'

Estimate of Rhythmic Action and Seashore Sense of Rhythm.

When the intercorrelations of grades in four college courses in music are computed, the highest intercorrelation coefficient is that for dictation and sight singing; the others show slight or negligible relationship, probably because of the narrow spread of the grades in harmony and history of music.

Professors' estimates show marked relationship to grades in dictation and sight singing, slight relationship to grades in history of music, and negligible relationship to grades in harmony.

General Conclusions.- It is evident that, as a whole, the music test batteries do not evidence sufficient predictive power to be used by themselves for guidance purposes, yet neither do they have so little as to warrant discarding them entirely. Three tests are outstanding in comparison with the others in the batteries employed. These three tests are Background Discrimination of Mode, K-D Pitch Imagery, and K-D Tonal Memory. While the last two tests named are familiar and have been employed in many investigations, the first was completely untried at the time that the data were gathered for this study. The Background Tests have since been revised and standardized. The fact that the Background Discrimination of Mode Test evidenced high predictive power for both college and professional success suggests that more experimental tests involving such perceptual capacities as this test measures, might well be developed.

Although musical talent is, of course, the primary requirement for college success in music and for professional success in

music, the individual who possesses that musicality will reach a limit above which he cannot rise unless his musical ability is accompanied by no small degree of intelligence. The evidence of the correlation coefficients and of the contingency coefficients calculated in the present study supports this statement.

The student who is successful in his college work, in particular in the courses, dictation and sight singing, is the one who has the greatest chance to succeed professionally.

Much has been said concerning the value of teachers' estimates of ability. The evidence of the present investigation tends to support that of others, that professors' judgments of a student's ability are fairly reliable indices of his subsequent success as a professional musician.

The evidence gathered in this study tends to support an analytical theory of the nature of musical talent and achievement, rather than the single trait theory, that musical talent is one unified trait.

In conclusion, it may be said that the present study has evaluated as to prognostic worth the most widely used and carefully standardized of available tests, together with certain new and promising tests, a total of twenty-two music tests in all; has compared the prognostic values of these tests with those of certain other measures, including an intelligence test, ratings by instructors on various traits, and grades in college courses; has utilized as criteria both success in college courses in music and success in

music as a profession; has covered a time span of five years of testing and four additional years of elapsed time during which students might have demonstrated their professional success; has involved sufficient cases to yield significant results; and has analyzed relationships in terms both of individual tests and of test batteries.

Earlier studies in this area of investigation have failed to bring conviction that their results are scientifically sound and conclusive. The present study marks the end of a period of controversy as to the validity of musical talent tests as they exist at present. The data are such as to make this in certain respects a definitive investigation.

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A P P E N D I X A

Name..... Date..... Age last birthday.....

Birthplace..... Sex..... Married?.....

How long married?..... Are you living with your parents while attending school?.....

What is your father's nationality?..... Mother's?.....

What is your father's occupation?..... Mother's?.....

Number of children in the family:..... Is either of your parents dead?..... Which?.....

How old were you when they died?..... Were you thrown on your own resources by this loss?.....

Have you any other occupation?..... What?.....

How many hours per week do you devote to it?..... Are you a High School graduate?.....

Where?..... When?.....

Course?....., Approximate enrollment of High School:.....

Have you had any academic college work before taking up the formal study of music?.....

How much?..... Where?.....

How long ago?..... Have you studied any musical instruments?.....

What?..... Where?.....

Of whom?..... How long?.....

Materials studied:.....

.....

What voice range have you?..... Have you studied voice?.....

Where?..... Of whom?.....

.....

How long?..... Materials studied:.....

.....

What other musical training have you had?.....

.....

What musical experience have you had?.....

.....

.....

Are you entering for degree, diploma, or certificate?..... In what?.....

Major, if studying for degree:..... Are any of your near relatives music teachers?.....

Professional musicians?..... College graduates?.....

Rating blank form for the use of instrumental and vocal teachers.

Student	Teacher			Date	Classification	
	Very Poor E	Poor D	Low Average C—	High Average C+	Very Good B	Superior A
MUSICAL TALENT: Inborn capacity, for musical achievement independent of training.						
1. MUSICAL FEELING; Artistic temperament, creative imagination, initiative in interpretation						
2. TECHNIQUE; Mechanical ability in performance						
3. RHYTHMIC ACTION; ability for rhythmic expression in playing or singing						
4. QUALITY OF TONE: in playing or in singing						
5. APPLICATION; Effort, faithfulness in practice, sustained interest and attention						
6. ACHIEVEMENT; Progress in technique and musical expression						

FACTORS WHICH AID PROGRESS _____FACTORS WHICH HINDER PROGRESS _____

Number of months you have taught this pupil, if these are your first ratings _____

To the teacher:- Record your judgment of this pupil in each of the listed factors by placing a mark (X) in the appropriate column.

The College of Music is indebted to the Eastman
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ALBINO GORNO, MUS. DOC., DEAN

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As a part of a statistical survey, an attempt is being made to ascertain the present status of several hundred former College of Music students. Since we do not have a record of your present occupation, we shall be genuinely grateful if you will check the enclosed form and mail it back to us. Stamped envelope is also enclosed.

Yours very truly,

I am teaching privately full time _____ part time _____
 teaching in the public schools full time _____ part time _____
 teaching in college full time _____ part time _____
 playing or singing professionally full time _____ part time _____
 pursuing advanced studies full time _____ part time _____
 pursuing another occupation full time _____ part time _____

This other occupation is _____

I have received a certificate _____

 diploma _____

 bachelor's degree _____

 master's degree _____

since leaving the College

 of Music at _____

I am married _____

I am single _____

A P P E N D I X B

TABLE XXII

COEFFICIENTS OF CONTINGENCY
 BASED UPON FIVE EQUAL DIVISIONS OF THE RANGE OF
 SCORES CALCULATED BETWEEN RATINGS ON PROFESSIONAL SUCCESS
 AND TEST SCORES, COURSE GRADES, AND PROFESSORS' ESTIMATES

Measures	C
Sight Singing.....	.582
History of Music.....	.546
Dictation.....	.544
Professors' Estimate of Application.....	.541
Intelligence.....	.537
Kwalwasser Melodic Sensitivity.....	.522
Professors' Estimate of Achievement.....	.518
Professors' Estimate of Talent.....	.501
K-D Pitch Imagery.....	.489
K-D Tonal Memory.....	.488
Background Recognition of Themes.....	.487
Background Discrimination of Mood.....	.485
Seashore Sense of Intensity.....	.474
Background Rhythmic Discrimination.....	.470
Seashore Tonal Memory.....	.460
Seashore Sense of Time.....	.455
Seashore Sense of Rhythm.....	.448
K-D Rhythm Discrimination.....	.446
K-D Rhythm Imagery.....	.444
Background Discrimination of Mode.....	.430
Harmony.....	.426
Kwalwasser Harmonic Sensitivity.....	.428
K-D Melodic Taste.....	.426
K-D Pitch Discrimination.....	.419
K-D Intensity Discrimination.....	.418
K-D Tonal Movement.....	.389
Seashore Sense of Consonance.....	.355
K-D Quality Discrimination.....	.317
Seashore Sense of Pitch.....	.303
K-D Time Discrimination.....	.232

A P P E N D I X C

TABLE XXV

DISTRIBUTION OF GRADES IN DICTATION AND GROUPING FOR
THE CALCULATION OF THE COEFFICIENT OF CONTINGENCY

Grade	Fre- quency	Group
99	5	I
98	1	
97		
96	2	
95	12	II
94		
93	2	
92	4	
91	1	
90	2	
89	1	
88	3	III
87	1	
86	1	
85	7	
84	1	
83	1	
82	1	
81	2	
80		
79		
78	2	
77	1	
76	1	
75	9	
74	1	
73	2	
72	1	
71	2	
70	3	
69	2	
68	1	
67	1	

Grade	Fre- quency	Group
66	2	IV
65	1	
64		
63	2	
62	2	
61		
60	1	
59		
58		
57		V
56		
55	1	
54		
53	2	
52		
51		
50		
49		
48		
47		
46		
45		
44	1	
43		
42	1	
41		
40		
39		
38		
37		
36		
35		
34		

Grade	Fre- quency	Group
33		1
32		
31		
30		
29	1	
28		
27		
26		
25		
24		
23		
22		
21		
20		
19		
18		
17		
16		
15		
14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		
0	2	

TABLE XXVI

DISTRIBUTION OF GRADES IN SIGHT SINGING AND GROUPINGS
FOR THE CALCULATION OF THE COEFFICIENT OF
CONTINGENCY

Letter	Per cent	Frequency	Group
A	95 94	17	I
A-	93 92 91 90 89	2	II
B /	88 87 86	8	
B	85 84	20	
B-	83 82 81 80 79	8	
C /	78 77 76	5	
C	75 74 73	8	III
C-	72 71 70	2	
D /	69 68 67	2	
D	66 65 64 63	4	
D-	62 61 60 59 58 57 56	1	
E	55 54 53	5	IV
F	52 51 50	6	
			V

TABLE XXVII

DISTRIBUTION OF GRADES IN HARMONY AND GROUPING
FOR THE CALCULATION OF THE COEFFICIENT OF CONTINGENCY

Grade		Frequency	Group
Letter	Per cent		
A	95	26	I
	94		
A-	93	4	II
	92		
	91		
	90		
B+	89	23	
	88		
	87		
B	86	25	III
	85		
	84		
	83		
C+	82	1	
	81		
	80		
	79		
	78		
	77		
	76		
	75		
C	74	4	IV
	73		
	72		
	71		
	70		
	69		
	68		
	67		
D-	66	1	V
	65		
	64		
	63		
	62		

TABLE XXVIII

DISTRIBUTION OF GRADES IN HISTORY OF MUSIC
AND GROUPING FOR THE CALCULATION OF THE
COEFFICIENT OF CONTINGENCY

Grade		Frequency	Group
Letter	Per cent		
A	95 94	23	I
A-	93 92 91 90 89	1	
B+	88 87	20	II
B	86 85 84	25	III
B-	83 82 81 80 79	1	
C+	78 77 76	1	IV
C	75 74 73		
C-	72 71 70 69	1	
D	68 67 66 65	2	V

A P P E N D I X D

TABLE XXXVII
SUMMARY OF COEFFICIENTS OF CORRELATION
CALCULATED FOR THIS STUDY
RANKED IN ORDER OF SIZE

Variables	r	PE	N
1. P. Talent - P. Achievement.....	.690	.027	159
2. Dictation - B. Discrimination of Mode....	.645	.033	145
3. Dictation - K-D Pitch Imagery.....	.593	.036	144
4. Dictation - Intelligence.....	.585	.039	128
5. Dictation - Sight Singing.....	.589	.037	154
6. Sight Singing - B. Discrimination of Mode	.507	.043	144
7. Sight Singing - P. Rhythmic Action.....	.463	.044	143
8. Dictation - P. Rhythmic Action.....	.453	.045	143
9. Dictation - K-D Tonal Memory.....	.445	.044	147
10. Sight Singing - Intelligence.....	.430	.048	131
11. Dictation - P. Talent.....	.418	.047	145
12. History - K-D Rhythm Imagery.....	-.416	.054	108
13. Dictation - P. Application.....	.413	.047	145
14. History - P. Achievement.....	.402	.053	114
15. P. Feeling - B. Discrimination of Mood...	.400	.048	142
16. Sight Singing - P. Talent.....	.396	.047	143
17. Sight Singing - P. Achievement.....	.389	.048	143
18. Dictation - P. Achievement.....	.387	.048	145
19. Dictation - B. Rhythmic Discrimination...	.387	.047	146
20. Intelligence - K-D Tonal Memory.....	.378	.056	138
21. Intelligence - K-D Quality Discrimination	.368	.049	139
22. Dictation - History.....	.365	.055	114
23. History - P. Application.....	.352	.055	114
24. Sight Singing - K-D Pitch Imagery.....	.348	.049	142
25. P. Rhythmic Action - S. Sense of Rhythm..	.335	.050	146
26. Sight Singing - S. Sense of Intensity....	.331	.049	149
27. Sight Singing - P. Application.....	.329	.051	143
28. Harmony - Intelligence.....	.299	.054	130
29. Dictation - S. Sense of Intensity.....	.298	.047	151
30. Intelligence - B. Discrimination of Mood.	.295	.054	127
31. Dictation - K-D Intensity Discrimination.	.293	.051	147
32. Sight Singing - K-D Tonal Memory.....	.286	.052	145
33. History - K-D Time Discrimination.....	.277	.059	110
34. Dictation - S. Sense of Time.....	.272	.051	151
35. Intelligence - S. Sense of Consonance....	-.271	.054	135
36. Harmony - S. Sense of Rhythm.....	.269	.052	149
37. Dictation - S. Tonal Memory.....	.268	.051	147
38. Intelligence - P. Achievement.....	.262	.056	126

TABLE XXXVII (Continued)

Variables	r	PE	N
39. Intelligence - P. Application.....	.259	.057	126
40. Dictation - S. Sense of Consonance.....	.257	.051	147
41. Dictation - K-D Rhythm Imagery.....	.256	.053	145
42. History - P. Talent.....	.256	.059	114
43. Intelligence - B. Rhythmic Discrimination.	.256	.056	128
44. Dictation - Harmony.....	.255	.052	146
45. History - K-D Melodic Taste.....	.254	.060	110
46. Harmony - History.....	.239	.059	119
47. History - K. Harmonic Sensitivity.....	.238	.061	110
48. Sight Singing - S. Tonal Memory.....	.233	.053	146
49. Intelligence - P. Tone Quality.....	.231	.058	126
50. Dictation - S. Sense of Rhythm.....	.214	.057	147
51. History - K-D Tonal Memory.....	.213	.062	110
52. Dictation - K-D Quality Discrimination....	.211	.059	147
53. Intelligence - K-D Melodic Taste.....	.210	.055	139
54. Dictation - K. Harmonic Sensitivity.....	.208	.053	147
55. S. Sense of Rhythm & B. Rhythmic Discrim..	.206	.053	152
56. Harmony - P. Achievement.....	.197	.053	147
57. P. Rhythmic Action - K-D Rhythm Discrim...	.191	.054	145
58. Intelligence - S. Sense of Rhythm.....	.189	.055	137
59. Harmony - K-D Pitch Discrimination.....	-.184	.054	145
60. K-D Rhythm Discrim. - S. Sense of Rhythm..	.182	.057	157
61. Harmony - K. Melodic Sensitivity.....	.178	.054	149
62. Intelligence - K-D Pitch Imagery.....	.172	.056	136
63. Sight Singing - S. Sense of Time.....	.171	.054	148
64. Harmony - P. Application.....	.169	.054	147
65. Sight Singing - K-D Rhythm Discrimination.	.166	.055	155
66. Harmony - P. Talent.....	.166	.055	147
67. S. Sense of Pitch - K-D Pitch Imagery.....	.165	.053	155
68. Harmony - S. Tonal Memory.....	.157	.054	148
69. Intelligence - K-D Intensity Discrim.....	.153	.057	139
70. Intelligence - B. Recognition of Themes...	.144	.058	127
71. Sight Singing - K-D Intensity Discrim.....	.143	.057	145
72. Sight Singing - S. Sense of Rhythm.....	.142	.054	147
73. Sight Singing - Harmony.....	.141	.055	147
74. Harmony - B. Discrimination of Mode.....	.139	.055	145
75. Intelligence - P. Talent.....	.138	.060	126
76. History - S. Sense of Time.....	.128	.063	113
77. Dictation - K-D Melodic Taste.....	-.127	.055	147
78. History - K-D Quality Discrimination.....	-.126	.063	110
79. Intelligence - P. Rhythmic Action.....	.122	.060	126

TABLE XXXVII (Continued)

Variables	r	PE	N
80. Sight Singing - S. Sense of Pitch.....	.121	.055	147
81. History - K-D Intensity Discrimination....	.119	.063	110
82. B. Rhythmic Discrim. - K-D Rhythm Imagery..	.111	.055	148
83. S. Sense of Time - K-D Time Discrim.....	.110	.053	158
84. Sight Singing - K-D Quality Discrim.....	.109	.056	145
85. Intelligence - S. Sense of Intensity.....	.103	.060	138
86. P. Rhythmic Action - B. Rhythmic Discrim..	.103	.056	143
87. Dictation - K-D Tonal Movement.....	.102	.055	147
88. Intelligence - P. Feeling.....	.102	.060	126
89. Harmony - S. Sense of Consonance.....	.101	.055	148
90. Intelligence - S. Sense of Time.....	.097	.056	138
91. History - S. Sense of Rhythm.....	.095	.064	112
92. Dictation - K-D Rhythm Discrimination.....	.094	.055	147
93. Sight Singing - K-D Rhythm Imagery.....	.089	.057	143
94. Intelligence - B. Discrimination of Mode..	.088	.060	126
95. Sight Singing - K-D Time Discrimination...	-.076	.056	145
96. Harmony - S. Sense of Pitch.....	-.076	.050	149
97. Harmony - K-D Intensity Discrimination....	-.075	.055	147
98. Intelligence - K-D Pitch Discrimination...	-.074	.056	139
99. Intelligence - K. Melodic Sensitivity.....	-.071	.057	139
100. Intelligence - K-D Rhythm Imagery.....	.070	.058	136
101. History - B. Rhythmic Discrimination.....	-.067	.064	110
102. History - S. Tonal Memory.....	-.066	.064	111
103. Intelligence - P. Technique.....	.065	.062	126
104. Sight Singing - K-D Melodic Taste.....	.065	.056	145
105. Sight Singing - K-D Tonal Movement.....	.064	.056	145
106. Sight Singing - K. Melodic Sensitivity....	.064	.055	148
107. Dictation - K-D Time Discrimination.....	.064	.056	148
108. Dictation - K-D Pitch Discrimination.....	.064	.056	148
109. Intelligence - S. Tonal Memory.....	.063	.058	136
110. History - S. Sense of Pitch.....	-.063	.063	112
111. History - K-D Rhythm Discrimination.....	-.061	.064	111
112. Dictation - K. Melodic Sensitivity.....	.058	.055	149
113. Sight Singing - History.....	.058	.062	119
114. Harmony - S. Sense of Time.....	-.057	.055	150
115. S. Sense of Consonance - K. Harmonic Sens.	-.056	.053	162
116. Harmony - K. Harmonic Sensitivity.....	.056	.056	147
117. History - S. Sense of Consonance.....	-.055	.064	111
118. Sight Singing - S. Sense of Consonance....	-.053	.055	146
119. History - K. Melodic Sensitivity.....	.053	.064	111

TABLE XXXVII (Concluded)

Variables	r	PE	N
120. K-D Rhythm Discrim. - B. Rhythmic Discrim.	.052	.055	149
121. History - S. Sense of Intensity.....	.048	.063	113
122. History - B. Recognition of Themes.....	.047	.064	111
123. Intelligence - K-D Time Discrimination....	-.047	.057	139
124. History - B. Discrimination of Mode.....	.046	.064	111
125. Sight Singing - K. Harmonic Sensitivity...	-.045	.055	146
126. Harmony - K-D Rhythm Discrimination.....	-.040	.055	147
127. Intelligence - K-D Tonal Movement.....	.036	.058	139
128. Harmony - K-D Melodic Taste.....	-.033	.056	147
129. S. Sense of Intensity - K-D Intensity Discrimination.....	-.032	.053	159
130. Sight Singing - B. Rhythmic Discrimination	-.029	.056	145
131. S. Tonal Memory - K-D Tonal Memory.....	.029	.054	155
132. Dictation - S. Sense of Pitch.....	.027	.055	150
133. S. Sense of Rhythm - K-D Rhythm Imagery...	.026	.054	154
134. Intelligence - S. Sense of Pitch.....	-.026	.058	136
135. S. Sense of Pitch - K-D Pitch Discrim.....	-.025	.053	158
136. History - K-D Tonal Movement.....	-.024	.064	110
137. Intelligence - K-D Rhythm Discrimination..	-.021	.057	137
138. Harmony - S. Sense of Intensity.....	.021	.055	150
139. Harmony - K-D Pitch Discrimination.....	.021	.056	147
140. Intelligence - History.....	.021	.068	97
141. Harmony - K-D Tonal Memory.....	.020	.056	146
142. Intelligence - K. Harmonic Sensitivity....	.019	.057	138
143. Harmony - B. Rhythmic Discrimination.....	-.019	.056	146
144. Harmony - K-D Rhythm Imagery.....	.017	.057	144
145. History - K-D Pitch Imagery.....	-.014	.064	111
146. K-D Rhythm Discrim. - K-D Rhythm Imagery..	-.013	.054	160
147. K-D Pitch Discrimination - K-D Pitch Imag.	.009	.053	160
148. Harmony - K-D Pitch Imagery.....	-.008	.057	144
149. Harmony - K-D Quality Discrimination.....	-.008	.056	147
150. Harmony - K-D Time Discrimination.....	.007	.056	147
151. K. Melodic Sensitivity - K-D Melodic Taste	.005	.053	159
152. Harmony - K-D Tonal Movement.....	.004	.056	147

Key: P. Professors' Estimate; B., Background; K., Kwalwasser;
K-D, Kwalwasser-Dykema; S., Seashore.