Guidebook

for the

Instrument Timbre Preference Test

2008 Guidebook Revision

Edwin E. Gordon

GIA Publications, Inc.
Chicago

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Instrument Timbre Preference Test
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G-2830M
ISBN: 978-1-57999-744-1

7404 S. Mason Avenue, Chicago, IL 60638

www.giamusic.com

Printed in the United States of America.

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Part 1

PURPOSE AND DESCRIPTION OF THE INSTRUMENT TIMBRE PREFERENCE TEST

The *Instrument Timbre Preference Test* (ITPT) has one primary purpose: to act as an objective aid to teachers and parents in helping a student select an appropriate woodwind, brass, or string instrument to learn to play in private or class instrumental music instruction as well as in band or orchestra. Test results indicate a student's likes and dislikes of sounds associated with various woodwind, brass, and string instruments. Barring serious physical limitations, if a student likes a particular sound, he or she will be more successful on that instrument than on an instrument that has a sound he or she does not like. The ITPT may be administered to students in third through twelfth grades, either individually or a group. There are no correct or incorrect answers to the questions on this text. Thus, there are no norms for the test.

ITPT includes recorded synthesized timbres (tone colors) in related ranges (span of pitches from highest to lowest) of the same brief melody performed with exactly the same musical expression on a Moog Opus 3 Synthesizer. As with a Roland Expanded XP-50 Music Workstation, the seven timbres in various ranges are produced by changing and combining footages (octaves) and by modifying tone color through filtering. Each of the seven sounds is intended to represent the timbre and range of one or more woodwind, brass, or string instruments. Because the recorded melody has a range of an eleventh, it is possible to produce a broad spectrum of each timbre/range. The first timbre/range sound represents flute and violin; the second, clarinet and viola; the third, saxophone, French horn, and viola; the fourth, oboe, English horn, and bassoon; the fifth, trumpet and cornet; the sixth, trombone, baritone, euphonium, and cello; and the seventh, tuba, Sousaphone, and string bass.

NOTE: Synthesized sounds are used rather than actual sounds from musical instruments for a significantly essential reason. Prepublication developmental research of ITPT showed when actual sounds from musical instruments are used, validity of the test is sacrificed. Many students indicate a preference for the actual sound of an instrument simply because it is familiar and can be associated with friends who play or will be learning to play the instrument, popular musicians who play the instrument, size and appearance of the instrument, uniforms, activities at sports events, band and orchestra trips, or whether the instrument is owned by the school or must be rented or purchased. Timbre and range is of little concern to them. Thus, to ensure validity of the purpose of ITPT, the use of synthesized sounds produce the most accurate, unbiased assessment of instrument preference based on timbre and range. Subsequent research supports that principle. Outlined in Part 2 are technical as well as practical reasons for the use of synthesized sounds.

Seven combined timbre/ranges are organized into 42 recorded test questions on ITPT. The sound of each of the seven timbre/ranges is paired twice with every other timbre/range. Each pair is a test question. Each timbre/range is heard once first in the pair and once second in the pair. The student is asked to listen to each test question and indicate on an answer sheet which of the two timbre/ranges he or she prefers. Because the melody is always the same and in the same tonality and keyality, and because musical expression is held constant, timbre and range are the only factors that change from question to question. The melody does not become boring because it is uncommon, brief, and purposely composed to sustain interest by being modestly ambiguous.

The test CD includes approximately 22 minutes of listening time, requiring less than 30 minutes of total test administration time. Either a classroom teacher or music specialist may direct the testing session. Included in Part 3 are brief verbal directions that are read to students, as well as suggestions for organizing the testing program. Directions for scoring answer sheets and using the class record sheet to document test results are provided in Part 4. Answer sheets may be machine scored or scored by hand. Information for interpreting test results is offered in Part 5.

Part 2

RATIONALE, CONTENT, AND DESIGN OF THE INSTRUMENT TIMBRE PREFERENCE TEST

Rationale

In a three-year longitudinal predictive validity study, the correlation between fourth and fifth grade students' *Musical Aptitude Profile* (MAP)[1] composite scores before instrumental music instruction was begun and five music achievement criteria combined after the students had received three years of instrumental music instruction was calculated to be .75.[2] If the coefficient of .75 is squared, then it can be determined students' music aptitudes account for approximately 56% of the reason(s) for their success in beginning instrumental music classes. Stated another way, pre-instruction MAP scores predict success in beginning instrumental music with approximately 56% accuracy—that is, 56% better than chance. The 56% does not refer to individual students but rather to 56% of the reason(s) for overall success of all students in a group.

MAP is a test of stabilized music aptitude. It is used with students in fourth grade and above. Research results indicate that is the time when music aptitude is no longer affected by environmental factors.[3] The *Primary Measures of Music Audiation* (PMMA)[4] is used with students in kindergarten through third grade, and the *Intermediate Measures of Music Audiation* (IMMA),[5] designed like PMMA but

1 Edwin E. Gordon, *Musical Aptitude Profile* (Chicago: GIA, 1965–1995).
2 Edwin E. Gordon, *A Three-Year Longitudinal Predictive Validity Study of the Musical Aptitude Profile* (Chicago: GIA, 1967–2001), p. 38.
3 Edwin E. Gordon. *A Three-Year Longitudinal Predictive Validity Study of the Musical Aptitude Profile* (Chicago: GIA, 1967–2001), p. 40.
4 Edwin E. Gordon, *Primary Measures of Music Audiation* (Chicago: GIA, 1979–1986).
5 Edwin E. Gordon, *Intermediate Measures of Music Audiation* (Chicago: GIA, 1979–1986).

including more complex questions, is used with students in first through fourth grades. Music aptitude (potential) is developmental and continues to fluctuate from birth (and probably prenatally) through approximately age eight as it interacts with environmental influences.[6] Music aptitude becomes stabilized at approximately age nine.

Students' success in beginning instrumental music is predicted about as effectively with a developmental music aptitude test as it is with a stabilized music aptitude test. In a one-semester longitudinal predictive validity study of PMMA, pre-instruction composite test scores forecast success in violin performance of students age seven and eight with a coefficient of .73.[7] In a one-year longitudinal predictive validity study of IMMA, pre-instruction composite test scores predicted success in violin and recorder performance of students age eight and nine with coefficients ranging from .62 to 76.[8]

Upon revealing that success in beginning instrumental music could be predicted by music aptitude scores with at least 56% assurance, no attempt was made to identify experimentally the nature of the remaining approximate 44% of the reason(s) students were successful. Considering the reliability for each of the three music aptitude test batteries is above .90, and reliabilities of the music achievement criterion measures used in the longitudinal predictive validity studies was similarly high, it was assumed approximately 12% of the remaining 44% of the variance could be explained as error of measurement. Further, research over the years has indicated music aptitude and general intelligence test scores rarely correlate higher than .20.[9] Thus, the effect of general intelligence on success in music may account for another 4% of the variance. It may further

6 Edwin E. Gordon, *The Manifestation of Developmental Music Aptitude in the Audiation of "Same" and "Different" as Sound in Music* (Chicago: GIA, 1981).

7 Edwin E. Gordon, *Manual for the Primary Measures of Music Audiation and the Intermediate Measures of Music Audiation* (Chicago: GIA, 1979–1986), p. 114.

8 Edwin E. Gordon, "A Longitudinal Predictive Validity Study of the Intermediate Measures of Music Audiation," *Council for Research in Music Education,* 78 (1984), pp. 1–23.

9 Edwin E. Gordon, *Introduction to Research and the Psychology of Music* (Chicago: GIA, 1998), pp. 80–82; Edwin E. Gordon, GIA Monograph Series, "The Longitudinal Interaction of Developmental Music Aptitude and Chronological Age: Implications," *Test Validity and Curriculum Development* (2001), pp. 63–73; and Edwin E. Gordon, *Developmental and Stabilized Music Aptitudes* (Chicago: GIA, 2002).

be assumed, though without any objective evidence as a basis, that as much as 3% of the reason(s) students are successful in music is associated with their physical and psychological health and their home and cultural surroundings. Thus, the nature of the remaining 25% of the variance remained unexplained. However, in experimental studies (described in detail in Part 6), it was discovered instrument timbre/range preference accounts for at least 10% of the remaining variance for success in beginning instrumental music instruction.

As detailed in Part 6, research has found that importance of timbre and range of a musical instrument are second only to music aptitude as significant factors in student success in instrumental music. Students become motivated and successful when they learn to play with good tone quality on an instrument that has a timbre and range they like. That is, if students learn to play instruments for which they have a timbre and range preference, they will be more successful than students who learn to play instruments for which they do not have a timbre and range preference. Students find it unpleasant to learn to play with good tone quality an instrument that does not have a timbre sounding in a range they actually favor. When ITPT scores are combined with students' scores on a valid music aptitude test, as much as 65% of the reason(s) for their success in instrumental music can be predicted after only one year of instruction. It is reasonable to assume levels of prediction would be even higher after additional instrumental music instruction.

ITPT is administered to all students who will soon be or are in an appropriate grade in which instrumental music instruction is offered. When a student's ITPT results indicate he or she has a timbre and range preference for a certain instrument (which is usually the case for the majority of students), he or she is encouraged to select that instrument for study. Not only will students who play a preferred instrument demonstrate higher levels of music achievement, but most also remain interested in continuing their instrumental music instruction. Overall, dropouts will be minimal.

For students who think they would like to play a percussion instrument, it would be wise to encourage them to also study a woodwind, brass, or string instrument associated with their timbre/

range preference. They may either study a percussion instrument at the same time they are learning to play a woodwind, brass, or string instrument, or they may learn to play a percussion instrument after they have received fundamental instruction on a woodwind, brass, or string instrument. Moreover, while learning a percussion instrument, it would be beneficial for students to also learn to play a keyboard instrument.

Whether or not students indicate a timbre/range preference, almost 50% of students in fourth and fifth grades who score above the 80% percentile on MAP and IMMA do not ask to study an instrument. Thus, along with ITPT, either MAP or IMMA might be administered to identify those musically gifted students who should be encouraged to participate in instrumental music instruction. Students with higher scores on MAP and IMMA who learn to play a music instrument for which they have timbre and range preferences achieve more than lower-scoring students who learn to play an instrument associated with their timbre and range preference. Timbre and range preferences will not compensate for modest music aptitude. Nonetheless, with or without demonstrated timbre and range preferences, students with low scores on MAP or IMMA who volunteer to learn to play a musical instrument must unconditionally be allowed, if not encouraged, to do so.

Content and Design

ITPT is made up of seven tests with seven scores—one for each timbre/range. To compute results, the test is scored seven times, once for each timbre/range.

Each of the seven timbre/ranges is heard 12 times throughout the test. If a student chooses a timbre/range at least nine or ten of the times, depending on the specific timbre/range, he or she is considered to have a preference for that timbre/range. If a timbre/range is chosen no more than two of the times, the student is considered to have a dislike for that timbre/range. It is possible for a student to demonstrate a preference for or a dislike of as many as four timbre/ranges. Most students who demonstrate a preference for one or more timbre/ranges also demonstrate a dislike of one or more timbre/

ranges. Some students choose every timbre/range no more than eight times or no fewer than three times. Thus, they do not demonstrate a preference or dislike for even one timbre/range. There are generally more students in a group who have a preference for a timbre/range than there are students who have a dislike for a timbre/range. Also, there are generally more students in a group who have a preference or dislike for a timbre/range than there are students who have no preference or dislike for a timbre/range, the proportion being three or four to one.

The practical reasons for using synthesized rather than actual sounds of musical instruments are presented in Part 1. In addition, there are four technical and pedagogical reasons for using synthesized sounds:

1. It is not possible for different, or even the same, musicians to perform the same short melody on different instruments with the same musical expression. As a result, developmental research uncovered a tendency for students to base their preferences on quality of the musical expression with which the melody was performed rather than on the timbre/range of the instrument on which it was performed.

2. From a standpoint of test reliability and validity, it would not have been prudent (if feasible) to increase the length of the ITPT to include all different stylistic tone qualities (such as commercial, studio, symphonic, and jazz) for each instrument on the recording. If only one actual sound were presented, it might be one that some students would not like even though they might have a preference for another actual sound associated with that instrument. In that regard, use of vibrato complicated the problem.

3. A synthesized sound may be representative of more than one timbre/range, whereas an actual instrument in most cases is indicative of only one instrument timbre/range.

4. Because a synthesized sound may represent more than one instrument timbre/range, a student who demonstrates a preference for a given timbre/range may be given a choice of musical instruments to study. Then, if attitude or physical characteristics interfere with a student's ability to learn an instrument associated with a preferred timbre/range, that student may be assigned a different, more suitable instrument also associated with that timbre/range.

Admittedly, synthesized timbre/ranges have limitations. It was not possible to achieve a full spectrum for a timbre/range using a synthesizer. (It was possible, however, to generate a timbre/range on a synthesizer that is representative of all stylistic timbre/ranges of an actual musical instrument.) Also, although one of two synthesized timbre/ranges may be more representative of the sound of an actual musical instrument, one synthesized sound is representative of the sound of disparate musical instruments. These limitations notwithstanding, ITPT has shown exceptional power for predicting which instruments are most appropriate for students to learn to play in terms of overall achievement and sustained motivation.

Part 3

ADMINISTRATION OF THE INSTRUMENT TIMBRE PREFERENCE TEST

Standard Test Administration Procedure

For accurate interpretation of test results, the *Instrument Timbre Preference Test* (ITPT) must be administered in accordance with the standard procedure described herein. Any questions that may not be answered should be referred to the publisher for prompt clarification.

Materials Required for Administering the Test

ITPT is recorded on a CD. It is important that only the publisher-provided CD be used and be played on high-quality equipment in good mechanical condition. To do otherwise would seriously invalidate test results. To ensure validity of test results and quality of the CD, be sure to store the CD in a secure place so no one will purposely or unconsciously misuse or mistreat it. Under no circumstances should the CD be used without accompanying test material or for purposes other than an officially scheduled testing conducted under the stated procedures.

The following materials are included in the ITPT kit:

- This guidebook, which includes directions to be read to students, instructions for administering and scoring the test, and information for interpreting test results
- One (1) CD for ITPT
- One hundred (100) answer sheets, which may be used for either machine scoring or hand scoring
- Seven (7) scoring masks, for hand scoring the test

- Five (5) class record sheets
- One (1) GIA scoring service order form

The following materials and conditions need to be available at the school:

- A quality CD player in good mechanical condition (a portable machine or CD deck with external speakers may be used)
- A pencil and eraser for each student (ink, colored pencils, crayons, or ballpoint pens may not be used to mark answer sheets; if answer sheets are to be machine scored, they must be marked using a soft (No. 2) pencil)
- A quiet comfortable room with good acoustics
- A writing surface (desk, board, or smooth floor) and ample working space for each student

Scheduling and Administering the Test

ITPT is administered to all students who will soon be or are in an appropriate grade in which instrumental music instruction is offered. The test is designed to be administered to groups, though it may be used with individual students. It is best to test one group at a time, but if physical conditions are adequate and if proctors are in the room, multiple groups may be tested at the same time.

Allow 30 minutes for complete administration of ITPT. Of the 30 minutes, 22 minutes will be used for students to listen to the CD. The remaining time (or less, depending upon maturity of students and size of the group) will be used to seat students, distribute answer sheets, offer pencils and erasers as needed, read the specific test instructions to students, operate the CD player, and collect answer sheets. Either a music specialist or classroom teacher may administer the test, but the specific directions for students to take the test must be read by the teacher. There are no practice exercises. Preliminary guidelines for organizing the testing session are detailed in the pages that follow.

Checking the Test Kit Upon Receipt

As soon as the shipment arrives, unpack and examine the contents of the ITPT kit. Compare the contents with the original order. If the order did not include sufficient material (especially if you ordered additional CDs, answer sheets, or class record sheets needed for testing multiple groups) or if a mistake was made filling it, notify the publisher at once by calling one of the following numbers so additional materials can be sent before the scheduled day of testing. One or more teachers should volunteer to accept responsibility for arranging proper facilities and for ordering and organizing all test material.

Within the United States.....1-800-442-1358
Outside the United States 00-1-708-496-3800

Advance Planning and Motivation

A crucial factor in determining the value of a testing program is the attitude of all teachers, including those who will not be administering the test but whose students will be participating in the test session. If teachers are not convinced of the importance of the test and if students are not at ease in following directions, or if they are not positively anticipating results of their time and effort, at least partial validity of ITPT scores will be sacrificed. Thus, careful planning of the testing program is of utmost importance. The test should probably not be administered until such planning is undertaken.

Teachers who will be administering ITPT should read this guidebook and listen to the CD (at least to the beginning) so they will be familiar with the full nature and design of the test and, thus, be able to answer questions and anticipate others that students may ask before the CD is played and the test begun. They should also become familiar with the specific directions to be read to students. (Those directions are boldly printed at the end of this section of the guidebook along with a sample answer sheet. The actual size of the answer sheet is 4 x 11 inches.)

Preliminary Guidelines for Administering the Test

1. Before students enter the room, place the portable CD player so everyone will be able to hear the recording. If a CD deck is used, be sure all control knobs are in proper position and external speakers are connected securely. Turn on the CD player and listen to a short portion of the test to obtain the desired volume and balance of the recording.

2. Place an answer sheet front side up on each desk or temporary writing surface before students enter the room. Otherwise, distribute them after students are seated. (The same answer sheet is used for hand and machine scoring.)

3. If students have not been instructed to bring pencils and erasers, distribute them with the answer sheets. Only black lead pencils should be used to mark the answer sheets. Always have extra pencils and erasers available for students to use in the event of mishaps. Tell students to raise a hand silently if a pencil breaks and you will replace it with another. If answer sheets are to be machine scored, students must use a soft (No. 2) pencil.

4. Ask each student to **print** his or her name and grade, school name, and room number in the proper places on the answer sheet.

5. Although students will see the title of the test on the answer sheet, a detailed explanation and the exact purpose of the test should not be offered before the test is administered. To do so could invalidate test results. However, explain to students that information is being gathered from test results to help their teachers plan and organize music instruction. Stress to students they will not be given a grade on the test. After the test administration has been completed, explain the exact purpose of the test to students, as outlined in Part 5. Positive

attitudes and proper motivation is of utmost importance in obtaining valid test results.

6. Explain to students they must fill in the appropriate box using a heavy mark to answer each question. They may change an answer but must completely erase the previous answer.

7. Be sure students understand the specific directions as you read them. Adapt the speed at which the directions are read as necessary to ensure students experience no difficulty in understanding the directions. Do not reread the directions or parts of the directions. Typically, students will answer their own questions as soon as they begin to hear the recording.

8. When the testing session is completed, collect the answer sheets in an organized manner. Later, put the answer sheets in alphabetical order. Place all test material in the ITPT kit and store it in a safe place for future use. Be sure the CD is carefully returned to the CD case. Turn off the CD player.

Specific Spoken Directions to Students for Taking the Test

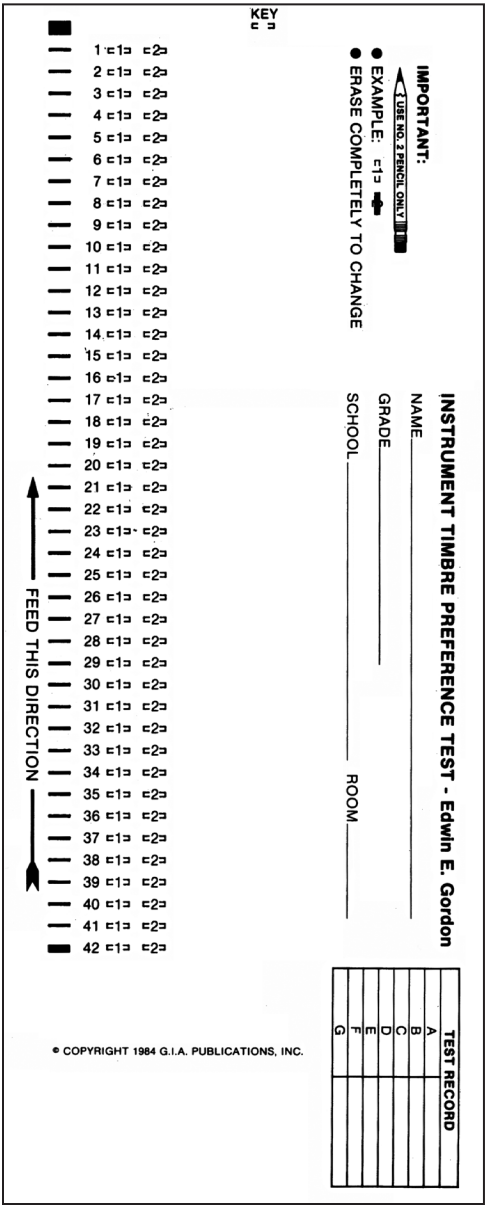
The following directions for taking the test are to be read to students by the teacher before the CD is played:

> **"You will hear the same short melody played twice with a different sound. After you hear the melody played twice, you will be asked to decide whether the melody sounds better the first time or better the second time.**
>
> **Look at your answer sheet. If you the like the way the melody sounds the first time better than the way it sounds the second time, fill in the box with the 1 after the number of the question. If you the like the way the melody sounds the second time better**

than the way it sounds the first time, fill in the box with the 2 after the number of the question. Always make a choice.

You will hear the melody played twice for each of the 42 questions on your answer sheet. The number for each question will be announced before you hear the melody played twice. Be sure to fill in the box after the number you hear announced."

Sample Answer Sheet



Part 4

SCORING THE INSTRUMENT TIMBRE PREFERENCE TEST

Scores Derived from the Test

There are seven raw scores derived from the *Instrument Timbre Preference Test* (ITPT). A raw score is a simple count of the number of times a students indicates a preference for each of the seven timbre/ranges. Percentile ranks, other standard scores, or norms are not necessary for interpreting results on ITPT. The age or grade of students is irrelevant to the interpretation of test scores.

The seven scores are identified as A, B, C, D, E, F, and G. Each score represents a timbre/range as follows:

A	Flute and Violin
B	Clarinet and Viola
C	Saxophone, French Horn, and Viola
D	Oboe, English Horn, and Bassoon
E	Trumpet and Cornet
F	Trombone, Baritone, Euphonium, French Horn, and Cello
G	Tuba, Sousaphone, and String Bass

Preparing Answer Sheets for Machine Scoring Service

Inspect each answer sheet for completeness. Make sure the blanks for name, grade, school, and room have been printed accurately and clearly. Remove all stray marks.

Next check each answer sheet to be certain only one box has been marked for each question. If both boxes are filled for a question and there was no obvious attempt by the student to erase one of them, erase the marks in both boxes so neither mark will be counted in the

scoring process. If an attempt was made by the student to erase one of the two marks, erase the mark completely so it will not be counted mistakenly in the scoring process. If there is a light mark in one of the boxes and no mark for the other for a question, darken the light mark so it will be counted in the scoring process. Do nothing if neither of the two boxes is filled for a question. That question will be omitted in the scoring process.

If not already done, arrange the answer sheets in alphabetical order, separately for each group tested. Package them so they ship flat to be scored. If the answer sheets are not packaged carefully, they will not run through the scoring machine. Complete the scoring order form. Return the scoring order form and answer sheets to your supervisor, principal, superintendent, or other person responsible for sending them to the publisher. Of course, ship them yourself if that was the plan. The name and address of the publisher, which follows, is also on the scoring order form.

GIA Publications Scoring
7404 S. Mason Avenue
Chicago, IL 60638

Scoring Answer Sheets by Hand

ITPT answer sheets must be scored seven times, once for each timbre/range. There are seven scoring masks, each marked with a different letter: A, B, C, D, E, F, or G. A different scoring mask is used each of the seven times an answer sheet is scored. The result is seven scores for each answer sheet.

If you score the answer sheets by hand, be sure you have seven different scoring masks. First check each answer sheet to make certain only one box has been marked for each question. If both boxes are filled for a question and there was no obvious attempt by the student to erase one of them, erase the marks in both boxes so neither mark will be counted in the scoring process. If an attempt was made by the student to erase one of the two marks, erase the mark completely so it will not be counted mistakenly in the scoring process. If there

is a light mark in one of the boxes and no mark for the other for a question, darken the light mark so it will be counted in the scoring process. Do nothing if neither of the two boxes is filled for a question. That question will be omitted in the scoring process.

Stack the answer sheets. Begin with scoring mask A. Count all the black marks that appear through the windows on every answer sheet. Follow the lines between the windows so you will not count any answers more than once. There is a cut-out for the test record box in the lower right corner of the scoring mask. Enter the number of black marks counted (from 0 to 12) after letter A in the test record box on each answer sheet.

After all answer sheets are scored using scoring mask A, score all answer sheets using scoring mask B, following the same procedure used with scoring mask A. Now enter the number of black marks counted on each answer sheet after the letter B. Follow the same procedure using scoring masks C, D, E, F, and G.

After all seven scores have been entered on each answer sheet, add the seven scores on each answer sheet. The total should be 42, minus any marks for questions a student may not have answered. Though a score may be lower than 42, it should never be higher than 42. If a score is higher than 42, rescore the answer sheet, using all seven scoring masks if necessary, until the error or errors are discovered and the correct numbers are entered in the test record box.

Documenting Test Results on the Class Record Sheet

For purposes of record keeping, transfer the scores from each answer sheet to the Class Record Sheet. (A reduced Class Record Sheet is shown on the next page.) The numbers will be in the same place in the test record box in the lower right corner of each answer sheet whether the answer sheets were machine or hand scored.

There is space for the names of fifty students on each Class Record Sheet. Use a separate Class Record Sheet for each group of students who took the test. After the information at the top of the Class Record Sheet has been completed, print the name of each student in a group in the space provided on the sheet. Then enter

each student's scores after his or her name using a dark pencil or pen under the appropriate letters on the class record sheet. After all scores have been documented, use a colored pen or pencil to underline or highlight scores of 10, 11, and 12 under letters A, B, C, and D, and scores of 9, 10, 11, and 12 under letters E, F, and G. Finally, use a pen or pencil of another color to underline or highlight scores of 2, 1, or 0 under all letters.

Sample Class Record Sheet

INSTRUMENT TIMBRE REFERENCE TEST

Edwin E. Gordon

CLASS RECORD SHEET

School _____ **Grade** _____ **Room** _____

Name of Student	A	B	C	D	E	F	G
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
19.							
20.							
21.							
22.							
23.							
24.							
25.							

Name of Student	A	B	C	D	E	F	G
26.							
27.							
28.							
29.							
30.							
31.							
32.							
33.							
34.							
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45.							
46.							
47.							
48.							
49.							
50.							

Part 5

INTERPRETATION OF RESULTS ON THE INSTRUMENT TIMBRE PREFERENCE TEST

The *Instrument Timbre Preference Test* (ITPT) is designed to act as an objective aid to use with teachers' and parents' subjective judgment in assisting a student in choosing an appropriate woodwind, brass, or string instrument to learn to play in beginning instrumental music class, band, and orchestra. Results of ITPT must never be used to deprive any student of music instruction. All students, whether or not they have a verified timbre/range preference, and whether or not their music aptitude test scores are impressive, should be given instruction and opportunities in music that best suit their individual musical and personal needs.

Identifying Students' Instrument Timbre/Range Preferences

The names of students who received a score of 10 or higher under each of columns A, B, C, and D (as underlined on the Class Record Sheet) should be written on a separate paper. Next, the names of students who received a score of 9 or higher under each of columns E, F, and G (as underlined on the Class Record Sheet) should be written on a separate paper. A score of 10 or higher under columns A, B, C, and D indicates the following timbre/range preferences:

A Flute and Violin
B Clarinet and Viola
C Saxophone, French Horn, and Viola
D Oboe, English Horn, and Bassoon

A score of 9 or higher under columns E, F, and G indicates the following timbre/range preferences:

E Trumpet and Cornet
F Trombone, Baritone, Euphonium, French Horn, and Cello
G Tuba, Sousaphone, and String Bass

When students learn to play a musical instrument in accord with their timbre/range preferences, research results suggest they will attain higher levels of music achievement and be inclined to sustain their interest in instrumental music (that is, relatively few will drop out) when compared to students who learn to play instruments not in accord with their timbre/range preferences or who have no preference whatsoever. Thus as outlined above, students with scores of 10 or higher for the A category should be encouraged to play flute or violin. Students with scores of 10 or higher for the B category should be encouraged to play clarinet or viola. Students with scores of 10 or higher for the C category should be encouraged to play saxophone, French horn, or viola. Students with scores of 10 or higher for the D category should be encouraged to play oboe, English horn, or bassoon.

Students with scores of 9 or higher for the E category should be encouraged to play trumpet or cornet. Students with scores of 9 or higher for the F category should be encouraged to play trombone, baritone, euphonium, French horn, or cello. Students with scores of 9 or higher for the G category should be encouraged to play tuba, Sousaphone, or string bass.

If a student has more than one timbre/range preference, it is plausible he or she might learn to play one of the instruments better than another associated with his or her timbre/range preference. If, however, in the teacher's judgment a student is not achieving commensurate with his or her potential, a switch of instruments should not be made hastily. In the case of multiple preferences, until further research is completed, the instrument a student should be encouraged to learn can be only an arbitrary choice. A student's physical characteristics should not be a decisive factor in making that decision. Only in extreme cases will a student's ability to learn to play an instrument depend on physical attributes. It is recommended if a student demonstrates timbre/range preferences for both categories C and F, French horn should be the choice. In the case of preferences

for both categories B and C, viola should take precedence. A student should never be forced—only encouraged—to learn to play an instrument suggested by his or her timbre/range preference.

Students with or without a timbre/range preference are best encouraged to learn a woodwind, brass, or string instrument even though they may wish to learn only a percussion instrument. They may study a percussion instrument at the same time they are studying a woodwind, brass, or string instrument, or they may learn to play a percussion instrument after they have received fundamental instruction on a woodwind, brass, or string instrument. It would be most beneficial for their audiation development if the initial percussion instrument for study were a mallet instrument, such as xylophone or vibraphone. Specifically, students without a timbre/range preference who wish to study a percussion instrument might be encouraged to study a keyboard instrument in addition to a percussion instrument.

Students who score high on a valid music aptitude test who learn to play musical instruments associated with their timbre/range preference attain higher levels of music achievement than students who score low on a valid music aptitude test who learn to play music instruments associated with their timbre/range preference. Thus, the *Musical Aptitude Profile* (MAP) or the *Intermediate Measures of Music Audiation* (IMMA) should be administered to all students in conjunction with ITPT. Hence, students who will profit most from and contribute to music activities in the school may be identified objectively. Students who obtain a composite score at the 80th percentile and higher on either of the two music aptitude tests have exceptional musical potential. However, students with composite scores below the 80th percentile should never be denied the opportunity to study a musical instrument or participate in any other manner in school music activities regardless of whether or not they have demonstrated a timbre/range preference.

MAP may be administered to students in fourth through twelfth grades, and IMMA may be administered to students in first through fourth grades. IMMA is a shorter test than MAP. If IMMA is administered to fourth grade students simply to identify and encourage high-scoring students to learn to play an instrument, then

it is recommended the more comprehensive MAP be administered to students after they have begun instrumental music study.

A student who receives a score of 2 or lower on the test for a timbre/range preference should be discouraged from learning to play an instrument associated with that timbre/range preference. Equally important to encouraging students to learn to play an instrument with a preferred timbre/range is discouraging them to learn to play an instrument for which they have a timbre/range dislike. That being said, however, if students insist on playing an instrument inappropriate for their timbre/range preference, there is little alternative but to ultimately permit them to do so.

Test results have shown approximately four or five students in a group of approximately 25 who take the ITPT can be expected to have more than one timbre/range preference or more than one timbre/range preference dislike. Furthermore, it has been found in repeated administrations of ITPT that more students prefer timbre/ranges in categories A, B, C, and D than in categories E, F, and G. That is necessarily a disadvantage considering proportional instrumentation of music ensembles.

After test results have been documented, explain the exact purpose of the test and their scores on the test to students who have timbre/range preferences. Students may be told individually or in a group which instrument you recommend they learn to play, and then you should encourage them to elect and enroll in an appropriate music class or ensemble. Also send a follow-up letter or call parents to inform them of their child's test results. Be sure to emphasize the benefits and importance of instrumental music instruction. Seek assistance from parents in guiding their child to learn to play a musical instrument on which he or she should experience the greatest success and garner most satisfaction. If music aptitude test results are available, they may also be related to parents whose children scored exceptionally high. However, because of possible misunderstanding and/or competitive mindsets, it would not be prudent to report actual music aptitude scores without professional forethought. That information should remain confidential and used solely for purposes of improving instruction.

Although students can learn to play an instrument regardless of which method of music instruction is used, it is recommended they be taught in accordance with research underlying audiation and music learning theory. *Jump Right In: The Instrumental Series*, also published by GIA, most closely embraces research in audiation and music learning theory. In that series, students learn sequentially to play an instrument first through aural understanding in contrast to the typical visual (note reading) methodology. As a result, students learn from the beginning to produce good tone quality and improvise with musicianship. Music reading is not ignored but, rather, is introduced after students are able to audiate what is seen in music notation.

With continued research and use of ITPT, refinements to and additional ways for using the test should become available. The following intriguing, though less compelling, questions might also be answered in time:

1. Does a score of 12 for a timbre/range indicate a significantly greater preference for that timbre/range than a score of 10 or 11 for categories A, B, C, and D or a score of 9, 10, or 11 for categories E, F, and G?

2. Does a score of 0 for a timbre/range indicate a significantly greater dislike for that timber/range than a score of 1 or 2?

3. Which musical instrument is most appropriate for a student to learn to play who has multiple timbre/range preferences?

4. Does a student's dislike of one timbre/range have any effect on or relationship to success in learning the instrument for which he or she has a timbre/range preference?

5. What other instruments, such as guitar, might be associated with specific timbre/range preferences?

The publisher and author would be grateful for insights pertaining to these and related questions.

Part 6

TECHNICAL CHARACTERISTICS OF THE INSTRUMENT TIMBRE PREFERENCE TEST

Means, Standard Deviations, Reliabilities, and Stability of Scores

Because it was not possible to design the *Instrument Timbre Preference Test* (ITPT) so it would yield a composite (total) score, its overall reliability in terms of internal consistency (either split-halves or odds-evens) could not be investigated. The reason is because each of the 12 times one of the timbre/ranges is heard on the test, it is paired with one of the other six timbre/ranges. Also, six times it is heard first in the pair and six times it is heard second in the pair. The 12 questions that include the same timbre/range could have been divided into test halves of six questions each. However, in that case, the paired test halves would lack homogeneity of content because of inconsistency of order, sequence, and variable timbre/range combinations. Thus, calculation of the coefficient of stability (test–retest) seemed to be the only reasonable solution. Reliability was established separately for each of the seven timbre/ranges constituting ITPT.

Test and retest means, standard deviations, and reliability coefficients for each of the seven timbre/ranges are reported in Table 1. Mean 1 and SD 1 are for the first administration of the test, and Mean 2 and SD 2 are for the second administration of the test. The two administrations were one week apart. The data are based upon results of students in three schools in the Philadelphia, Pennsylvania area, separately for students in third through eighth grades. Shawmont is an inner-city music magnet school, Neshaminy a suburban school, and Drexel Hill a private parochial school.

High reliabilities are suggested by the close correspondence between the means and standard deviations for the two administrations

of the test. Considering there are only 12 questions for each timbre, the actual reliabilities are surprisingly high. Students sustain their timbre/range preferences rather consistently from week to week. Moreover, it did not always seem necessary for some students to hear the second timbre/range in a pair before they made a decisive preference. In no case did a student demonstrate a timbre/range preference on the first administration of the test and a dislike of that same timbre/range on the second administration of the test, and vice versa. It is interesting to note, with few exceptions, the mean for timbre/range preference in categories E, F, and G are lower than the mean for timbre/range preference in categories A, B, C, and D. Students in all schools and grades have timbre/range preferences characteristic of woodwinds and the higher string instruments than for other instruments.

Table 1

Means, Standard Deviations, and Test-Retest Reliabilities for the Instrument Timbre Preference Test

	Categories						
	A	B	C	D	E	F	G
Shawmont							
Grade 4							
N=64							
Mean 1	5.0	5.8	5.8	6.8	5.9	6.1	5.1
SD 1	3.8	2.3	3.1	3.6	3.0	2.4	4.3
Mean 2	4.7	6.1	6.0	6.3	5.4	6.1	5.5
SD 2	2.9	2.4	2.9	3.4	2.7	2.4	3.9
r	.65	.78	.75	.89	.65	.73	.87

Table 1 (cont.)

	Categories						
	A	B	C	D	E	F	G
Shawmont							
Grade 5							
N=62							
Mean 1	6.0	6.6	6.9	5.7	5.7	6.0	4.8
SD 1	5.6	2.4	2.8	3.1	2.6	2.4	3.4
Mean 2	5.5	6.3	6.4	6.2	6.2	6.2	4.7
SD 2	5.1	2.4	2.9	3.2	2.7	2.3	4.0
r	.69	.70	.79	.70	.60	.55	.82
Shawmont							
Grade 6							
N=59							
Mean 1	4.8	7.1	5.7	8.2	5.7	5.5	4.4
SD 1	3.3	2.2	2.3	2.9	2.4	2.3	3.2
Mean 2	4.5	6.8	6.2	8.0	5.9	5.6	4.7
SD 2	3.5	2.3	2.4	3.0	2.3	2.5	3.4
r	.78	.71	.70	.81	.68	.63	.86
Neshaminy							
Grade 3							
N=19							
Mean 1	5.6	5.2	5.5	6.4	6.3	5.7	5.5
SD 1	3.9	2.3	3.4	3.1	2.7	2.7	3.8
Mean 2	5.5	5.7	5.0	6.6	5.9	5.9	5.5
SD 2	3.9	2.8	2.8	3.3	3.0	2.5	4.0
r	.87	.88	.77	.62	.80	.74	.82
Neshaminy							
Grade 4							
N=26							
Mean 1	5.0	5.8	5.8	6.8	5.9	6.1	5.1
SD 1	3.8	2.3	3.1	3.6	3.0	2.4	4.3
Mean 2	4.7	6.1	6.0	6.3	5.4	6.1	5.5
SD 2	2.9	2.4	2.9	3.4	2.7	2.4	3.9
r	.65	.78	.75	.89	.65	.73	.87

Table 1 (cont.)

	Categories						
	A	B	C	D	E	F	G
Neshaminy							
Grade 5							
N=40							
Mean 1	6.0	6.6	6.9	5.7	5.7	6.0	4.8
SD 1	5.6	2.4	2.8	3.1	2.6	2.4	3.4
Mean 2	5.5	6.3	6.4	6.2	6.2	6.2	4.7
SD 2	5.1	2.4	2.9	3.2	2.7	2.3	4.0
r	.69	.70	.79	.70	.60	.55	.82
Neshaminy							
Grade 6							
N=102							
Mean 1	4.8	7.1	5.7	8.2	5.7	5.5	4.4
SD 1	3.3	2.2	2.3	2.9	2.4	2.3	3.2
Mean 2	4.5	6.8	6.2	8.0	5.9	5.6	4.7
SD 2	3.5	2.3	2.4	3.0	2.3	2.5	3.4
r	.78	.71	.70	.81	.68	.63	.86
Neshaminy							
Grade 7							
N=117							
Mean 1	4.4	6.7	6.4	7.7	5.7	5.6	5.0
SD 1	3.1	2.2	2.6	3.1	2.4	2.2	2.9
Mean 2	3.9	6.5	6.3	7.3	6.2	6.0	5.4
SD 2	3.2	2.2	2.4	3.2	2.6	2.4	3.1
r	.77	.60	.73	.86	.83	.72	.76
Neshaminy							
Grade 8							
N=120							
Mean 1	4.2	6.3	6.36	7.0	6.5	6.6	4.6
SD 1	3.2	2.1	2.8	2.7	2.5	2.5	3.2
Mean 2	4.1	6.3	5.9	7.3	6.8	6.6	4.6
SD 2	3.2	2.1	2.4	2.8	2.6	2.5	2.8
r	.82	.68	.76	.72	.77	.79	.86

Table 1 (cont.)

	Categories						
	A	B	C	D	E	F	G
Drexel Hill							
Grade 5							
N=19							
Mean 1	6.0	7.0	5.8	7.4	4.9	4.8	3.1
SD 1	5.3	2.5	3.5	2.9	2.2	2.9	2.8
Mean 2	6.1	6.5	5.5	7.1	4.6	5.1	3.0
SD 2	5.6	2.8	3.5	2.5	2.4	3.0	3.2
r	.89	.70	.88	.74	.70	.74	.85
Drexel Hill							
Grade 6							
N=14							
Mean 1	5.3	7.7	7.3	5.5	3.9	5.1	4.4
SD 1	3.4	2.9	3.7	3.5	2.9	2.5	3.3
Mean 2	4.8	7.2	6.9	6.0	4.3	5.6	4.5
SD 2	3.6	2.7	3.7	3.1	3.4	2.9	2.8
r	.75	.88	.93	.51	.89	.65	.62

Item Intercorrelations

Item (test question) intercorrelations based on test results of all 305 students in third through eighth grades in the three schools were examined. Recall, the seven timbre/ranges are arranged in random order throughout the test. The two responses in items with pairs of timbre/ranges that are reversals of each other were correlated. For example, in question 1, the first timbre/range heard is associated with trumpet and cornet, and the second timbre/range is associated with clarinet. In question 22, the first timbre/range heard is associated with clarinet, and the second/timbre range is associated with trumpet and cornet. Students' responses to those two questions were correlated, as were all other 21 pairs of questions that are reversals of each other. If students prefer, as would be expected, the first timbre/range in one question and the second timbre/range in the reversed question, the intercorrelation coefficient between the two questions should

be negative. All 21 intercorrelation coefficients were negative, ranging from –.12 to –.38. A complete report of the intercorrelation coefficients is presented in Table 2.

Table 2

Intercorrelations Between Reversed Test Questions on the Instrument Timbre Preference Test

Question Number	Intercorrelation
1 and 22	–.12
2 and 21	–.31
3 and 26	–.25
4 and 7	–.31
5 and 29	–.28
6 and 30	–.30
8 and 40	–.23
9 and 11	–.33
10 and 28	–.21
12 and 27	–.20
13 and 37	–.12
14 and 38	–.33
15 and 34	–.13
16 and 36	–.25
17 and 31	–.13
18 and 32	–.19
19 and 42	–.37
20 and 23	–.33
24 and 33	–.31
25 and 39	–.26
35 and 41	–.38

Preliminary Validity

In prepublication research, one group of 50 music professors, music supervisors, and school music teachers and another group of 136 members of a university band were asked to associate a musical instrument or instruments with each of the seven timbre/ranges that were intended to constitute ITPT. They listened to a special three-minute recording on which the seven timbre/ranges were heard successively. The recording was played a second time with longer pauses between hearings of the timbre/ranges. Listeners were then asked to fill in the blank under the number of each timbre/range category on a prepared form the name of the instrument or instruments, excluding the synthesizer, they believed was associated with each sound. The form also contained names of woodwind, brass, string, percussion, and keyboard instruments to serve as suggestions. Most of the members of each group associated each synthesized timbre/range with more than one actual musical instrument. At least one actual instrument the author and collaborating technician, who specially constructed the synthesizer for development of ITPT, had previously associated with each of the timbre/ranges was associated with the same timbre by the majority of listeners in both groups.

Longitudinal Predictive Validity

Several longitudinal predictive validity studies of ITPT have been conducted over the years. The design and results of each are described in chronological order in this section of the guidebook. The first study, which is explained in detail, was undertaken in all five elementary schools in the Rush-Henrietta Central School District in New York state. The remaining studies, highly similar in design and analysis, are summarized with the most important details emphasized. Comprehensive reports of the abridged reports of the additional studies may be read in professional journals and monographs listed in relevant footnotes and the Bibliography at the back of this guidebook.

Rush-Henrietta Study: Year One

With the donation of 46 musical instruments by the National Association of Band Instrument Manufacturers (NABIM), an objectively designed two-year longitudinal predictive validity study of ITPT became feasible. Included in the grant were 9 flutes, 9 clarinets, 5 saxophones, 2 oboes, 7 cornets, 5 trumpets, 3 trombones, 2 baritones, 2 French horns, and 2 tubas.

Of the 346 students in fifth grade in the Rush-Henrietta Central School District (NY), 134 elected to study a music instrument. Before the study had been designed, and thus before ITPT was administered, each of the students had decided at the completion of fourth grade which instrument he or she wished to study. Of the 134, 23 students chose instruments that agreed with their ITPT results. That number is 4 more than the 19 who should be expected by chance to select instruments to study that agree with their results on the ITPT.

The 111 students who had chosen to study instruments that did not agree with their ITPT scores were told that if they would study an instrument for which they had a timbre/range preference, then those instruments would be assigned to them without rental, repair, or insurance charges. Not one of the students accepted the proposal. Thus, the only way to pursue the study was to approach students in fifth grade who had not enrolled in beginning instrumental music instruction at the completion of fourth grade and interest them in studying a musical instrument. Letters and personal contacts were made with those 178 students and their parents, and the proposal was explained to parents. It was also explained that their children would be allowed to resign from instrumental music instruction at any time for any reason. The students had to make no commitments except to attend all group lessons and to practice. Of the 178 fifth grade students, 34 from the five elementary schools accepted the proposal and were given NABIM instruments.

The design of the study incorporated three experimental groups and one control group. Experimental group 1 (N=34) included students who were learning to play NABIM instruments as suggested by their ITPT scores. Experimental group 2 (N=23) included students who were learning to play their own instruments as suggested by their

ITPT scores. Experimental group 3 (N=111) included students who were learning to play their own instruments that were not suggested by their ITPT scores. The control group (N=165) included all students in fifth grade who had not elected to enroll in beginning instrumental music instruction. Thirteen of the 165 students left the school district by the end of the year.

In addition to ITPT, the *Musical Aptitude Profile* (MAP) was administered to all students in fifth grade. Also, the students' *Otis-Lennon Intelligence Test* scores were made available, with the promise to keep them confidential, for purposes of the study. Means and standard deviations for the three tests for each of the three experimental groups, the control group, and all groups combined are presented in Tables 3 through 7. In addition to the seven categories for the seven ITPT scores, means and standard deviations are reported for students with overall category preferences and overall category non-preferences in Tables 3 through 7.

Means and standard deviations for preferences and non-preferences were derived in the following manner: A student was considered to have a preference for a timbre/range if he or she chose that timbre/range at least ten times for categories A, B, C, and D, and at least nine times for categories E, F, and G. A student was considered not to have a preference for a timbre/range if he or she chose it no more than two of the 12 times. For the preference score, if a student demonstrated a preference for one or more of the seven timbre/ranges, a score of 2 was awarded. If a student demonstrated a non-preference for one or more of the seven timbre/ranges, a score of 1 was awarded. Overall preference means and standard deviations are not presented in Tables 3 and 4 because every student in those groups had a timbre/range preference. For the overall non-preference score, if a student demonstrated a dislike for one or more of the seven timbre/ranges, a score of 2 was awarded. If a student did not demonstrate a dislike for one or more of the seven timbre/ranges, a score of 1 was awarded. Eleven standard scores (seven subtests, three total tests, and the composite test) were computed for MAP. One IQ score was derived for the *Otis-Lennon Intelligence Test*.

Table 3

Means and Standard Deviations for Instrument Timbre Preference Test, Musical Aptitude Profile, and Otis-Lennon Intelligence Test

Experimental Group 1: Non-Volunteers Performing on Appropriate Instruments

N=34	Mean	SD
Instrument Timbre Preference Test		
Category A	6.4	3.68
Category B	7.4	2.49
Category C	6.9	2.81
Category D	6.4	3.33
Category E	5.9	3.20
Category F	4.8	2.51
Category G	4.3	3.06
Overall Preference		
Overall Non-Preference	1.8	.41
Musical Aptitude Profile		
Tonal Imagery–Melody	50.4	9.10
Tonal Imagery–Harmony	50.0	7.87
Total Tonal Test	50.2	7.70
Rhythm Imagery–Tempo	46.4	7.50
Rhythm Imagery–Meter	43.8	8.00
Total Rhythm Test	45.1	6.97
Musical Sensitivity–Phrasing	44.4	8.64
Musical Sensitivity–Balance	45.8	8.53
Musical Sensitivity–Style	46.2	5.90
Total Musical Sensitivity Test	45.6	6.60
Composite	47.2	5.47
Otis-Lennon Intelligence Test		
Total	107.4	12.56

Table 4

Means and Standard Deviations for Instrument Timbre Preference Test, Musical Aptitude Profile, and Otis-Lennon Intelligence Test

Experimental Group 2: Volunteers Performing on Appropriate Instruments

N=23	Mean	SD
Instrument Timbre Preference Test		
Category A	8.3	3.93
Category B	6.7	2.02
Category C	7.2	2.35
Category D	7.7	2.96
Category E	5.8	2.39
Category F	4.1	2.47
Category G	2.3	3.06
Overall Preference		
Overall Non-Preference	1.9	.21
Musical Aptitude Profile		
Tonal Imagery–Melody	47.0	6.61
Tonal Imagery–Harmony	47.7	7.86
Total Tonal Test	47.4	4.86
Rhythm Imagery–Tempo	47.7	4.86
Rhythm Imagery–Meter	50.0	5.52
Total Rhythm Test	48.9	4.19
Musical Sensitivity–Phrasing	49.8	6.97
Musical Sensitivity–Balance	47.3	5.38
Musical Sensitivity–Style	47.3	6.43
Total Musical Sensitivity Test	48.3	3.39
Composite	48.4	3.51
Otis-Lennon Intelligence Test		
Total	114.0	12.17

Table 5

Means and Standard Deviations for Instrument Timbre Preference Test, Musical Aptitude Profile, and Otis-Lennon Intelligence Test

Experimental Group 3: Volunteers Performing on Inappropriate Instruments

N=111	Mean	SD
Instrument Timbre Preference Test		
Category A	6.1	2.95
Category B	7.2	1.95
Category C	7.3	2.26
Category D	7.6	3.04
Category E	5.1	2.31
Category F	4.6	2.22
Category G	4.2	3.41
Overall Preference	1.7	.44
Overall Non-Preference	1.4	.45
Musical Aptitude Profile		
Tonal Imagery–Melody	48.5	9.49
Tonal Imagery–Harmony	46.8	8.28
Total Tonal Test	47.7	7.78
Rhythm Imagery–Tempo	46.2	7.67
Rhythm Imagery–Meter	44.9	8.23
Total Rhythm Test	45.5	7.47
Musical Sensitivity–Phrasing	48.7	9.21
Musical Sensitivity–Balance	46.7	8.39
Musical Sensitivity–Style	46.3	7.77
Total Musical Sensitivity Test	47.3	6.90
Composite	46.7	6.18
Otis-Lennon Intelligence Test		
Total	111.2	11.98

Table 6

Means and Standard Deviations for Instrument Timbre Preference Test, Musical Aptitude Profile, and Otis-Lennon Intelligence Test

Control Group: Non-Participants in Beginning Instrumental Music Instruction

N=165	Mean	SD
Instrument Timbre Preference Test		
Category A	6.5	3.33
Category B	7.0	1.92
Category C	6.9	2.38
Category D	7.6	2.90
Category E	5.0	2.28
Category F	4.8	2.54
Category G	4.1	3.25
Overall Preference	1.7	.46
Overall Non-Preference	1.7	.45
Musical Aptitude Profile		
Tonal Imagery–Melody	47.9	8.18
Tonal Imagery–Harmony	45.7	7.76
Total Tonal Test	46.8	6.82
Rhythm Imagery–Tempo	44.8	8.30
Rhythm Imagery–Meter	44.3	8.67
Total Rhythm Test	44.5	7.88
Musical Sensitivity–Phrasing	46.8	9.81
Musical Sensitivity–Balance	44.9	8.24
Musical Sensitivity–Style	45.9	7.76
Total Musical Sensitivity Test	45.8	7.20
Composite	45.8	6.07
Otis-Lennon Intelligence Test		
Total	110.4	12.97

Table 7

Means and Standard Deviations for Instrument Timbre Preference Test, Musical Aptitude Profile, and Otis-Lennon Intelligence Test

Three Experimental Groups and Control Group Combined

N=333	Mean	SD
Instrument Timbre Preference Test		
Category A	6.5	3.22
Category B	7.1	2.00
Category C	7.1	2.38
Category D	7.5	3.00
Category E	5.2	2.42
Category F	4.7	2.42
Category G	4.0	3.30
Overall Preference	1.8	.42
Overall Non-Preference	1.7	.44
Musical Aptitude Profile		
Tonal Imagery–Melody	48.3	8.64
Tonal Imagery–Harmony	46.7	8.01
Total Tonal Test	47.5	7.23
Rhythm Imagery–Tempo	45.6	7.85
Rhythm Imagery–Meter	44.8	8.37
Total Rhythm Test	45.2	7.49
Musical Sensitivity–Phrasing	47.4	9.40
Musical Sensitivity–Balance	45.8	8.18
Musical Sensitivity–Style	46.2	7.49
Total Musical Sensitivity Test	46.5	6.88
Composite	46.4	5.93
Otis-Lennon Intelligence Test		
Total	110.6	12.57

Although the number of students in each of the three experimental groups and the control group is not the same, scores on ITPT, MAP, and the *Otis-Lennon Intelligence Test* among the groups are generally similar. For not one of the groups did results differ much from those for all groups combined. For ITPT, students in all groups typically preferred the first four timbre/ranges in comparison to the last three. A majority of students demonstrated a preference for one or more timbre/ranges (overall preference) as well as a dislike for one or more timbre/ranges (overall non-preference). As for MAP, it is interesting to note the composite standard score of 46.4 for all groups combined is almost the same as the composite standard score of 46.7 derived in the national standard standardization program of the battery for students in fifth grade. Thus, it may be assumed students who participated in the study are typical of students in fifth grade across the country.

Non-volunteers in experimental group 1 generally scored higher on MAP than did volunteers in experimental group 3, but lower than volunteers in experimental group 2. It is obvious if it were not for this research study that a number of students with high music potential would not have learned to play a musical instrument. Such a waste of human potential was first documented nearly forty years ago. (See Edwin Gordon, *The Psychology of Music Teaching,* Englewood Cliffs: Prentice Hall, 1971, p. 7.) As would be expected, students in the control group, those who did not volunteer to study instrumental music or would not accept a NABIM instrument, generally demonstrated the lowest music aptitude. It is not surprising students in experimental group 1 had lower IQ scores than students in the other two experimental groups and the control group. It has been consistently indicated in research results there is almost a non-existent relationship between music aptitude and intelligence test scores. (See Edwin E. Gordon, *Introduction to Research and the Psychology of Music*, Chicago: GIA, 1998, p. 77.)

Intercorrelations on ITPT for the three experimental groups, the control group, and all groups combined are presented in Table 8. Intercorrelations could not be computed for overall preference in the table for experimental groups 1 and 2 because all students

in those groups had timbre/range preferences. The majority of intercorrelations are moderate to low, both positive and negative, although throughout the groups intercorrelations among the seven timbre/ranges range from –.80 to +.80, the majority being negative. Thus, it is obvious students have specific timbre/range preferences and specific timbre/range dislikes. It would not have been possible for some of the intercorrelations to reach such high magnitudes if categories on ITPT did not possess substantial reliability.

Table 8

Timbre/Range Intercorrelations for Instrument Timbre Preference Test

Abbreviations used in Table 8:
A–G = timbre/range preference categories
OP = overall preference ONP = overall non-preference

Experimental Group 1: Non-Volunteers Performing on Appropriate Instruments

N=34

	A	B	C	D	E	F	G	OP	ONP
A		.04	.00	.38	–.27	–.69	–.80		.17
B	.04		.71	–.28	–.75	–.34	–.16		–.01
C	.00	.71		–.25	–.69	–.37	–.19		–.14
D	.38	–.28	–.25		–.13	–.53	–.53		.17
E	–.27	–.75	–.69	–.13		.48	.26		–.29
F	–.69	–.34	–.37	–.53	.48		.69		–.10
G	–.80	–.16	–.19	–.53	.26	.69			–.12
OP									
ONP	.17	–.01	.14	.17	–.29	–.10	–.12		

Table 8 (cont.)
Experimental Group 2:
Volunteers Performing on Appropriate Instruments

N=23

	A	B	C	D	E	F	G	OP	ONP
A		–.04	–.32	.41	–.16	–.69	–.73		.15
B	–.04		.62	–.10	–.64	–.34	–.22		–.19
C	–.32	.62		–.24	–.65	–.06	.02		–.21
D	.41	–.10	–.24		.05	–.75	–.68		–.03
E	–.16	–.64	–.65	.05		.30	.05		–.48
F	–.69	–.34	–.06	–.75	.30		.83		–.17
G	–.73	–.22	.02	–.68	.05	.83			–.12
OP									
ONP	.15	–.19	.21	.03	–.48	–.17	–.12		

Experimental Group 3:
Volunteers Performing on Inappropriate Instruments

N=111

	A	B	C	D	E	F	G	OP	ONP
A		–.16	.03	.40	–.15	–.67	–.62	.09	.04
B	–.16		.40	–.18	–.39	–.13	–.19	.11	.30
C	.03	.40		–.22	–.64	–.31	–.08	.04	.20
D	.40	–.18	–.22		.07	–.57	–.67	.18	.14
E	–.15	–.39	–.64	.07		.23	–.11	–.13	–.25
F	–.67	–.13	–.31	–.57	.23		.57	–.08	–.13
G	–.62	–.19	–.08	–.67	–.11	.57		–.18	–.21
OP	.09	.11	.04	.18	–.13	–.08	–.18		.44
ONP	.04	.30	.20	.14	–.25	–.13	–.21	.44	

Table 8 (cont.)
Control Group:
Non-Participants in Beginning Instrumental Music Instruction

N=165

	A	B	C	D	E	F	G	OP	ONP
A		.03	–.09	.40	–.07	–.64	–.71	.12	.16
B	.03		.43	–.22	–.47	–.29	–.16	.03	.16
C	–.09	.43		–.12	–.59	–.31	–.09	.04	.18
D	.40	–.22	–.12		–.09	–.51	–.59	.08	.07
E	–.07	–.47	–.59	–.09		.27	–.06	.00	–.09
F	–.64	–.29	–.31	–.51	.27		.52	–.06	–.15
G	–.71	–.16	–.09	–.59	–.06	.52		–.15	–.29
OP	.12	.03	.04	.08	.00	–.06	–.15		.44
ONP	.16	.16	.18	.07	–.09	–.15	–.29	.44	

Three Experimental Groups and Control Group Combined

N=333

	A	B	C	D	E	F	G	OP	ONP
A		–.04	–.06	.39	–.12	–.65	–.69	.11	.14
B	–.06		.47	–.21	–.49	–.25	–.16	.06	.18
C	–.06	.47		–.17	–.62	–.30	–.09	.04	.18
D	.39	–.21	–.17		–.05	–.54	–.61	.08	.10
E	–.12	–.49	–.62	–.05		.28	–.04	–.01	–.16
F	–.65	–.25	–.30	–.54	.28		.57	–.07	–.15
G	–.69	–.16	–.09	–.61	–.04	.57		–.17	–.25
OP	.11	.06	.04	.08	–.01	–.07	–.17		.43
ONP	.14	.18	.18	.10	–.16	–.15	–.25	.43	

Correlations between students' scores on ITPT and MAP for the three experimental groups, the control group, and all groups combined are presented in Table 9.

In general, correlations of the seven timbre/ranges and the overall preference and overall non-preference scores with the music aptitude scores are exceptionally low for all groups—much lower than the intercorrelations among the timbre/ranges themselves. Only a few coefficients are above .30, many are below .10, and the majority

are below .20. The fact that timbre/range preferences are virtually unrelated to music aptitude supports the construct validity of both ITPT and MAP.

Table 9

Correlations Between Scores on Instrument Timbre Preference Test and Musical Aptitude Profile

Abbreviations used for ITPT in Table 9:

A–G = timbre/range preference categories

OP = overall preference ONP = overall non-preference

Abbrevications used for MAP in Table 9:

T1 = Tonal Imagery/Melody T2 = Tonal Imagery/Harmony TT = Tonal Total

R1 = Rhythm Imagery/Tempo R2 = Rhythm Imagery/Meter RT = Rhythm Total

S1 = Musical Sensitivity/Phrasing S2 = Musical Sensitivity/Balance

S3 = Musical Sensitivity/Style ST = Sensitivity Total C = Composite

Experimental Group 1: Non-Volunteers Performing on Appropriate Instruments

N=34

	Instrument Timbre Preference Test								
	A	B	C	D	E	F	G	OP	ONP
Musical Aptitude Profile									
T1	.07	–.02	–.14	–.13	.11	.00	.08		.20
T2	.07	.12	–.07	–.06	.02	.03	–.10		.14
TT	.06	.05	–.12	–.12	.08	.03	.02		.20
R1	.10	.19	.27	–.23	.00	–.11	–.17		.12
R2	.02	.12	.17	–.21	.03	.01	–.10		.10
RT	.08	.17	.23	–.24	.01	–.06	–.15		.12
S1	–.04	.07	.14	–.07	–.01	.02	–.07		.02
S2	.04	.06	.15	–.18	.08	–.15	.00		.15
S3	–.09	–.11	.12	–.10	.24	–.04	.00		.02
ST	–.02	.00	.11	–.14	.12	–.04	–.02		.09
C	.07	.05	.04	–.21	.12	–.03	–.04		.07

Table 9 (cont.)
Experimental Group 2:
Volunteers Performing on Appropriate Instruments

N=23

	Instrument Timbre Preference Test								
	A	B	C	D	E	F	G	OP	ONP
Musical Aptitude Profile									
T1	.15	.11	–.06	–.33	–.15	.08	.15		.26
T2	–.21	–.12	–.15	–.16	–.03	.35	.36		.05
TT	–.06	.00	–.13	–.28	–.11	.26	.32		.19
R1	–.15	–.04	.01	.06	.13	.07	.00		–.33
R2	–.27	.11	–.21	.17	.20	–.02	.13		–.20
RT	–.25	.05	–.11	.16	.19	.00	.07		–.31
S1	–.17	–.14	–.05	–.09	.14	.20	.17		–.16
S2	.06	–.34	–.56	.16	.35	.15	.05		–.15
S3	–.06	–.15	.00	.41	.12	–.12	–.22		–.16
ST	–.10	–.44	–.24	.08	.16	.18	.18		–.16
C	–.13	–.02	–.20	–.05	.04	.15	.22		–.10

Experimental Group 3:
Volunteers Performing on Inappropriate Instruments

N=111

	Instrument Timbre Preference Test								
	A	B	C	D	E	F	G	OP	ONP
Musical Aptitude Profile									
T1	–.06	–.08	–.11	.08	.04	.06	.04	.26	.01
T2	–.07	.06	.02	.07	.02	.09	.03	.15	–.03
TT	–.08	–.01	–.06	.09	.01	.00	.03	.24	.01
R1	.01	–.12	–.02	.19	.02	–.03	–.09	.21	.08
R2	–.02	–.08	–.05	.13	–.04	–.03	.03	.18	.08
RT	–.01	–.11	–.04	.16	–.01	–.02	.02	17	.06
S1	–.06	–.04	.12	.00	.02	–.02	–.02	.17	.16
S2	–.12	.12	.12	.09	–.08	–.03	–.06	.17	.16
S3	–.16	.07	.07	.11	–.09	–.07	.05	.22	.15
ST	–.12	.07	.14	.09	–.06	–.07	–.02	.23	.15
C	–.09	–.02	.00	.13	.00	–.04	.00	.28	.08

Control Group:
Non-Participants in Beginning Instrumental Music Instruction

N=165

	Instrument Timbre Preference Test								
	A	B	C	D	E	F	G	OP	ONP
Musical Aptitude Profile									
T1	–.01	.00	.08	.16	–.08	–.10	–.08	.06	.12
T2	.01	–.02	–.03	.12	–.06	.06	–.07	.14	.10
TT	.00	–.01	.03	.17	–.07	–.02	–.10	.11	.13
R1	.09	–.03	–.02	.12	.02	–.05	–.15	.10	.11
R2	.04	–.05	.06	.09	–.06	–.01	–.09	–.03	.02
RT	.07	–.05	.03	.10	–.03	–.04	–.12	.04	.06
S1	.03	.00	.13	.08	–.04	–.20	–.11	–.09	.10
S2	.05	.04	.04	.08	–.04	–.11	–.12	.02	.05
S3	.05	.10	.13	.16	–.11	–.15	–.18	–.02	.16
ST	.05	.04	.11	.13	–.06	–.18	–.16	–.03	.12
C	.05	–.01	.05	.16	–.05	–.10	–.14	.06	.13

Three Experimental Groups and Control Group Combined

N=333

	Instrument Timbre Preference Test								
	A	B	C	D	E	F	G	OP	ONP
Musical Aptitude Profile									
T1	–.01	–.02	–.02	.06	.00	–.02	.00	.14	.09
T2	–.03	.02	–.02	.05	–.01	.02	–.02	.16	.07
TT	–.02	.00	–.02	.06	.00	.00	–.02	.17	.09
R1	.06	–.03	.02	.09	.03	–.05	–.13	.15	.10
R2	.02	–.04	.03	.08	–.02	–.03	–.06	.07	.06
RT	.04	–.04	.03	.09	.00	–.04	–.10	.12	.09
S1	–.01	–.02	.13	.04	–.01	–.11	–.07	.00	.08
S2	.00	.05	.06	.05	–.01	–.09	–.09	.09	.10
S3	–.03	.05	.10	.13	–.05	–.12	–.06	.08	.14
ST	–.01	.03	.12	.09	.03	–.13	–.09	.07	.13
C	.00	.00	.03	.09	.00	–.07	–.08	.16	.11

For purposes of comparison and further evidence of construct validity of ITPT, correlations among scores on ITPT, MAP, and the *Otis-Lennon Intelligence Test* for the three experimental groups, the control group, and all groups combined are presented in Table 10.

Correlations between ITPT and the *Otis-Lennon Intelligence Test* in general are considerably lower (many being negative) than those between MAP and the *Otis-Lennon Intelligence Test*. Intelligence appears to have little association with preferences and rejections of timbre/ranges. With regard to correlations between scores on MAP and the *Otis-Lennon Intelligence Test,* particularly for all groups combined, they are typical of those reported in the manual for MAP.

Students in the three experimental groups received one 30-minute group instrumental music lesson each week. Each group was composed of students who were studying the same instrument. Students were taught by five "shared teachers," two of whom were assigned to two elementary schools. Each of the other three teachers were shared by one elementary school and one secondary school. Thus, there were two shared teachers in three elementary schools and one shared teacher in two elementary schools. Teachers in all elementary schools taught students in every experimental group. Each class included students from every experimental group, according to the instrument they were being taught. Although teachers were aware students in the class belonged to different experimental groups, they were unaware of which experimental group so, therefore, partiality could not be shown in that regard to students in any experimental group. Moreover, none of the teachers was given MAP scores of students in the class. Thus, individual students could not be objectively singled out as having high, average, or low music aptitude.

One teacher assisted in assigning a student an alternate instrument in experimental group 1 who was believed to have physical characteristics that would prevent him from experiencing success on the instrument initially assigned. The alternate instrument was one for which he demonstrated multiple timbre/range preferences on ITPT. Because extra time had been spent identifying students who would agree to play a NABIM instrument for which they demonstrated a timbre/range preference, students in experimental group 1 began

their instrumental music instruction as much as two months later than students in experimental groups 2 and 3.

Table 10

Correlations Among Instrument Timbre Preference Test, Musical Aptitude Profile, and Otis-Lennon Intelligence Test Scores

Abbreviations used for ITPT in Table 10:

A–G = timbre/range preference categories

OP = overall preference ONP = overall non-preference

Abbreviations used for MAP in Table 10:

T1 = Tonal Imagery/Melody T2 = Tonal Imagery/Harmony TT = Tonal Total

R1 = Rhythm Imagery/Tempo R2 = Rhythm Imagery/Meter RT = Rhythm Total

S1 = Musical Sensitivity/Phrasing S2 = Musical Sensitivity/Balance

S3 = Musical Sensitivity/Style ST = Sensitivity Total C = Composite

Experimental Group 1: Non-Volunteers Performing on Appropriate Instruments

N=34

Instrument Timbre Preference Test and Otis-Lennon Intelligence Test

A	B	C	D	E	F	G	OP	ONP
–.20	–.35	–.12	–.12	.30	.29	.22		.13

Musical Aptitude Profile and Otis-Lennon Intelligence Test

T1	T2	TT	R1	R2	RT	S1	S2	S3	ST	C
.23	.12	.19	.29	.26	.29	.26	.35	.53	.42	.36

Table 10 (cont.)
Experimental Group 2:
Volunteers Performing on Appropriate Instruments

N=23

Instrument Timbre Preference Test and Otis-Lennon Intelligence Test

A	B	C	D	E	F	G	OP	ONP
.26	–.01	–.12	–.13	.06	.01	–.15		–.34

Musical Aptitude Profile and Otis-Lennon Intelligence Test

T1	T2	TT	R1	R2	RT	S1	S2	S3	ST	C
.37	.27	.36	.46	.01	.28	–.07	.01	.15	.15	.43

Experimental Group 3:
Volunteers Performing on Inappropriate Instruments

N=111

Instrument Timbre Preference Test and Otis-Lennon Intelligence Test

A	B	C	D	E	F	G	OP	ONP
.12	.20	.13	–.04	–.21	.07	.04	.06	.21

Musical Aptitude Profile and Otis-Lennon Intelligence Test

T1	T2	TT	R1	R2	RT	S1	S2	S3	ST	C
.27	.27	.32	.46	.32	.41	.35	.38	.44	.49	.47

Control Group:
Non-Participants in Beginning Instrumental Music Instruction

N=165

Instrument Timbre Preference Test and Otis-Lennon Intelligence Test

A	B	C	D	E	F	G	OP	ONP
.06	–.09	–.01	.05	.04	.00	–.08	.15	.16

Musical Aptitude Profile and Otis-Lennon Intelligence Test

T1	T2	TT	R1	R2	RT	S1	S2	S3	ST	C
.30	.19	.29	.29	.31	.33	.21	.23	.21	.25	.35

Table 10 (cont.)
Three Experimental Groups and Control Group Combined

N=333

Instrument Timbre Preference Test and Otis-Lennon Intelligence Test

A	B	C	D	E	F	G	OP	ONP
.00	–.03	.02	.00	.00	.04	–.03	.10	.16

Musical Aptitude Profile and Otis-Lennon Intelligence Test

T1	T2	TT	R1	R2	RT	S1	S2	S3	ST	C
.27	.20	.28	.35	.30	.35	.25	.29	.31	.35	.39

In addition to one group instrumental music lesson each week, students in fifth grade whose progress warranted it participated in sixth grade band in every elementary school. The bands met once each week for 40 minutes. Students who performed on percussion instruments received one group lesson each week. For analytical purposes of the research, however, percussionists were considered as part of the control group.

At the conclusion of the academic school year, every student in the three experimental groups performed by playing three short etudes on his or her instrument. The etudes were composed by the writer in consultation with the teachers. Etude 1 was taught to students by teachers in group instrumental lessons over a period of two months. Students prepared etude 2 with minimal help from teachers. Teachers did answer technical questions about etude 2 pertaining to fingerings, but the etude was not taught formally. Students were given two months to prepare etude 2, and it may be assumed most, if not all, sought some assistance with preparation outside of school. Etude 3 was sight-read. Although the etudes were original and in major and minor tonalities and duple and triple meters, all three included ranges and keyalities with which students were familiar. The etudes were written to be as similar as possible in difficulty for all instruments.

Students' performances were recorded over a period of seven days by the director of music education in the Rush-Henrietta Central School District. Approximately five minutes were spent with each student in a private recording session. The same recording procedure

was followed with each student. The student was asked to look at the etude before he or she performed it, audiate the tonal patterns and rhythm patterns, and then associate fingerings with the notation. Extra time was allowed for this process for the etude to be sight-read. A tempo was not established unless requested by the student. The student was instructed to complete each etude even if errors were made. The director made no comments about the quality of the performance, nor did he offer any technical help or correct any errors. If the student did not bring the notation of etudes 1 and 2 to the session, copies were provided. Etude 1 was recorded first, etude 2 second, and etude 3 last.

Without knowing to which experimental group the student belonged, two judges independently evaluated the students' performances of the three etudes. The tonal, rhythm, tone quality, and expressive facets of each student's performance were assessed. The same rating scale was used for all etudes. It had four dimensions, one for each facet being rated. Each dimension had five points. The tonal, rhythm, and tone quality dimensions were continuous scales (a student could not be given a 2 unless a 1 was achieved, a 3 unless a 2 was achieved, and so on), but the expressive dimension was a simple additive scale. A student could receive as many as 20 points from each judge for each etude, and as many as 60 points from a judge for all three etudes. Thus, a score of 120 from both judges was possible for all three etudes combined.

Of the students in the experimental groups who had begun instruction, 12 of the 34 in experimental group 1, 12 of the 23 in experimental group 2, and 64 of the 111 in experimental group 3 discontinued instruction by the end of the school year. Thus, approximately 65% remained in experimental group 1, 48% in experimental group 2, and 42% in experimental group 3. (It may be more accurate to say only approximately 33% remained in experimental group 3. Although 15 percussion students were considered members of experimental group 3, none discontinued instruction. No percussionist took part in the evaluation process.) The average discontinuance rate of 52%, from 168 to 88, was somewhat less than had been typically experienced yearly in the school district.

It is interesting that only 20% of students in experimental group 1 were members of sixth grade band, whereas 92% of students in experimental group 2 and 83% of students in experimental group 3 were members of sixth grade band.

The initial intent had been to compare performance achievement of students in the three experimental groups. However, because of the unanticipated high dropout rate, which left an unusually small number of students in experimental group 2, it did not seem warranted to treat experimental group 2 statistically as a separate collection of students. Thus, the plan was altered. Because students in experimental groups 1 and 2 were studying instruments for which they demonstrated a timbre/range preference, data from the two groups were combined for purposes of further analysis. The procedure seemed acceptable because the only difference between the two groups, which did not bear on the study, was that non-volunteers in experimental group 1 were using NABIM instruments and volunteers in experimental group 2 were using their own instruments. Thus, in reporting results hereafter, what is referred to as experimental group 1 includes students formerly in experimental groups 1 and 2, and what is referred to as experimental group 2 includes students formerly in experimental group 3.

Means and standard deviations for each of the three etudes and the three etudes combined for experimental groups 1 and 2 are presented in Table 11. (Interjudge reliabilities were .81 for etude 1, .85 for etude 2, .86 for etude 3, and .87 for all etudes combined.) Although it appears the etudes were somewhat difficult for all students, students in experimental group 1 achieved higher performance scores than students in experimental group 2. Specifically, students who were studying instruments for which they demonstrated a timbre/range preference profited more from instruction, were better able to prepare the etude without formal assistance from their teacher, and sight-read more fluently than students who had not indicated a timbre/range preference for the instrument they were learning to play. It is particularly encouraging to note students in experimental group 1 received consistently higher ratings on the tone quality dimension than did students in experimental group 2 for all three etudes. The difference of nine points between the two experimental groups for

all etudes combined is statistically significant. (A value of 2.06 with 78 degrees of freedom is significant at the .05 level.) Importance of timbre/range preference is also shown by the fact students in experimental group 2 who were learning to play an instrument for which they had not indicated a timbre/range preference on ITPT generally received the lowest ratings on all three etudes.

Table 11

Means and Standard Deviations for the Performance Etudes

	Experimental Group 1 N=33		Experimental Group 2 N=47		
	Mean	SD	Mean	SD	Mean Difference
Etude 1	18.2	8.79	15.8	9.60	2.4
Etude 2	16.4	9.97	12.8	9.92	3.6
Etude 3	11.8	7.27	8.8	6.84	3.0
Etudes 1–3	46.4	20.10	37.4	17.13	9.0

MAP composite score predictive validity coefficients for experimental group 1 and experimental groups 1 and 2 combined are presented in Table 12. For students who were playing instruments for which they had a timbre/range preference, those in experimental group 1, success in performing all three etudes combined was predicted by the MAP score with a coefficient of .81. This suggests that after one year of instruction, the reason for more than 65% of student success in instrumental music instruction is a result of both the students' level of music aptitude and the fact that they learned to play an instrument commensurate with a timbre and range they prefer. As can also be seen in Table 12, for students who were playing an instrument for which the majority did not have a timbre/range preference, those in experimental groups 1 and 2 combined, the MAP composite score predicted success in performing all three etudes with a coefficient of .61. Thus, scores on MAP alone accounted for 37% of

the reason students were successful in beginning instrumental music, 28% less than when ITPT and MAP were combined for the purpose of prediction. It is striking in the three-year longitudinal predictive validity study of MAP cited earlier, the composite score for the battery predicted success in beginning instrumental music after one year of instruction with a coefficient of .53, a value not greatly different from the one-year predictive validity coefficient of .61 derived for experimental groups 1 and 2 combined in the present study.

Table 12

One-Year Predictive Validity Coefficients for the Musical Aptitude Profile

	Experimental Group 1 N=33	**Experimental Groups 1 and 2** N=80
Etude 1	.70	.54
Etude 2	.79	.48
Etude 3	62	.50
Etudes 1–3	.81	.61

It is clear from the results of just a one-year study that timbre/range preference plays an important role in a student's success in beginning instrumental music. When scores on ITPT are combined with scores on MAP, success can be predicted with 10% greater accuracy than when music aptitude scores are used alone. Perhaps even more persuasive for teachers, when students learn to play an instrument for which they have a timbre/range preference, they are less inclined to discontinue instruction in instrumental music (i.e., dropout rates are lower). However, a student's high level of music aptitude alone will not completely compensate for limitations a student experiences when learning to play an instrument for which he or she does not have a timbre/range preference, nor will learning to play a music instrument for which he or she does have a timbre/range preference compensate for an unimpressive level of music aptitude.

As an addendum to the study, a questionnaire was given to students in the originally designated experimental groups 2 and 3. They were asked why they chose to learn the instrument they were playing. Students in experimental group 1 were not queried because it seemed clear that the reason they chose their instrument of study, for the most part, was related to timbre/range preference. Eighteen students in experimental group 2 and 78 students in experimental group 3 responded to the questionnaire. The number of "yes" and "no" responses to each question is shown in Table 13.

Table 13

Summary of Responses to the Questionnaire

		Experimental Group 2		Experimental Group 3	
		Yes	No	Yes	No
I chose the instrument I am learning to play because					
1.	my parents wanted me to choose it.	1	15	26	52
2.	my teacher wanted me to choose it.	0	16	9	69
3.	my parents did not want to buy or rent one.	3	13	20	58
4.	one of my parents plays it.	0	16	6	72
5.	one of my friends plays it.	3	13	30	48
6.	one of my sisters or brothers plays it.	5	11	5	73
7.	I like the sound of it.	16	0	76	2
8.	I like the way it looks.	13	3	52	26
9.	a famous person plays it.	1	15	24	54
10.	it is easy to get into a car or bus.	3	13	36	42
11.	it is easy to carry.	6	10	34	44
12.	I can take lessons on it outside of school.	4	12	21	57
13.	it is easy to learn to play.	7	9	48	30
14.	no one else wants to play it.	2	14	6	72
15.	I may get into the band if I play it.	6	10	13	65
16.	I may use a school instrument.	1	15	13	65

Oddly, all but two students in both groups indicated they chose the instrument because they liked the sound of it. Perhaps that partiality was acquired after playing the instrument for awhile. Nonetheless, timbre surely was not foremost in the thinking of students in experimental group 2. They were also influenced by appearance of the instrument, ease in transporting it, what was thought to be a lack of difficulty in learning to play it, and that by playing it they might become a member of the band. Students in experimental group 3 were influenced in their choices by parents and friends, admiration of famous persons, and by not needing to rent or buy the instrument. The need to administer ITPT along with a valid music aptitude test appears to be compelling.

It may be of final interest to note in casual conversation with students who chose to discontinue instrumental music study, the most often stated reason was because the driver would not allow it on the school bus.

Rush-Henrietta Study: Year Two

The complete design and results of the second year of the study are reported separately in a professional journal.[10] The data are summarized herein.

Of the 33 students in experimental group 1 who completed one year of instrumental music instruction, 22 (68%) continued to participate in the study throughout the second year. In comparison, 28 (59%) of the 47 students in experimental group 2 who completed one year of instrumental music instruction continued participation in the study for both years.

As indicated in the first-year report, the three validity criteria etudes were found to be somewhat difficult for all students. Therefore, it seemed reasonable to use the same etudes as validity criteria the second year. Of course, the sight-reading etude was not actually unfamiliar to students. However, it is doubtful students remembered its specific

10 Edwin E. Gordon, "Final Results of a Two-Year Longitudinal Predictive Validity Study of the Instrument Timbre Preference Test and the Musical Aptitude Profile," *Council for Research in Music Education,* 89 (1986), pp. 8–17.

content after one year. It should be noted, however, instrumental performance of students in both groups advanced commendably.

Pertinent results derived from the second year of the study are presented in Table 14. Again, students in experimental group 1 attained higher achievement levels of instrumental performance than did students in experimental group 2. The mean difference of more than 10 points between the groups for the three etudes combined is significant at the .05 level. That is not surprising given the interjudge reliabilities of .95 for etude 1, .95 for etude 2, .95 for etude 3, and .96 for the three etudes combined.

Table 14

Second-Year Means and Standard Deviations for the Three Performance Etudes Combined

Experimental Group 1 N=22		Experimental Group 2 N=28		
Mean	SD	Mean	SD	Mean Difference
62.9	16.92	52.3	20.45	10.6

MAP composite score longitudinal predictive validity coefficients for the three etudes combined for experimental group 1 and for experimental group 2 are reported in Table 15. Predictive coefficients for experimental group 1, which included only students who were playing instruments for which they have a timbre/range preference, increased from .81 to .85. Accuracy in predicting success in beginning instrumental music instruction for students in experimental group 1 increased from 65% after one year of instruction to 72% after two years of instruction. This is attributable to a combination of music aptitude and favorable conditions that allows students to learn to play an instrument for which they have a timbre/range preference. Comparatively, accuracy in predicting success in beginning instrumental music instruction for students in experimental group 2, which included students who were and were not playing

instruments for which they have a timbre/range preference, increased from 37% (a coefficient of .61) after one year of instruction to 47% (a coefficient of .69) after two years of instruction. Again, as evidenced by first-year results, it is relevant that in the three-year longitudinal predictive validity study of MAP cited earlier, the composite score for the battery predicted success in beginning instrumental music after two years of instruction with a coefficient of .70, almost exactly the same as the two-year predictive validity coefficient of .69 derived for experimental group 2 in the present study.

In the same three-year study of MAP, longitudinal predictive validity was found to be .75. The predictive validity of MAP in combination with ITPT after only two years in the present study, however, is .85 for experimental group 1. That all students in experimental group 1 were playing instruments for which they have a timbre/range preference would seem largely responsible for the 16% increase evidenced in the accuracy of the predictive coefficient in even a shorter period of time.

Table 15

Second-Year Predictive Validity Coefficients for the Musical Aptitude Profile

	Experimental Group 1	Experimental Groups 1 and 2
	N=22	N=28
Etudes 1–3	.85	.69

Guilderland Study

The design of the Guilderland study[11] is essentially the same as years 1 and 2 of the Rush-Henrietta studies. Thus, it is not described again. There is, however, one difference: content and number of etudes used as validity criteria were dissimilar.

11 Edwin E. Gordon, *Predictive Validity Studies of IMMA and ITPT,* GIA Monograph Series, (Chicago: GIA, 1989), pp. 1–28.

The most important data derived from this study are the longitudinal predictive validity coefficients. They are given singular attention, and only for students who were playing NABIM instruments. Comparable data for students who were not using NABIM instruments were not collected because of a lack of motivation by these students to perform criterion etudes. To examine secondary information, such as semester and yearly means, standard deviations, intercorrelations, and judge reliabilities in tabular form for each study, the extensive monograph report, cited in the footnote, may be read.

ITPT and IMMA were administered to all 292 students in fourth grade attending the three elementary schools in Guilderland, New York. Of the 292 students, 181 elected to study a musical instrument in fifth grade when beginning instrumental music lessons were traditionally initiated. Only 30 accepted the offer of a NABIM instrument.

By the end of the first semester of the first year of instruction, 2 students (6%) of the 30 discontinued instruction. At the end of the second semester of the first year of instruction, 9 more students (32%) decided to no longer participate in beginning instrumental music lessons. Thus, 19 students participated in the evaluation procedure after one year of instruction. At the end of the first semester, students performed two etudes. Etude 1 was taught in regularly scheduled classes, and etude 2 was prepared without teacher assistance. Students were rated on tonal and rhythm achievement. At the end of the second semester and the following year, students performed three etudes. The third etude was sight-read, and this time, judges also rated the students' musical expression. Unlike the Rush-Henrietta study, the etudes students performed were composed to be progressively more complex each semester. First-year first and second semester predictive validity coefficients for the 19 students (63% of the original group) are outlined in Tables 16 and 17.

Table 16

First-Year First-Semester Predictive Validity Coefficients

	Etude 1	Etude 2	Etudes 1 and 2
Tonal	.69	.32	.58
Rhythm	.34	.22	.30
Composite	.50	.28	.48

Table 17

First-Year Second-Semester Predictive Validity Coefficients

	Etude 1	Etude 2	Etude 3	Etudes 1–3
Tonal	.55	.54	.43	.58
Rhythm	.41	.43	.46	.50
Composite	.58	.56	.50	.60

One more student in the group (now all in sixth grade) did not complete instrumental music instruction by the end of the first semester of the second year, leaving 57% of the group who initially enrolled in beginning instrumental music instruction. Thereafter, upon completion of the second semester of the second year, no more students discontinued instruction. Comparatively, of the 151 students who declined use of NABIM instruments, only a small number learning to play an instrument for which they had a timbre/range preference, only 26 (17%) remained in the program after two years of instrumental music instruction. Second-year first- and second-semester predictive validity coefficients for the 19 students who were using NABIM instruments are reported in Tables 18 and 19. The second-year second-semester predictive validity coefficient for the composite of the two etudes (.80) reported in Table 19, though somewhat lower, parallels that found in the second-year results (.85) in the Rush-Henrietta study for the three etudes combined.

Table 18

Second-Year First-Semester Predictive Validity Coefficients

	Etude 1	Etude 2	Etude 3	Etudes 1–3
Tonal	.42	.56	.59	.61
Rhythm	.23	.36	.66	.50
Composite	.40	.57	.80	.68

Table 19

Second-Year Second-Semester Predictive Validity Coefficients

	Etude 1	Etude 2	Etude 3	Etudes 1–3
Tonal	.54	.59	.56	.75
Rhythm	.43	.62	.65	.73
Composite	.60	.76	.78	.80

A summary of the results reported in the relevant monograph, in which all facets of the study are detailed, are outlined below:

1. Students' timbre/range preferences are not only reliable and thus valid, but they also remain relatively consistent over a period of time.

2. Students with higher levels of music aptitude tend to have more timbre/range preferences than do students with lower levels of music aptitude.

3. Student success in instrumental music instruction can be predicted with a high degree of accuracy when ITPT is used in combination with a valid music aptitude test.

4. Students who learn to play a musical instrument for which they have a timbre/range preference attain significantly higher levels of achievement than do students who learn to play an instrument for which they do not have a timbre/range preference.

5. Students who learn to play an instrument for which they have a timbre/range preference are more likely to continue music instruction than students who learn to play an instrument for which they do not have a timbre/range preference.

North Babylon Study

Because results of the Guilderland study support those found in the Rush-Henrietta study, each set cross validating the other, it was decided to design the North Babylon predictive study[12] differently from the first two studies. Thus, supplementary valuable information pertaining to ITPT and its relationship to music aptitude could be garnered. The study took place in the North Babylon Union Free School District in North Babylon, New York.

ITPT and IMMA were administered to all 258 fourth grade students enrolled in the five elementary schools in the school district. Of the 258 students, 78 elected to begin study of a musical instrument. They participated in at least one group lesson each week. Although teachers had knowledge of students' test scores and encouraged those with higher overall music aptitude to enroll in beginning instrumental music instruction (without discouraging those with lower overall music aptitude from participating in the program), no effort was made to direct students to choose an instrument to study in accordance with their timbre/range preferences. Teachers made students aware of their timbre/range preference scores but not their music aptitude scores. The students were guided in choosing an instrument to study according to customary practices. In the event a student chose to study

12 Edwin E. Gordon, "Continuing Studies of the Characteristics of the Instrument Timbre Preference Test," *The Advanced Measures of Music Audiation and the Instrument Timbre Preference Test: Three Research Studies, GIA Monograph Series* (Chicago: GIA, 1991), pp. 22–44.

an instrument consistent with his or her timbre/range preference but did not have access to one or could not afford to rent or buy one, the student was offered use of a NABIM instrument free of charge.

At the conclusion of two years of instrumental music instruction, 63 of the 78 students remained in the program. Only 10 were playing woodwind or brass instruments for which they had a timbre/range preference, 47 were not, and 6 studied percussion instruments. At this point, the five teachers in the five elementary schools who taught the students were asked to rate independently, on a simple scale of 1 to 5, the tonal, rhythm, and overall musicianship in terms of instrumental performance achievement of the 57 students who were and were not playing woodwind and brass instruments suggested by ITPT. This was accomplished without students performing specific etudes. However, the five teachers did consult as a group and made decisions concerning how the rating scale was to be interpreted. Nonetheless, some subjectivity in the use of the rating scale was to be expected. Certainly, familiarity with students and their test scores created a bias to some degree.

Correlations of pre-instructional IMMA scores with teachers' ratings after two years of instrumental music instruction are described in Table 20. The predictive validity coefficients are what might be expected. When music aptitude scores are used apart from ITPT scores, magnitude of prediction is lower than when the two sets of scores are used together. The correlation of .50 of the IMMA composite score with overall musicianship represents 30% predictive accuracy as compared to 72% predictive accuracy found in the Rush-Henrietta study when all students were playing instruments for which they had a timbre/range preference.

Table 20

Two-Year Longitudinal Predictive Validity Coefficients for the Intermediate Measures of Music Audiation

	Teachers' Ratings of Students' Instrumental Music Performance Achievement		
	Tonal	Rhythm	Overall Musicianship
Intermediate Measures of Music Audiation			
Tonal	38	.43	.45
Rhythm	.40	.46	.44
Composite	.49	.54	.55

Supplementary data culled from the monograph report follows. First is the relationship of gender to timbre/range preferences. As can be seen in Table 21, bi-serial correlations (2=girls and 1=boys) for all 258 fourth grade students indicate there is no more than 4% in common between sex and timbre/range preference. In research using actual instruments, both with and without sound, that is rarely the case. Thus, it may be assumed synthesized sounds representative of timbre/range sounds of actual musical instruments are successful in preventing stereotypes and other extra-musical factors from influencing students in choosing inappropriate instruments for study.

Second are the percentages of timbre/range preferences and dislikes among all 257 fourth grade students. The number of choices and related percentages are presented in Table 22. Somewhat less than 50% of students prefer categories A and D, whereas somewhat more than 50% dislike category G.

Table 21

Correlations Between Gender and Instrument Timbre Preference Test Scores of Fourth Grade Students

ITPT Categories	Coefficients
A	.17
B	–.02
C	–.17
D	.10
E	.18
F	–.19
G	.00

Table 22

Number and Percent of Fourth Grade Students Who Indicated a Preference for or Dislike of Each Timbre/Range on the Instrument Timbre Preference Test

	Preference		Dislike	
	Number	Percent	Number	Percent
ITPT Categories				
A	97	38	11	4
B	28	11	9	3
C	36	14	8	3
D	80	31	6	2
E	33	13	14	5
F	12	5	45	17
G	18	7	155	60

Haverford Study

All 355 fourth grade students enrolled in the five elementary schools in the Haverford Township School District in Haverford, Pennsylvania, took ITPT. Of that total, 72 (20%) enrolled in beginning string instruction and, therefore, participated in the Haverford study.[13] One string specialist taught all students for one year in one group lesson each week. Class sizes ranged from two to six students and, depending on school scheduling, students studying like and different string instruments were taught in the same classes. Although no students received private lessons, all 72 students were members of a school orchestra that met for 30 minutes every other week.

Of the 72 students, 28 (39%) decided to study the string instrument for which they showed a timbre/range preference on ITPT. Those 28 students are referred to as the experimental group throughout this summary report. In contrast, 44 (61%) studied a string instrument for which they did not show a timbre/range preference on ITPT. Those 44 students are herein referred to as the control group. Incidentally, and oddly, one-third of the students in the control group did not demonstrate any timbre/range preference on the test. In the experimental group, 21 were studying violin, 2 viola, 1 cello, and 4 string bass. In the control group, 29 were studying violin, 2 viola, 10 cello, and 3 string bass. The only proportional disparity in instrumentation between the groups was with cello.

By the end of the first semester, 12 students discontinued their participation in the program for a variety of reasons. Of the 12, 8 were in the control group and 4 in the experimental group. At the end of the year, 22 of the initial 28 students in the experimental group completed the program of instruction, whereas 30 of the initial 44 students in the control group finished the year of instruction. That is, after one year of instruction, 21% of students in the experimental group and 32% of students in the control group discontinued instruction.

13 Edwin E. Gordon, "Selecting an Appropriate String Instrument for Study Using the Instrument Timbre Preference Test," *A Comparison of Scores on the 1971 and 1993 Editions of the Iowa Tests of Music Literacy: Implications for Music Education and Selecting an Appropriate String Instrument for Study Using the Instrument Timbre Preference Test, GIML Monograph Series, No. 1* (Chicago: GIA, 1994), pp. 33–47.

At the conclusion of the first year of beginning string instruction, all 52 students who remained in the program were asked to perform two familiar songs taught in class without the use of notation. The first was "Hot Cross Buns" in G minor and duple meter, and the second was "Twinkle, Twinkle, Little Star" in F major and triple meter. Individual performances were recorded. To ensure anonymity in rating the performances, numbers were used in place of names. Also, students were recorded in a different order for each song.

The recordings were independently rated by two experienced judges who were unfamiliar with the students. They used the same three 5-point continuous rating scales for both songs. The first was to rate tonal skills and the second, rhythm skills. Both were continuous scales. The third, an additive scale, was used to rate musical expression. Because a student could earn up to 5 points on each of the rating scales, as many as 15 points could be awarded for each song, for a total possible 60 points for both songs and judges. Interjudge reliabilities ranged from .68 to .88 for individual songs (all but two being in the mid to high 80s), and .92 for all ratings for both songs combined.

Rather than using correlation techniques to predict success in beginning string instruction, an alternate method was undertaken to facilitate understanding of the importance of ITPT. By documenting means of the criterion songs recorded after one year of study, the actual achievement of students in both the experimental and control groups could be examined and compared. Presented in Table 23 are means and standard deviations of the combined judges' ratings of both songs pooled. The data shows each rating scale separately and the composite of the three scales. On all dimensions of the rating scales, means favor the experimental group. For tonal, the difference is 1.8; for rhythm, .5; and for expression, 3.1. The overall difference is 5.4. It is interesting to note the difference for expression itself (expression and timbre/range preference having an integral relationship) accounts for more than half the difference associated with the overall difference. In contrast, the difference for rhythm is not compelling.

Table 23

Overall Means and Standard Deviations of Both Judges' Ratings of Students' Recorded Performances of Both Songs

Experimental Group

	Tonal	Rhythm	Expression	Composite
Means	14.5	9.3	7.3	31.1
Standard Deviations	2.77	4.49	5.16	10.16

Control Group

	Tonal	Rhythm	Expression	Composite
Means	12.7	8.8	4.2	25.7
Standard Deviations	3.95	6.09	4.45	12.41

Three complementary types of data analyses were culled from the study:

1. Correlations among ITPT category scores with combined experimental and control group achievement ratings of both judges for both songs combined.

2. Factor analyses of ITPT category scores with combined experimental and control group achievement ratings of both judges for both songs combined.

3. Factor analyses of ITPT category scores with combined experimental and control group students' music aptitude scores.

Data for the first analysis is in Table 24, and for the second and third analyses, in Table 25.

Table 24

Correlations Among Instrument Timbre Preference Test Category Scores with Achievement Criteria

	Instrument Timbre Preference Test						
	A	B	C	D	E	F	G
Achievement Criteria							
Tonal	.08	–.02	–.06	–.21	.06	.22	–.01
Rhythm	–.17	.02	.18	–.34	.03	.26	.15
Expression	–.22	–.06	.13	–.21	–.10	.30	.23
Composite	–.17	–.08	–.08	–.29	.07	.31	.17

Relationships among ITPT category scores with tonal, rhythm, and expressive achievement in string performance are overall almost non-existent. There seems to be, however, a consistent low to moderate negative relationship among all achievement criteria and category D, which is associated with double-reed instruments. On the other hand, there is a low to moderate positive relationship among all achievement criteria and category F, which is associated with trombone, baritone, euphonium, French horn and, most importantly for this study, cello. In a cursory examination of the data, it was discovered most accomplished string students had a preference for richer and lower sounds rather than thinner and higher ones.

Using the principle components method with orthogonal transformation in varimax rotations, four factors emerged in both factor analyses. Oblique analyses yielded highly similar results. All in all, it seems fair to conclude timbre/range preferences represent different factors than those associated with actual music achievement and music aptitude.

Table 25

Factor Analysis of Instrument Timbre Preference Test Category Scores with Achievement Criteria

	Factor I	Factor II	Factor III	Factor IV
A	–.93	.08	.03	–.09
B	–.23	–.73	.21	–.20
C	.09	.85	.00	.20
D	–.04	–.23	–.88	–.18
E	–.02	–.87	.09	.08
F	.34	–.39	.68	.11
G	.87	.06	.29	.02

Factor Analysis of Instrument Timbre Preference Test Category Scores with Intermediate Measures of Music Audiation Scores

	Factor I	Factor II	Factor III	Factor IV
A	.09	–.93	.02	.01
B	.74	–.24	.12	.03
C	.85	.12	.07	–.05
D	–.23	–.04	–.92	–.05
E	–.87	–.02	.14	–.13
F	–.39	.33	.66	.10
G	.05	.86	.29	.08

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