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THE EFFECTS OF PLAYING THE MELODY BY ROTE DURING THE PRESTUDY PROCEDURE UPON SIGHT-READING SKILL DEVELOPMENT OF BEGINNING CLASS PIANO STUDENTS

The University of Oklahoma PH.D. 1983

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THE EFFECTS OF PLAYING THE MELODY BY ROTE DURING THE PRESTUDY PROCEDURE UPON SIGHT READING SKILL DEVELOPMENT OF BEGINNING CLASS PIANO STUDENTS

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

by

Betty Fincher

Norman, Oklahoma

1983

THE EFFECTS OF PLAYING THE MELODY BY ROTE
DURING THE PRESTUDY PROCEDURE UPON
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CHAPTER I

THE PROBLEM AND ITS SETTING

Introduction

Shinichi Suzuki's[1] philosophy of music education is based on the concept that children hear and speak language before they learn to read. Inherent in this concept is the premise that since children naturally speak before reading, they should play a musical instrument before engaging in music note reading. The Suzuki violin student plays by rote for one to three years before actual note reading begins. Through rote teaching/learning, the student plays by imitating what he hears and sees. When note reading begins, the student is shown the notation of the very first piece he/she learned to play. The student plays the piece while watching the notation. This is an associative process in which the learner matches what he/she is playing to the notation.

Due to the success of the Suzuki method, some piano teachers have borrowed the "rote before note" concept, but have adapted the idea to fit into individual lessons.

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[1]Shinichi Suzuki, Ability Development from Age Zero (Athens, Ohio: Ability Development Associates, Inc., 1981).

Instead of allowing the student to play by rote for several years before seeing the notation, the entire process occurs within a single one-hour lesson. The student listens to a melody or piece of music in an effort to grasp its aural image. Once he/she has heard the piece several times without looking at the music, the student tries to play it by rote. After several attempts, he/she then turns to the printed page and continues to learn the piece. Rote teaching is not a substitute for learning to read notes, but an addition to it, since the two methods are used simultaneously.

Need for the Study

In view of the success of the rote-to-note procedure, the researcher has long questioned the view of many piano teachers who believe that a student will learn to sight read faster if he/she does not hear the pieces played in advance. They believe that the student who hears the piece in advance will simply play by ear, rather than develop sight-reading skills. The first question which the researcher posed was, "Which approach is better for teaching sight reading?" This study is believed to be the first investigation which deals with this question.

Statement of Purpose

The purpose of the study was to investigate the effects of playing the melody by rote during the prestudy

procedure upon sight-reading skill development of beginning adult class piano subjects.

Procedure of Investigation

In order to determine the effects of hearing and then playing a melody by rote prior to seeing the printed music, a research experiment was conducted. Four groups of students were selected for the experiment, two of which were exposed to the experimental treatment (rote playing) as a part of the regular instructional program while the other two groups (control) were denied the opportunity to play by rote. The population of the experiment was limited to an urban two-year college. Specifically, the sample was comprised of subjects randomly-enrolled into four adult beginning piano classes of Rose State College, Midwest City, Oklahoma, during the spring semester of 1983. Since two of the four classes met during the daytime and the other two classes met during the evening (and therefore might represent a slightly different population), one day class and one evening class were designated as experimental groups and the remaining day and evening classes were treated as control groups. The beginning piano classes at that institution are composed of hobbyists, not keyboard majors.

Both the experimental and control groups followed a carefully structured analytical prestudy procedure. In addition, subjects in the experimental groups were asked

to play the melody by rote during the prestudy procedure. Since all aspects of instruction were identical in all groups except for rote playing, then one can assume that any difference between the sight-reading skills of the experimental and control groups at the end of the experiment was attributable to the independent variable. The dependent variables were two sight-reading skills (pitch accuracy and rhythmic accuracy) as measured by the posttest.

The research question was "Will playing by rote give the experimental groups an additional advantage in the development of sight-reading skills, or will playing by rote simply teach the subject to play by ear and hinder the development of sight-reading skills?"

Hypotheses

The researcher believes that playing the melody by rote before seeing the printed page will lead the student to concentrate on melodic shape, direction, phrasing, fingering, and thereby significantly enhance sight-reading skills. The researcher therefore hypothesized that there would be a significant difference between the sight-reading skill development of the experimental and control groups. Furthermore, because day classes were populated by full-time students while evening classes were largely comprised of part-time students who worked regularly during the day, the researcher assumed that the groups

would not respond equally to instruction. Consequently, she hypothesized that there would be a significant difference in sight-reading skills between day and evening groups. In order that these concepts could be evaluated quantitatively, the following null hypotheses were tested:

1. There will be no significant difference in pitch-reading skills between the experimental and control groups as measured by the posttest and determined at the .01 level of significance by an analysis of variance.

2. There will be no significant difference in rhythmic-reading skills between the experimental and control groups as measured by the posttest and determined at the .01 level of significance by an analysis of variance.

3. There will be no significant difference in pitch-reading skills between the day and evening groups as measured by the posttest and determined at the .01 level of significance by an analysis of variance.

4. There will be no significant difference in rhythmic-reading skills between the day and evening groups as measured by the posttest and determined at the .01 level of significance by an analysis of variance.

Although instruction involved expressive elements, such as phrasing, dynamics, and articulation, they were not tested.

Basic Assumptions

The following assumptions will be basic to the investigation:

1. Sight-reading skills of adult beginning class piano subjects can be objectively and accurately measured.

2. Beginning adult class piano subjects will be able to play the melody by rote by listening to the researcher play the melody and watching the shape of the sound on a keyboard visualizer according to the procedure described in Chapter III.

3. Beginning adult class piano subjects will be able to analyze beginning piano pieces according to the analytical procedure described in Chapter III.

Definition of Terms

Concept. A relatively complete and meaningful idea or understanding derived by a person's ability to organize cognitively his sensory experiences.

Instruction. The process of leading the learner through a sequence of experiences that increases the learner's ability to grasp, transform, and transfer learned concepts, skills, and attitudes.

Prestudy. An instructional procedure that one follows while studying a piece before sight-reading it at the keyboard.

Playing by Rote. A process of learning to play without notation while listening to the music and watching an illuminated keyboard visualizer which displays lighted piano keys.[1]

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[1]The study took place in a Wurlitzer electronic piano laboratory.

Sight Reading. A translative process of reading and playing music notation at first sight.

CHAPTER II

REVIEW OF RELATED LITERATURE

A review of research and pedagogical literature of the last two decades reveals that no studies have investigated the effects of playing the melody by rote as part of the prestudy procedure on the development of piano sight-reading skills. In reviewing research on aural modeling, only one study investigated the effect of aural modeling on piano sight reading, and only one other study examined the effect of aural modeling on instrumental sight reading. There are several studies which have investigated sight-reading skill in the piano field, but they do not focus on aural modeling.

The following pages contain a synopsis of selected studies and research that concern sight-reading skills and aural modeling. Professional literature concerning the development of aural concepts is based largely upon the personal opinions and experiences of music educators. Although books and periodicals on piano pedagogy devote much attention to sight reading, little has been written on teaching the beginner to develop aural concepts.

Survey of Aural Modeling Research

Several researchers have completed studies on the impact of aural models. However, only one has investigated the effects of aural modeling on piano sight-reading skills. Netherland[1] investigated the effects of a tape recorded model, a peer model, an adult model, and the absence of a model on the sight-reading and performance skills of piano students. Each of the forty-four subjects attended four twenty-minute treatment sessions in which he/she received a piano piece from each of the models. Immediately after each treatment session, a tape recording was made of each subject's performance. The subject's error score was based on an evaluation of the taped performances. Analysis of the data indicated that there was no significant difference between the adult model, the peer model, the tape recorded model, and the absence of a model in piano sight-reading skill and performance skill.

In the instrumental field, Anderson[2] researched the effects of tape-recorded aural models on sight-reading and performance skills of sixth-grade clarinet players. Each student in the experimental group took the tape home

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[1]Vernon R. Netherland, "The Effect of Adult, Peer, and Taped Recorded Models on Piano Students' Sight Reading and Practiced Performance Achievement" (Ed.D. dissertation, Columbia University Teachers College, 1975).

[2]James N. Anderson, "Effects of Tape-Recorded Aural Models on Sight-Reading and Performance Skills" (Ph.D. dissertation, University of Texas, 1979).

for the purpose of guiding practice, but Anderson does not know if the students actually listened to the tapes. At the end of an eight-week period, he found no significant difference between the experimental and control groups in the number of music exercises completed. Perhaps the students in the control group had sufficient opportunity during band rehearsals to develop a concept of how each exercise should sound. As a result the advantages of taped models for home practice may have been eliminated.

Other Piano Sight-Reading Research

Although there is only one piano study which investigates aural modeling, there are several studies that focus on the skill of sight reading without aural modeling. Fjerstad[1] investigated the effectiveness of tachistoscopic (times stimulus) versus metronomic (forced response) training on the teaching of piano sight reading. The independent variable in the tachistoscopic training procedure was the duration of the projected notation. The independent variable in the metronomic training was the control of the tempo by a metronome with a flasher and a sound signal. Fjerstad concluded that both approaches were equally effective. Both groups sight-read better than a non-participating group.

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[1]Clinton Dale Fjerstad, "A Comparison of Tachistoscopic and Metronomic Training for Developing Sight Reading of Harmonic Notation Within Class Piano Instruction" (M.Ed.D. dissertation, Indiana University, 1968).

Young[1] studied the eye-movements and eye-hand temporal relationships of piano sight-readers. Through the use of an eye-movement camera, she discovered that the subjects looked from treble to bass while reading a piano score. The more successful piano sight-readers were found to average more fixations per event and to spend a larger percentage of their total fixation in rereading fixations than did the unsuccessful piano sight-readers.

Havill[2] developed a sight-reading method consisting of ten learning units, where the student begins by playing on the black keys. First the student is asked to feel the black keys and then relate them to reference points on the staff. He/she learns to read steps and skips by relating to the reference points on the staff. Later the other notes are added. Havill did not evaluate her proposed sight-reading method through an experimental research study. The value of the study rests largely on the inherent pedagogical ideas contained in her proposed method.

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[1]Leonora Jeanne Young, "A Study of the Eye-Movements and Eye-Hand Temporal Relationships of Successful and Unsuccessful Piano Sight Readers While Piano Sight Reading" (Ph.D. dissertation, Indiana University, 1971).

[2]Lorina Havill, "A Guide for the Development of Sight-Reading for Non-Piano Majors Utilizing Original Compositions for Two Pianos-Fourhand Ensemble" (Ed.D. dissertation, Columbia University Teachers College, 1976).

In his study on reading concepts and fingering patterns, Lowder[1] asked his experimental group to think of their hands as music staves. Adjacent fingers represented steps on the staff, and disjunct fingers represented skips on the staff. The students then related these concepts to fingering patterns. The control group was taught by a conventional approach. Both approaches were found to be equally effective.

Selected Professional Literature

During the last three decades, many music educators have emphasized the importance of teaching aural concepts. The following comments are indicative of commonly-held viewpoints of music educators. Gordon believes that

> to read and write music meaningfully, one must be able to hear music seen in notational form before it is performed. . . . The mechanical ability to name and define individual notes, or other music symbols, does not, of itself, provide the readiness for music literacy. One does not read music names or definitions, but on the contrary, one hears groups of notes (patterns) as one reads. Only when one can audiate tonal and rhythm notation can the names and definitions of music symbols become musically relevant. . . . Just as we read words (groupings of letters) in a language, so we read patterns (groupings of notes), both tonally and rhythmically, in music. We give meaning to the pattern we read in music because we can audiate notation.[2]

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[1] Jerry Elwood Lowder, "An Experimental Study of Teaching Reading Concepts and Fingering Patterns" (Mus.Ed.D. dissertation, Indiana University, 1971).

[2] Edwin Gordon, Learning Sequence and Patterns in Music (Chicago: G.I.A. Publications, Inc., 1976), pp. 2-3.

Cooper and Meyer also compare aural concepts of music to aural concepts of language:

> That is, just as letters are combined into words, words into sentences, sentences into paragraphs, and so on, so in music individual tones become grouped into motives, motives into phrases, phrases into periods, etc. . . . The grouping of sounds into structured patterns is the result of the interaction among various aspects of the materials of music: pitch, intensity, timbre, texture, harmony, and duration.[1]

Leonhard and House suggest that teacher modeling provides the student an opportunity to establish an aural concept of what he/she is trying to achieve:

> The formation of concepts depends upon his organizing his experience and making discriminations among the stimuli that strike his senses. Concepts are cognitive organizers of experience. . . . Since teaching movement patterns in isolation from the instruction should begin with the establishment of an aural concept of what is to be achieved. Once the learner has an aural concept to guide his efforts, he needs to develop a concept of the movements required. In developing both kinds of concepts the teacher provides a model by demonstration and presents verbal explanations. He supplements the demonstration and explanation with pictures, recordings, diagrams, and other means.[9]

According to Benward, tonal orientation is the most important aural concept:

> Experience tells us that few musicians learn to sing melodies through conscious identification of the melodic intervals. Most important of all is tonal orientation--the subsconscious awareness of

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[1]Grosvenor W. Cooper and Leonard E. Meyer, The Rhythmic Structure of Music (Chicago: The University of Chicago Press, 1969), p. 2.

[2]Charles Leonhard and Robert W. House, Foundations and Principles of Music Education, 2d ed. (New York: McGraw-Hill Book Co., 1972), pp. 288-289.

> a tonal center and the relationship of all scale tones to that focal point. Related to the concept of a tonal center is the developed sense of implied harmony. Through experience the musician learns to perceive (construct in his mind) an appropriate harmony, sometimes for single melody tones and at other times for groups of melody tones.[1]

Woodruff contends that concepts are acquired through the senses, not through verbal teaching. He believes that students who are not allowed to hear music in a music class will not develop musical concepts as clearly as those students who are allowed to listen.[2]

In the field of piano pedagogy, Hofmann, Bolton, and Neuhaus emphasize the value of the aural image. Hofmann believes that the development of a good aural image of the score will aid the piano students in achieving technical control.[3] Bolton stresses that each student must be taught to imagine the sound he will play before he plays it.[4] Neuhaus writes that

> work on the artistic image should begin in the very first stage of studying music and learning to play the piano. . . . By this I mean that if a child is able to reproduce some very simple melody, it is essential to make this first performance expressive,

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[1] Bruce Benward, Sightsinging Complete (Dubuque: Wm. C. Brown Company Publishers, 1965), p. vii.

[2] Asahel D. Woodruff, Basic Concepts of Teaching (San Francisco: Chandler Publishing Company, 1961), pp. 32-40.

[3] Josef Hofmann, Piano Playing and Piano Questions Answered (Philadelphia: Theodore Presser, 1920), pp. 32-40.

[4] Hetty Bolton, How to Practice (London: Elkin and Co., Ltd., n.d.), p. 45.

> in other words, that the nature of the performance should correspond to the nature of the melody.[1]

Music educators of the last three decades have placed much emphasis on introducing aural concepts before teaching sight-reading skills. However, very little has been written by piano teachers in piano journals about introducing aural concepts at any stage in the teaching of sight-reading skills. Between 1955 and 1976, there were numerous articles on teaching sight-reading skills, but with no mention of teaching aural concepts as an aid to developing sight-reading skills. An examination of Clavier issues between 1977 and 1983 reveals a growing interest in teaching aural concepts as an aid to the development of sight-reading skills. Jacobson writes that procedures of the last two decades might have been more successful if both visual and aural concepts had been emphasized, rather than stressing only visual concepts:

> Hearing is perhaps the most neglected in this complex learning process. Teachers must ascertain the aural needs of each student, train the ear, and evaluate whether the student's aural potential is being developed into a useful skill. . . . Students must be shown the excitement of the various interacting elements of the musical whole, no matter how simple the piece and its elements might be. . . . Achieving the primary goal involves developing the three senses of sight, hearing and touch, along with the intellect. In spite of all the attention given to the visual/reading process and new methods of teaching reading developed in the last two decades, students are still lacking in their ability to sight-read. Fluent sight-reading involves keyboard facility and a well-developed ear. The ability

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[1] Heinrich Neuhaus, The Art of Piano Playing (New York: Praeger Publishers, 1973), p. 10.

> to read skillfully is directly related to the physical capacity to do what the page demands along with the ability to audiate (hear with the inner ear) the stimuli from the page.[1]

Covello stresses that teachers should begin the teaching of note reading by showing students that a sequence of notes forms a melody pattern.[2] According to Edith Cornfield,

> rote teaching enables the student to listen, to concentrate, to phrase intelligently, use correct fingering, study the music itself, and as a result play it intelligently and musically. He is free to concentrate on what the music is trying to express, since he has been released from the tyranny of the printed page.[3]

Bigler and Watts speak of the controversy among piano teachers about the value of teaching the aural concept:

> Students gain an aural concept of the entire piece and can perceive where each fragment fits into the whole. . . . It was once thought that playing the piece for children would encourage them to copy interpretation and that by working out their own fingerings they would become better students. It has been our experience, however, that more help in the early stages produces secure, independent students.[4]

Hilley states that the key to sight reading is to see shapes on the printed page:

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[1] Jeanine M. Jacobson, "The Primary Goal," Clavier 21 (September 1982):37.

[2] Steven Covello, "The Eyes Have It," Clavier 18 (January 1979):35.

[3] Edith Cornfield, "Teaching By Rote," Clavier 8 (September 1980):33.

[4] Carole L. Bigler and Valery Lloyd Watts, "The Suzuki Approach to Teaching a Bach Minuet," Clavier 19 (December, 1980):34.

> How many of your students fall behind in sight-reading as a group because they have to take the time to look at each note in a scale passage or have to think of each note in a chord? The key to sight-reading is to see shapes on the printed page and relate these shapes in your mind to a certain feel on the keyboard. . . . Being able to visualize the topography of the keyboard in your mind is the most important step to becoming an adequate sight-reader. This of course stems logically from the fact that when you are sight-reading, there is very little time to actually look at the keys on the piano. The eyes must concentrate on the printed notes, constantly looking ahead.[1]

Kovitz also believes that visualization must be related to pitch:

> The keyboard, specific locations on it, and relationships of keys must be visualized and related to pitch before there can be success in reading. . . . First and always, the music student must listen. All that he learns must be related to what he hears.[2]

Johnson writes that ear training is an essential part of any child's musical education. She has written several ear training games and activities that can be used in private or group piano lessons.[3]

Although little has been written historically to indicate that sight-reading skills can be improved by the teaching of concepts, J. S. Bach emphasized the

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[1]Martha Hilley, "Shapes and Abstracts," Clavier 16 (March 1977): 28.

[2]Valerie Kovitz, "New Ideas for Pre-reading Preparation," Clavier 16 (November 1977): 36.

[3]Julie Johnson, "Fun With Ear Training Games, Clavier 22 (May-June 1983): 28.

importance of teaching aural concepts. Forkel[1] gave the following description of Bach's teaching method:

> In order to lessen the difficulties, he made use of an excellent method; this was, first to play to them the whole piece, which they were to study, saying, "so it must sound." It can scarcely be imagined how many advantages this method has. If, by the pleasure of hearing such a piece played through at once in its true character, only the zeal and inclination of the scholar were excited, the advantage would be, even then, very great. But, by giving to the scholar, likewise, an idea how the piece ought to sound, and what degree of perfection he has to aim at, the advantage of this method is far greater still. For, without such a means to facilitate the acquisition, the scholar cannot learn either the one or the other, except gradually, as he conquers the mechanical difficulties, and, even then, perhaps, but very imperfectly. Besides, the understanding has now come into play, and under its direction, the fingers will obey much better than they could without it. In a word, the pupil has an ideal in his mind, which renders the difficulties in the given piece easier to the fingers; and many a young performer on the keyboard who scarcely knows how to make sense of such a piece after years' practice would, perhaps, have learnt it very well in a month if he had only heard it played to him once in its proper connection and with a due degree of perfection.

Summary

The review of the literature indicates a growing interest in teaching aural concepts as an aid to the development of sight-reading skills. Although piano pedagogy books of this century emphasize the value of listening as an aid to technical control, rhythmic

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[1] Johann Forkel, "On Johann Sebastian Bach's Life, Genius, and Works," in The Bach Reader, eds. Hans T. David and Arthur Mendel, rev ed. (New York: W. W. Norton and Company, 1966), p. 328.

control, and expressive control, there has been little written to indicate that sight-reading skills can be improved by the teaching of aural concepts. In reviewing the research that deals with aural modeling before piano sight reading, only one study investigated the effect of aural modeling on piano sight reading.

CHAPTER III

PROCEDURES

Experimental Design

The study sought to determine the effect of playing the melody by rote during the prestudy procedure upon sight-reading skill development of beginning adult class piano students. All four groups--experimental and control--received the same instruction except for the experimental treatment. Prior to playing each new piece, a carefully structured analytical prestudy procedure was followed by all. The prestudy procedure was the same for all subjects, except that the experimental groups were asked to play the melody by rote during the prestudy procedure. Control subjects were denied that learning opportunity. Since all aspects of instruction were identical in all groups except for playing by rote, differences between the sight-reading skills of the experimental and control groups at the end of the experiment can be attributed to the independent variable. The dependent variables are two sight-reading skills--pitch accuracy and rhythmic accuracy--as measured through the administration of the posttest.

The forty-eight subjects in this study comprised four beginning adult piano classes at Rose State College in Midwest City, Oklahoma, a suburb of Oklahoma City. Each class was limited to twelve students because of the availability of only twelve electronic pianos per classroom. All four classes were taught by the researcher. The classes met two hours per week (Monday-Wednesday or Tuesday-Thursday) for a period of fifteen weeks. Thirty minutes of each one-hour session was devoted to the development of sight-reading skills.

The research design for this study was a pretest-posttest control group design, with two additional tests of readiness (R_1 and R_2) being administered to examine group equivalency.

Experimental Group	(morning)	MW	T_1	R_1	R_2	X	T_2
Experimental Group	(evening)	MW	T_1	R_1	R_2	X	T_2
Control Group	(morning)	MW	T_1	R_1	R_2		T_2
Control Group	(evening)	TTH	T_1	R_1	R_2		T_2

This procedure was adopted because subjects could not be randomly assigned to various research groups. The study was designed for two daytime piano classes and two evening piano classes. The four classes were randomly selected from five classes being taught at Rose State College; the experimental and control classes were randomly identified.

By using intact classes more subjects were available

for the study than would otherwise have been possible. Also the subjects did not know that they were part of a research study. The pretest (T_1) and readiness tests (R_1 and R_2) were included in the design to counteract the threats to internal validity, arising from interaction between such variables as selection and maturation, selection and history, or selection and testing. These tests also served as a safeguard against threats to external validity from interaction between selection and treatment.[1]

The pretest consists of three sight-reading exercises which are equivalent to the three sight-reading exercises used in the posttest (T_2). The pretest was used as a screening device to exclude from the study subjects who were not beginners at the piano. Thus, the design is not the usual pretest-posttest design, wherein pretest scores are subtracted from posttest scores to derive gain scores. All subjects who could sight read at the piano were transferred to a class which was not involved in the study. The first readiness test (R_1) consists of five sub-tests designed to measure a student's understanding of various concepts and skills which are needed for sight reading at the piano. The second readiness test (R_2) consists of the same five sub-tests that comprise R_1, plus three additional sub-tests measuring pitch and rhythmic

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[1]Stephen Isaac and William B. Michael, Handbook in Research and Evaluation (San Diego: Edits Publishers, 1975), pp. 48-49.

discrimination. The readiness test R_1 was given prior to the beginning instruction. The following four class sessions were then devoted to teaching music readiness skills. All groups were taught readiness skills under equal conditions. At the end of that time, all subjects were given the second readiness test (R_2) to measure for individual or intergroup differences that might have developed as a result of interaction between selection and instruction. Following the administration of R_2, the experiment was begun.

Measuring Instruments

Development of a Pretest and a Posttest

There are no published tests, as far as the researcher has been able to ascertain, designed to measure piano sight-reading achievement. It was, therefore, necessary to develop a pretest and posttest specifically for the study. The following guidelines were used in constructing both tests:

1. The difficulty level of the pieces must be determined through a pilot-study so that they accurately measure the sight-reading achievement of beginning class piano students after fifteen weeks of study.

2. The test content must be constructed from pieces found in beginning piano texts. The test pieces must be as closely related as possible to the course content of the student text.

3. The test must be a valid measure of beginning class piano sight-reading achievement after fifteen weeks of study. The test should measure only pitch accuracy and rhythmic accuracy.

4. The test must be constructed so that it can be scored objectively.
5. The test should serve as a reliable measuring instrument.
6. Each student must be tested individually.
7. The length of time of administration must not be too long, since forty-eight subjects must be tested individually.
8. The pretest and posttest must be constructed of equivalent, but different pieces.

All available beginning piano texts were studied to determine which beginning pieces would have the greatest degree of relationship to the course content and could serve as test items appropriately measuring sight-reading achievement levels of beginning class piano students after fifteen weeks of study. To achieve maximum content validity, twelve pieces were selected which represent different textures, styles, and keys.[1] One month prior to the beginning of the formal research study, the pieces were pilot tested on a beginning adult piano class, which was not involved in the formal investigation. The pilot test was administered on the fifteenth week of study.

Each student was tested individually, and each performance was recorded on a tape recorder. No more than one minute was allowed for observation or prestudy. Each student was read the following directions before he began to play:

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[1]See Appendix A.

> Play the following three pieces at the piano. A tape recorder will record your performance. Hold each note its correct rhythmic value. If you make mistakes, keep on playing. Do not back up, or try to correct mistakes. Before you begin to play, I will set the tempo for each piece with a metronome. You should maintain that tempo. Start when you are ready. I will turn the metronome off after the first measure.

Student performance on the pilot test was evaluated through an objective error-detection scoring procedure, which consisted of counting the number and type of errors. Following a training session on scoring procedures, three members of the piano faculty from Rose State College working independently scored each student's test performance. The judges were asked to listen to each performance at least twice to facilitate the scoring of both pitch and rhythm errors. The judges were allowed to listen to the performance as many times as they wished. The objective for the student was to achieve the highest possible score. Errors were summed and subtracted from the total possible points. Each error counted as one point.

The results of the pilot test indicated that the scoring procedure was highly reliable. Interjudge agreement was determined by use of the Pearson product-moment correlation coefficients formula. Computation revealed the following reliability coefficients between pairs of adjudicators: judges A and B, $r=.99$; judges B and C, $r=.99$; and judges A and C, $r=.99$.

Of the twelve pieces which were pilot-tested, two were eliminated immediately. One piece (number 12) contained many repeated notes which proved to be confusing to the students and difficult to score accurately. The other piece (number 11) was found to be much too difficult. Even with coaxing and encouragement from the researcher, a number of the pilot-study subjects would not attempt to sight read it.

The difficulty levels of the remaining ten pieces were then analyzed to identify pieces which might comprise two equivalent tests. The average number of errors per piece ranged from 2.6 to 13.8 (Table 1).

TABLE 1

AVERAGE NUMBER OF ERRORS FOR PILOT TEST EXAMPLES

Example Number	Average Number of Errors
1	3.6
2	13.8
3	4.3
4	2.6
5	3.5
6	5.2
7	4.5
8	7.0
9	10.0
10	10.0

Based on the time required to administer and score each item on the pilot-study test, the researcher decided to limit the pretest and posttest to three pieces each. An examination

of the ten pilot-study pieces revealed that pieces #1, 5, and 9 had a combined average error rate of 5.7. By good fortune, pieces #4, 7, and 10 also had a combined average error rate of 5.7. The first set of pieces (#1, 5, and 9) were randomly selected to serve as the pretest while the second set was designated as the posttest (Table 2).[1]

TABLE 2

AVERAGE NUMBER OF ERRORS FOR PRETEST AND POSTTEST

Example Number	Average Number of Errors	Key
PRETEST		
1	3.6	G Major
5	3.5	F Major
9	10.0	C Major
Combined Average Error Rate	5.7	
POSTTEST		
4	2.6	C Major
7	4.5	G Major
10	10.0	F Major
Combined Average Error Rate	5.7	

Development of a Readiness Test for Comparing Research Groups

Groups were compared for equivalency because the subjects could not be randomly selected. Since there are

[1]The pretest and posttest pieces are in Appendix B.

no published tests known to the researcher which are designed to measure piano sight-reading readiness skills, a test was developed by the researcher to facilitate inter-group comparison and to determine possible group equivalence.

As mentioned earlier, the readiness test consists of two variants (R_1 and R_2). The first readiness test (R_1) is composed of five sub-tests designed to measure pitch and rhythmic knowledge as well as familiarity with the piano keyboard. R_2 contains the five sub-tests of R_1 plus three additional tests designed to measure aural and visual perception of pitch and rhythm. All eight sub-tests are listed below:

1) Labeling pitch notation
2) Labeling rhythmic notation
3) Matching pitch notation to the keyboard
4) Locating keys
5) Tapping rhythms
6) Auditory-visual discrimination of pitch
7) Auditory-visual discrimination of rhythm, no. 1.
8) Auditory-visual discrimination of rhythm, no. 2.

Each sub-test was written by the researcher, except for sub-tests 6, 7, and 8 which were taken from Test 2 (Part 3) and Test 4 (Part 2) of the Colwell Music Achievement Test.[1]

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[1]Richard Colwell, Music Achievement Tests (Chicago: Follett Educational Corporation, 1970).

Reliability of the readiness test was determined by subjecting test scores to the Kuder-Richardson Formula 21, which revealed a coefficient of $r_{KR_{21}}=.97$.

Content validity of the test (the relationship between readiness skills and actual piano sight-reading skills) was ascertained by asking fifteen piano teachers at four colleges and universities in central Oklahoma to judge the degree of relationship of each readiness skill to sight-reading music at the piano.[1] A five-point Likert scale was used, ranging from 1 (unrelated) to 5 (closely related). The ratings of this panel of experts were averaged for each readiness sub-test. Prior to receiving the ratings from the panel, the researcher, in consultation with the major professor, determined that any sub-test producing a composite average rating of less than 3.0 would be eliminated from the study and therefore would not be used in measuring group equivalence. Since all sub-tests produced a composite average rating of 3.0 or higher, all sub-tests were included in the study.

Of all the sub-tests, numbers 1, 3, and 5 were rated as possessing the highest degree of relationship to sight-reading music at the piano, while sub-tests 2 and 4 were thought to be only moderately related to piano sight-reading skills. All other sub-tests were ranked between these two sets. (Table 3).

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[1]The validity survey is in Appendix C.

TABLE 3

VALIDITY RATINGS OF THE READINESS TEST

RATERS	SUBTESTS 1.	2.	3.	4.	5.	6.	7.	8.
A.	5	4	5	4	5	4	4	4
B.	5	5	5	5	5	4	3	3
C.	5	3	5	4	5	5	5	4
D.	5	5	5	5	5	5	3	3
E.	5	4	3	4	5	4	5	5
F.	4	2	5	2	5	2	5	4
G.	5	2	5	3	5	5	5	5
H.	5	1	5	3	5	3	5	5
I.	4	2	5	3	5	5	4.5	4.5
J.	5	4	5	3	5	5	5	5
K.	5	5	5	5	5	5	3	3
L.	5	5	5	5	5	5	5	5
M.	5	2	5	5	5	2	5	5
N.	5	3	5	3	3	5	4	4
O.	5	3	5	5	5	5	4	3
Totals	73	50	73	59	73	64	65.5	62.5
Average	4.8	3.3	4.8	3.9	4.8	4.2	4.3	4.1

Testing Procedures for the Pretest

The pretest consists of three exercises which are

equivalent to the three exercises used in the posttest.[1] The pretest was used to identify subjects who were not beginners at the piano. All subjects who scored higher than zero were changed to a higher level piano class, or to the beginning piano class which was not included in this study. Thus, none of the forty-eight subjects possessed measurable sight-reading skills at the piano.

The pretest was administered outside of the regular class time so that each student could be evaluated individually and his/her performance could be tape recorded. The test was administered for each subject on either the first day or the second day of the term.[2] All were repeatedly encouraged to play the exercises.

All three judges were unanimous in their decision to exclude from the study all students who possessed some piano sight-reading ability. Two subjects, who could play the pieces with both hands, were transferred to intermediate piano classes. Two other subjects played parts of the exercises with only the right hand. One was placed in a beginning class which was not included in the study, and the other, for personal reasons, withdrew from all college classes. Since college enrollment continued for several days after the classes began, the four subjects who demonstrated some piano playing ability

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[1] See Appendix B.

[2] For administration of the test, see Appendix B.

were replaced by the next four subjects who enrolled; all four new subjects scored zero and were included in study.

Testing Procedures for Piano Sight-Reading Readiness Test

To facilitate inter-group comparison, subjects were given the R_1 test during the first week, before any instruction occurred.[1] The following four class periods were devoted to teaching readiness skills. All groups were taught readiness skills under equal conditions. At the end of that time, groups were given the R_2 test to measure for individual or intergroup differences that might have developed as a result of interaction between selection and instruction. The R_2 test was a repeat of sub-tests 1-5, plus three additional sub-tests, 6-8. After the four class periods which were devoted to teaching readiness skills, the students had acquired enough knowledge of pitch and rhythmic notation to take sub-tests 6-8 which ask the student to compare the music he/she hears (auditory) with the notation he/she sees on the answer sheet (visual).[2]

Testing Procedures for Posttest

The posttest was administered during the fifteenth week of the study. All forty-eight subjects completed

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[1]The readiness test is in Appendix D.

[2]The results verifying group equivalence are in Chapter IV.

the study. Each taped performance was evaluated by the same objective error detection scoring procedure that was refined in the pilot study, which consists of counting the number and type of errors. Following a training session on scoring procedures, three members of the piano faculty from Rose State College working independently scored each student's test performance. The judges were asked to listen to the performances as many times as they wished. The objective for the student was to achieve the highest possible score. Errors were summed and substracted from the total possible points. Each error counted as one point.[1]

Instructional Procedures

The study took place in a piano laboratory equipped with Wurlitzer electronic pianos. Progressive Class Piano by Elmer Heerema[2] was used as the text in all groups. Each group devoted thirty minutes of each one-hour session to the development of sight-reading skills. The remainder of the hour consisted of (1) playing by ear, (2) finger exercises, (3) improvising, (4) composing, (5) memorizing

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[1]For further information on administration, scoring, and posttest exercises, see Appendix B.

[2]Elmer Heerema, Progressive Class Piano (Sherman Oaks, California: Alfred Publishing Company, Inc., 1980).

solos, (6) transposing by ear, and (7) keyboard and written theory.

During the first four class sessions of the course, certain concepts were taught before sight reading began at the piano. Readiness for sight reading included (1) learning to locate the keys of the piano, (2) playing two simple songs by rote in order to learn the topography of the keyboard, (3) learning five-finger positions for C, D, E, F. and A, (4) understanding finger numbers, (5) understanding intervals, and (6) rhythmic exercises involving small and large body movements. The first fourteen pages of the Heerema text are devoted to development of these readiness skills. Sight reading begins on page fifteen.

All groups participated in an analytical prestudy procedure which was a part of the thirty-minute period devoted to the development of piano sight-reading skills. Students were asked to respond orally to the following questions which comprised the analytical prestudy procedure that was followed for each new exercise studied and played.

1. Is the hand position C, F, or G?
2. Name the first note in the right hand.
   Name the first note in the left hand.
3. Is the melody going up or down?
4. Do you see repeated notes? Where?
   Which measure?
5. Do you see any skips? Where?

6. Do you see a note that gets more than one beat? Where?

7. How many beats does the last note of the first phrase receive? The second phrase?

8. Do you see a tied note? Where?

9. Do you see contrary motion? Parallel motion? Oblique motion? Imitation? (All of these terms are introduced in the first chapter of the text.)

No more than four minutes were devoted to prestudy of each piece. As a part of their prestudy procedure, subjects in the experimental groups were asked to play the melody one line at a time while watching a Wurlitzer illuminated keyboard visualizer, which displayed lighted piano keys as they were played. The students heard the melody and saw its shape by watching the lighted keys. The left side of the visualizer, which shows notation, was not used. The students repeated each line after the researcher had played it. The researcher also played along with the students on the repeated line. The students' pianos were set on a soft volume, while the teacher's piano was adjusted for a louder volume.

After the second session, many procedural directions to the class were not repeated. By then the students in the experimental groups had learned that the teacher always counted aloud the last measure of each line, and that her counting was a signal for them to begin playing. After the piece was played twice by rote line by line, the same

procedure was repeated using two lines, rather than one line. Next the students were told to open their books and follow the music in their texts rather than watching the lighted visualizer for two more playings. After the prestudy, each student practiced individually, using earphones, at an electronic piano.

When the analytical prestudy was completed in a control group, each student practiced individually, using earphones, at an electronic piano. The researcher sat at the teacher console where she could listen to each student individually through her earphones. If a student appeared to need help, the researcher would go to the individual and assist that student by answering his/her questions or relating whatever information the student needed. Never did the researcher play the piece for a control subject.

In a study of this type, the possibility of researcher bias is always present. Every effort was made by the researcher to strictly control the experiment at all times. If there was psychological empathy by the researcher in favor of a specific group, it would have been in favor of the control subjects who were not developing sight-reading skills as rapidly as the experimental subjects.

CHAPTER IV

THE DATA AND RESULTS OF THE STUDY

Pretest Results

The data from the piano sight-reading pretest was not subjected to statistical analysis since the purpose of that test was to screen those students with measurable piano sight-reading skills from the study. Moreover, since only those students who scored zero on this test were retained in the study, the data gathered does not lend itself to statistical treatment. Thus, the pretest in this study did not function as a typical pretest in the usual pretest-posttest control group design, which allows the subtraction of pretest scores from posttest scores to ascertain achievement gain.

Readiness Test Results

The researcher administered the first readiness test (R_1) during the first two class sessions, prior to any instruction, to facilitate group comparison. The scores of R_1 revealed a wide variation of musical knowledge and skills among subjects in all groups. About half of the subjects demonstrated some knowledge of rhythm values and note

(pitch) names, but very few could match notes to the keyboard, locate specific keys at the piano, or tap simple rhythms (Tables 4-6).

The analysis of variance (ANOVA) was employed to analyze the data gathered from R_1. The results verified group equivalence in regard to type (experimental and control), F=.60, p=.69, nonsignificant (N.S.); as well as time (day and night), F=.07, p=.79 (N.S.). An F value below 1 is not significant at the .01 level. These small F values indicate that there is no appreciable or dependable difference that can be associated with class time or group selection.

After all subjects had completed four class periods of readiness training, the researcher administered the second readiness test (R_2) to verify group equivalence. All students correctly answered all of the questions on sub-tests 1-4. On sub-test 5 (rhythm tapping), no student in any group made more than three errors out of a possible 84 points (Table 6).

Greater heterogeneity was found in the scores of sub-tests 6-8 (auditory-visual discrimination of pitch and rhythm). These sub-tests proved to be quite challenging to all subjects. Although every subject scored some points on every sub-test, rarely did any student approach a perfect score (Tables 7 and 8).

An analysis of variance procedure was also used to analyze the results of sub-tests 6-8 and to determine if the

TABLE 4

A COMPARISON OF R_1 SCORES
FOR THE CONTROL GROUPS

DAY CONTROL

Student ID #	Sub-Test 1 Labeling Rhythm (21 possible)	Sub-Test 2 Labeling Pitch (24 possible)	Sub-Test 3 Matching Notation To Keyboard (24 possible)	Sub-Test 4 Location Keys (7 possible)
1	17	12	0	0
2	0	0	0	0
3	0	12	0	0
4	0	1	0	0
5	20	24	24	7
6	10	12	0	7
7	0	24	0	0
8	14	0	0	0
9	0	0	0	0
10	0	12	1	0
11	10	12	0	0
12	21	24	0	0
Totals	92	133	25	14

TABLE 4 (Continued)

A COMPARISON OF R_1 SCORES
FOR THE CONTROL GROUPS

EVENING CONTROL

Student ID#	Sub-Test 1 Labeling Rhythm (21 possible)	Sub-Test 2 Labeling Pitch (24 possible)	Sub-Test 3 Matching Notation To Keyboard (24 possible)	Sub-Test 4 Locating Keys (7 possible)
13	0	19	0	0
14	14	24	24	7
15	12	11	1	1
16	0	0	0	0
17	0	0	0	0
18	11	0	0	0
19	0	0	0	0
20	0	0	4	0
21	19	16	0	5
22	13	20	0	0
23	0	0	0	0
24	12	0	0	0
Total	81	90	29	13
Combined Total	173	223	54	27

TABLE 5

A COMPARISON OF R_1 SCORES
FOR THE EXPERIMENTAL GROUPS

DAY EXPERIMENTAL

Student ID#	Sub-Test 1 Labeling Rhythm (21 possible)	Sub-Test 2 Labeling Pitch (24 possible)	Sub-Test 3 Matching Notation To Keyboard (24 possible)	Sub-Test 4 Locating Keys (7 possible)
25	13	24	2	2
26	21	24	24	7
27	0	0	0	0
28	17	12	12	7
29	0	16	0	0
30	14	8	0	0
31	17	24	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	19	12	7	7
36	0	0	0	0
Total	101	120	45	23

TABLE 5 (Continued)

A COMPARISON OF R_1 SCORES
FOR THE EXPERIMENTAL GROUPS

EVENING EXPERIMENTAL

Student ID#	Sub-Test 1 Labeling Rhythm (21 possible)	Sub-Test 2 Labeling Pitch (24 possible)	Sub-Test 3 Matching Notation To Keyboard (24 possible)	Sub-Test 4 Location Keys (7 possible)
37	0	0	0	0
38	14	24	15	7
39	0	0	0	0
40	18	10	0	0
41	0	0	0	0
42	21	24	0	2
43	0	0	0	0
44	21	15	0	2
45	0	0	0	0
46	0	0	0	0
47	3	0	0	0
48	19	24	24	7
Total	96	97	39	18
Combined Total	197	217	84	41

TABLE 6

A COMPARISON OF R_1 AND R_2 SCORES
FOR SUB-TEST
5, RHYTHM TAPPING

	Day Control		Day Experimental	
	R_1	R_2	R_1	R_2
	25	84	26	84
	0	83	62	83
	0	84	0	84
	0	81	24	84
	49	84	0	84
	7	83	0	81
	0	84	17	84
	0	84	0	84
	0	84	0	84
	0	84	0	84
	0	84	15	84
	56	84	0	82
Total	137	1003	144	1002

TABLE 6 (Continued)

A COMPARISON OF R_1 AND R_2 SCORES
FOR SUB-TEST
5, RHYTHM TAPPING

Evening Control		Evening Experimental	
R_1	R_2	R_1	R_2
0	81	0	84
45	84	22	83
41	84	0	84
0	84	25	84
0	84	0	81
0	84	12	84
0	84	0	84
0	84	23	84
31	81	0	84
23	84	0	83
0	84	0	84
0	83	71	84
Total 140	1001	153	1003
Combined Total 277	1004	297	1005

TABLE 7

R_2 SCORES FOR SUB-TESTS
6, 7, AND 8
(COLWELL TEST)
FOR CONTROL GROUPS

DAY CONTROL				
Student ID #	Sub-Test 6 Pitch (28 Possible)	Sub-Test 7 Rhythm 1 (32 Possible)	Sub-Test 8 Rhythm 2 (19 Possible)	Total Score
1	12	15	9	36
2	5	5	5	15
3	6	4	6	16
4	5	6	7	17
5	11	9	7	27
6	12	4	7	23
7	5	8	5	18
8	4	5	5	14
9	6	5	4	15
10	3	7	6	16
11	7	7	4	18
12	9	6	8	25
Total	85	81	72	240

TABLE 7 (Continued)

R_2 SCORES FOR SUB-TESTS
6, 7, AND 8
(COLWELL TEST)
FOR CONTROL GROUPS

EVENING CONTROL

Student ID #	Sub-Test 6 Pitch (28 Possible)	Sub-Test 7 Rhythm 1 (32 Possible)	Sub-Test 8 Rhythm 2 (19 Possible)	Total Score
13	5	5	5	15
14	6	11	6	23
15	13	14	4	31
16	7	7	5	19
17	5	5	5	15
18	4	12	4	20
19	5	13	6	24
20	7	8	7	22
21	4	8	7	19
22	9	5	5	19
23	8	7	6	21
24	5	3	7	15
Total	78	98	67	243
Combined Total	163	179	139	483

TABLE 8

R_2 SCORES FOR SUB-TESTS 6, 7, AND 8 (COLWELL TEST) FOR THE EXPERIMENTAL GROUPS

DAY EXPERIMENTAL

Student ID#	Sub-Test 6 Pitch (28 possible)	Sub-Test 7 Rhythm 1 (32 possible)	Sub-Test 8 Rhythm 2 (19 possible)	Total Score
25	11	10	7	28
26	8	11	13	32
27	3	6	4	18
28	5	8	7	20
29	9	7	6	22
30	4	9	7	20
31	6	9	13	28
32	7	7	7	21
33	5	5	5	15
34	3	10	6	19
35	5	7	5	17
36	3	6	4	13
Total	69	95	84	248

TABLE 8 (Continued)

R_2 SCORES FOR SUB-TESTS
6, 7, AND 8
(COLWELL TEST)
FOR THE EXPERIMENTAL GROUPS

EVENING EXPERIMENTAL

Student ID #	Sub-Test 6 Pitch (28 Possible)	Sub-Test 7 Rhythm 1 (32 Possible)	Sub-Test 8 Rhythm 2 (19 Possible)	Total Score
37	6	8	5	19
38	5	6	6	17
39	7	4	5	16
40	3	7	6	16
41	4	9	6	19
42	4	6	5	15
43	5	4	5	14
44	5	11	5	21
45	5	7	5	17
46	6	10	14	30
47	6	8	8	22
48	11	6	15	32
Total	67	86	85	238
Combined Total	136	181	169	486

groups were identifiably different at the outset. The results were consistent with initial findings, both in regard to time (day and evening groups), F=.03,p=.86 (N.S); and type (experimental and control groups), F=.11,p=.74 (N.S.).

Thus, individual differences on all eight sub-tests R_2 were not significant. Those individuals with no readiness skills at the first class appear to have acquired those skills easily within the first four class sessions.

Analysis Procedures for Posttest Data

A two-way analysis of variance procedure was used to analyze the posttest data. The combined scores of the two experimental groups were much higher than those of the two control groups (Table 9). A comparison of the variances of the experimental and control groups on the posttest reveals unequal within-group variance (Table 10). The simplest safeguard against bad effects from inequality of variance is the use of equal cell numbers.[1] This study has equal cells, since each of the four classes was comprised of twelve subjects.

Results of Testing Hypotheses

It was hypothesized that subjects in the experimental groups would do significantly better than subjects in the control groups with regard to pitch reading and rhythm

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[1]W. L. Hayes, Statistics for the Social Sciences (New York: Holt, Rinehart and Winston, 1973).

TABLE 9

A COMPARISON OF POSTTEST RAW SCORES AND READINESS TEST SCORES FOR THE EXPERIMENTAL GROUPS

ID	POSTTEST PITCH	POSTTEST RHYTHM	READINESS TEST R_1 SUB-TESTS 1-5	READINESS TEST R_2 SUB-TESTS 6-8
Day 1	170	123	54	36
2	170	123	0	15
3	165	113	12	16
4	170	123	1	17
5	162	121	124	27
6	169	123	36	23
7	169	123	24	18
8	164	123	14	14
9	164	119	0	15
10	153	115	13	16
11	167	123	22	18
12	166	116	101	25
	1989	1445	401	240

TABLE 9 (Continued)

A COMPARISON OF POSTTEST RAW SCORES AND READINESS TEST SCORES FOR THE EXPERIMENTAL GROUPS

ID	POSTTEST PITCH	POSTTEST RHYTHM	READINESS TEST R_1 SUB-TESTS 1-5	READINESS TEST R_2 SUB-TEST 6-8
Evening				
25	169	123	67	28
26	164	121	138	32
27	167	118	0	18
28	169	123	72	20
29	170	123	16	22
30	154	108	22	20
31	160	111	58	28
32	170	123	0	21
33	163	107	0	15
34	165	120	0	19
35	167	123	60	17
36	166	121	0	13
Total	1984	1421	433	248

TABLE 9 (Continued)

A COMPARISON OF POSTTEST RAW SCORES AND READINESS TEST SCORES FOR THE CONTROL GROUPS

ID	POSTTEST PITCH	POSTTEST RHYTHM	READINESS TEST R_1 SUB-TESTS 1-5	READINESS TEST R_2 SUB-TESTS 6-8
Day 13	147	102	19	15
14	107	83	114	23
15	128	84	66	31
16	93	88	0	19
17	161	116	0	15
18	132	104	11	20
19	35	29	0	24
20	133	105	0	22
21	112	69	75	19
22	119	109	56	19
23	107	95	0	21
24	138	95	12	15
	1412	1079	353	243

TABLE 9 (Continued)

A COMPARISON OF POSTTEST RAW SCORES AND READINESS TEST SCORES FOR THE CONTROL GROUPS

ID	POSTTEST PITCH	POSTTEST RHYTHM	READINESS TEST R_1 SUB-TESTS 1-5	READINESS TEST R_2 SUB-TESTS 6-8
Evening				
37	88	87	0	19
38	153	108	82	17
39	170	88	0	16
40	156	101	53	16
41	71	79	0	19
42	156	89	59	15
43	154	110	0	14
44	54	58	61	21
45	125	103	0	17
46	97	98	0	30
47	115	84	3	22
48	115	82	145	32
	1454	1087	403	238

reading as measured by the sight-reading posttest. The analysis of variance indicated significant difference between the experimental and control groups with regard to the two sight-reading skills measured. These results indicate that playing the melody by rote during the prestudy procedure had a significant effect on sight-reading skill development.

TABLE 10

COMPARISON OF VARIANCES BETWEEN EXPERIMENTAL POSTTESTS AND CONTROL POSTTESTS

	Pitch Reading		Rhythm Reading	
	Experimental	Control	Experimental	Control
Day	23.62	1036.20	13.99	536.39
Evening	21.81	1427.33	37.70	212.00

Results of Testing Hypotheses One and Two

The null propositions of the first two hypotheses were tested as follows:

1. There will be no significant difference in pitch-reading skills between the experimental and control groups as measured by the posttest and determined at the .01 level of significance by the analysis of variance.

2. There will be no significant difference in rhythm-reading skills between the experimental and control groups as measured by the posttest and determined at the .01 level of significance by the analysis of variance.

The results of the analysis of variance for pitch-reading skills on the posttest indicated a difference between the experimental and control groups significant at the .01 level. The results for the rhythm-reading skills portion of the posttest also indicated a difference between the experimental and control groups significant at the .01 level. Thus, the first and second null hypotheses were rejected (Table 11).

TABLE 11

Summary Table of the Analysis of Variance for the Comparison of Pitch Reading Between Experimental and Control Groups on the Posttest and for the Comparison of Rhythm Reading Between Experimental and Control Groups on the Posttest

Source	F Value	p(F)
Pitch reading Experimental Versus Control	40.69	.0001
Rhythm reading Experimental Versus Control	51.02	.0001

As the data shows, rote playing by experimental subjects greatly enhanced their performance skills in rhythm reading and pitch reading when compared to subjects in the control groups.

Results of Testing Hypotheses Three and Four

The last two null hypotheses were also tested:

> 3. There will be no significant difference in pitch-reading skills between the day and evening groups as measured by the posttest and determined at the .01 level of significance by an analysis of variance.
>
> 4. There will be no significant difference in rhythmic-reading skills between the day and evening groups as measured by the posttest and determined at the .01 level of significance by an analysis of variance.

The analysis of variance procedure revealed no significant difference between the sight-reading skills of the day and evening subjects in each of the two sight-reading skills tested, since the probabilities of .83 and .87 are much larger than .01 (Table 12). Thus, the third and fourth hypotheses were accepted. Because the results of the day groups are similar to those of the evening groups, greater significance can be placed in the findings than would otherwise be possible.

In order to confirm the results of the analysis of variance, two other statistical procedures were used to analyze the data. Both the Kruskal-Wallis analysis of variance procedure and the Friedman analysis of variance procedure gave the same result as the two-way ANOVA.[1]

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[1] See Appendix E for results of the Kruskal-Wallis analysis of variance and the Friedman analysis of variance.

TABLE 12

Summary Table of the Analysis of Variance for the Comparison of Pitch Reading Between Day and Evening Groups on the Posttest and for the Comparison of Rhythm Reading Between Day and Evening Groups on the Posttest

Source	F Value	p(F)
Pitch reading Day versus Evening	.05	.83
Rhythm reading Day versus Evening	.03	.87

Comparison of Mean Ranks

Out of a possible 24 ranks for each of the two samples (day and evening), obvious differences were observed between the mean ranks for the experimental and control groups with regard to the two sight-reading skills measured (Table 13).

On the pitch-reading posttest, twenty-two experimental subjects scored within the top twelve ranks while only two control subjects scored within this parameter. On the rhythm-reading posttest, twenty-two experimental subjects scored within the top twelve ranks, while only three control subjects scored within this parameter. (Between one experimental subject and one control subject, there

was a tie of 12.5.)

Reliability of Judges in Scoring Posttest

The Friedman analysis of variance procedure was employed to ascertain the degree of agreement among judges' scoring techniques for the posttest. A multiple comparison

TABLE 13

Comparison of Mean Ranks Between Experimental Posttest and Control Posttest

	Pitch Reading		Rhythm Reading	
	Experimental	Control	Experimental	Control
Day	18.41	6.58	18.29	6.70
Evening	17.37	7.62	18.20	6.79

of the scoring accuracy of all three judges indicated F= .20, p=.82 (N.S.) on the pitch portion of the posttest, and F= .35, p=.70 (N.S.) on the rhythmic portion of the posttest. These small F values indicate that there is no appreciable or dependable difference that can be associated with the scoring techniques of the three judges. The Friedman analysis of variance is both similar and equivalent to Kendall's Coefficient of Concordance, since both produce the same result.[5]

[1]W. J. Conover, Practical Nonparametric Statistics, 2nd ed. (New York: John Wiley and Sons, 1980), p. 304.

CHAPTER V

SUMMARY AND CONCLUSIONS

Recapitulation

Many piano teachers believe that a student will learn to sight read faster if he/she does not hear the pieces played in advance. They believe that the student who hears the piece in advance will simply play by ear, rather than develop sight-reading skills. Yet notable musicians such as J. S. Bach and Shinichi Suzuki see great value in rote teaching and learning. The researcher believes that playing the melody by rote before seeing the printed page will lead the student to concentrate on melodic shape, direction, phrasing, fingering, and thereby significantly enhance sight-reading skills. The research question was "Will playing by rote provide the student an additional advantage to the development of sight-reading skills, or will playing by rote simple teach the student to play by ear and hinder the development of sight-reading skills?" The purpose of the study was to evaluate the impact of rote playing as a part of the prestudy procedure upon sight-reading skill development of beginning adult class piano students.

The research design for this study was a pretest-posttest control group design, with two additional tests for readiness given to examine group equivalency. This design was adopted because subjects could not be randomly selected.

The forty-eight subjects in this study comprised four beginning adult piano classes at Rose State College in Midwest City, Oklahoma. There were twelve students in each class. All forty-eight subjects completed the study. The classes met two hours per week for a period of fifteen weeks. Thirty minutes of each one hour session was devoted to the development of sight-reading skills.

Subjects in both the experimental and control groups followed a carefully structured analytical prestudy procedure. In addition, subjects in the experimental groups played the melody by rote during the prestudy procedure. Since all aspects of instruction were identical in all groups except for playing by rote, then the difference between the sight-reading skills of the experimental and control groups at the end of the study were attributed to the independent variable. The dependent variables were two sight-reading skills (pitch accuracy and rhythmic accuracy) as revealed through the administration of the posttest.

Results

A two-way analysis of variance (ANOVA) indicated

significant difference between the experimental and control groups with regard to two sight-reading skills measured. These results appear to indicate that playing the melody by rote during the prestudy procedure had a significant effect on sight-reading skill development.

The results of the ANOVA for pitch-reading skills, when subjects sight read the pitch portion of the posttest, indicated statistically significant difference between the experimental and control groups, $F=40.7$, $p=.0001$.

The results of the ANOVA for rhythm-reading skills, when subjects sight read the rhythm portion of the posttest, indicated statistically significant difference between the experimental and control groups, $F=51$, $p=.0001$.

The results of the ANOVA revealed no significant difference between the sight-reading skills of the day and evening subjects.

Conclusions

The researcher hypothesized that subjects in the experimental groups would do significantly better than subjects in the control groups with regard to pitch reading and rhythm reading as measured by the sight-reading posttest. Visual analysis of the raw data suggested an enormous difference between the two groups in favor of the experimental group. When this data was treated statistically, the two-way ANOVA confirmed the researcher's informal analysis by revealing a highly significant difference

between the experimental and control groups with regard to the sight-reading skills measured. These results suggest that playing the melody by rote during the prestudy procedure had a very dramatic impact on sight-reading skill development.

Obvious differences were observed between the mean ranks for the experimental and control groups with regard to the two sight-reading skills measured. On pitch reading twenty-two subjects from the experimental groups scored within the top twelve ranks, while only two subjects from the control groups scored within this parameter. On rhythm reading twenty-two subjects from the experimental groups scored within the top twelve ranks, while only three subjects from the control groups scored within this parameter. (Between one experimental subject and one control subject, there was a tie of 12.5).

Recommendations for Further Study

This study involved adult beginning class piano students who are hobbyists, not music majors. Thus, the results of this study are limited to that population. Further research is needed to study the effects of the independent variable upon the sight-reading skill development of other population groupings.

Several factors contributed to the focus of this study, including (1) course content, (2) test content, (3) use of the visualizer, and (4) the number of repetitions of

playing the melody by rote. By altering any of these factors, a different study might be designed to explore the effects of teaching subjects to play the melody by rote.

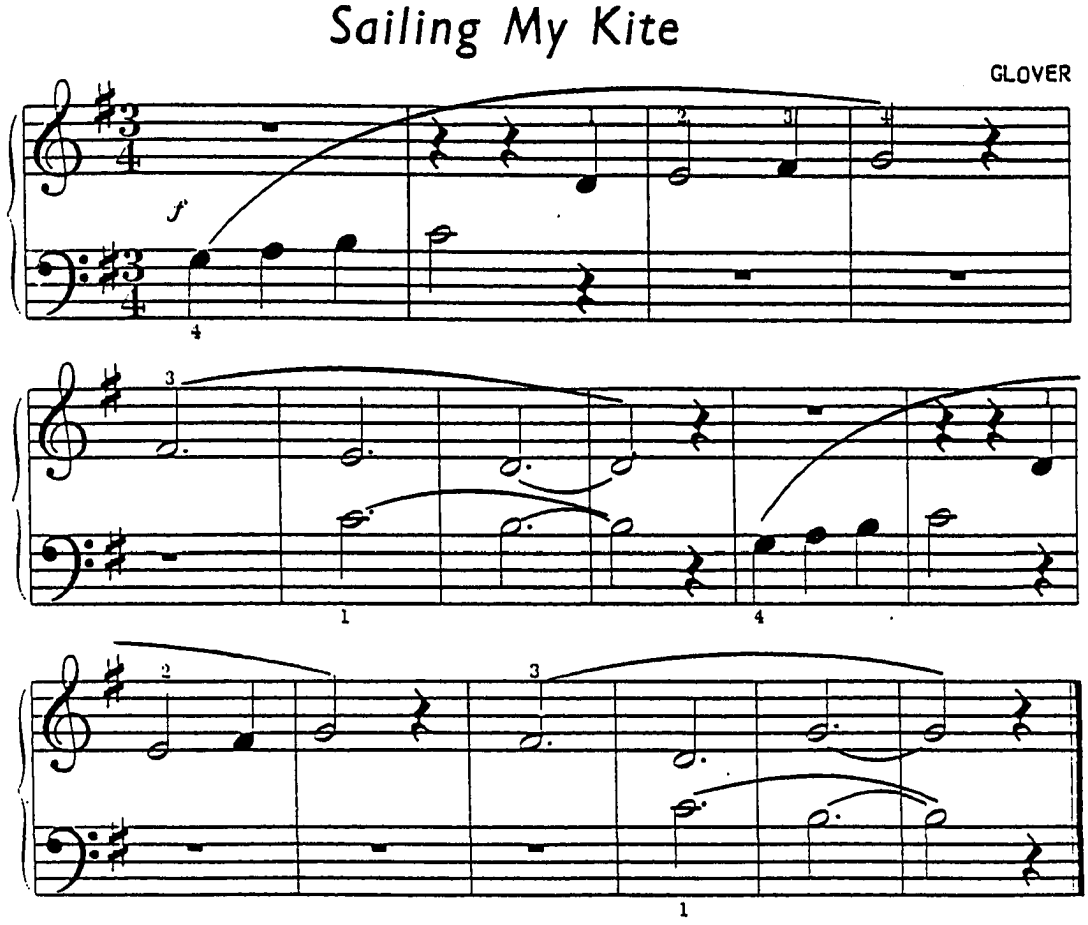
Other types of visualizers may be invented. Perhaps various types of visualizers could be used to increase achievement in other subjects. Perhaps music appreciation students would benefit from seeing the shape of the sound on a lighted keyboard visualizer.

Much research has been done on colors of lights. The lights on the visualizer used in this study were white for the white keys and red for the black keys. A study is needed to examine the effects of the color of the visualizer lights upon auditory retention.

APPENDIX A

PILOT TEST EXAMPLES

PILOT TEST, EXAMPLE 1



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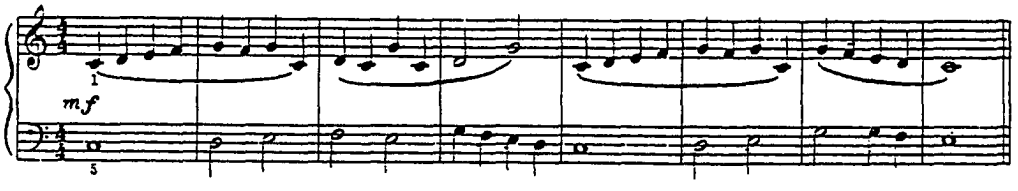
David Carr Glover and Louise Garrow, Piano Repertoire, Primer Level (Rockville Centre, N.Y: Belwin-Mills Publishing Corp., 1967), p. 20.

PILOT TEST, EXAMPLE 2



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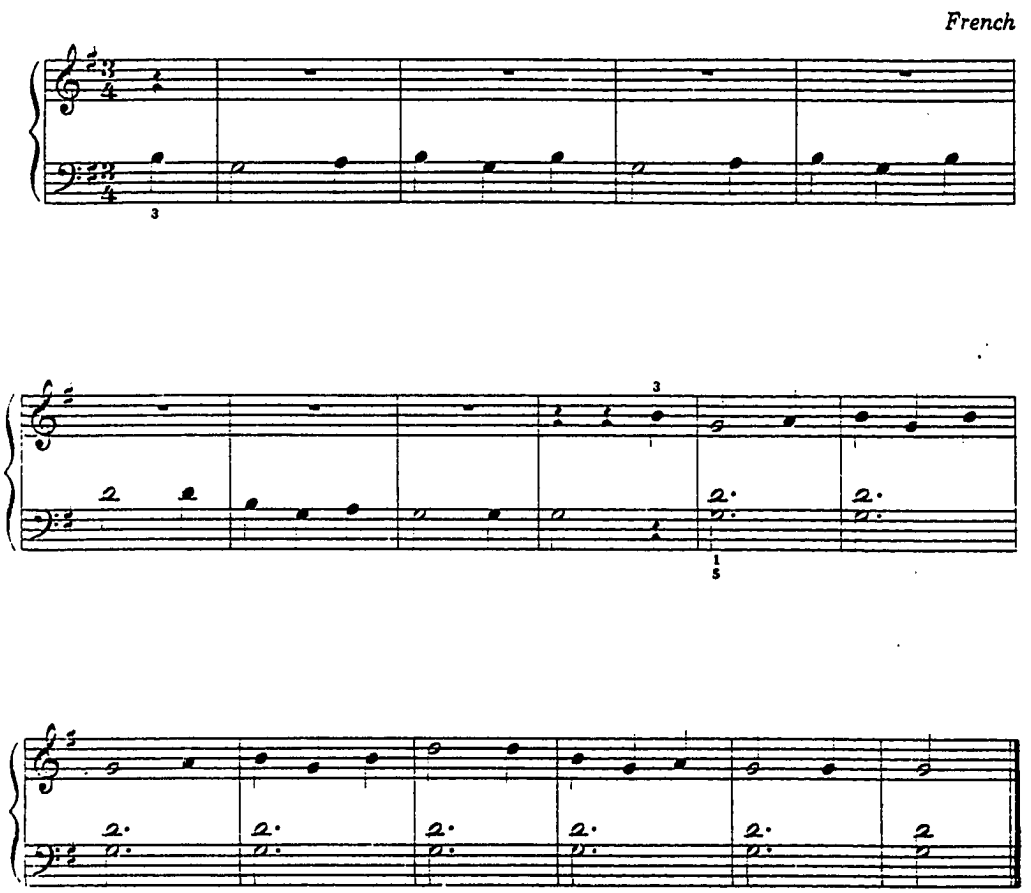
Al Hermann, An Introduction to Organizing Popular Music, Primer Level (N.Y: Robbins Music Corp., 1971), p. 26.

PILOT TEST, EXAMPLE 3



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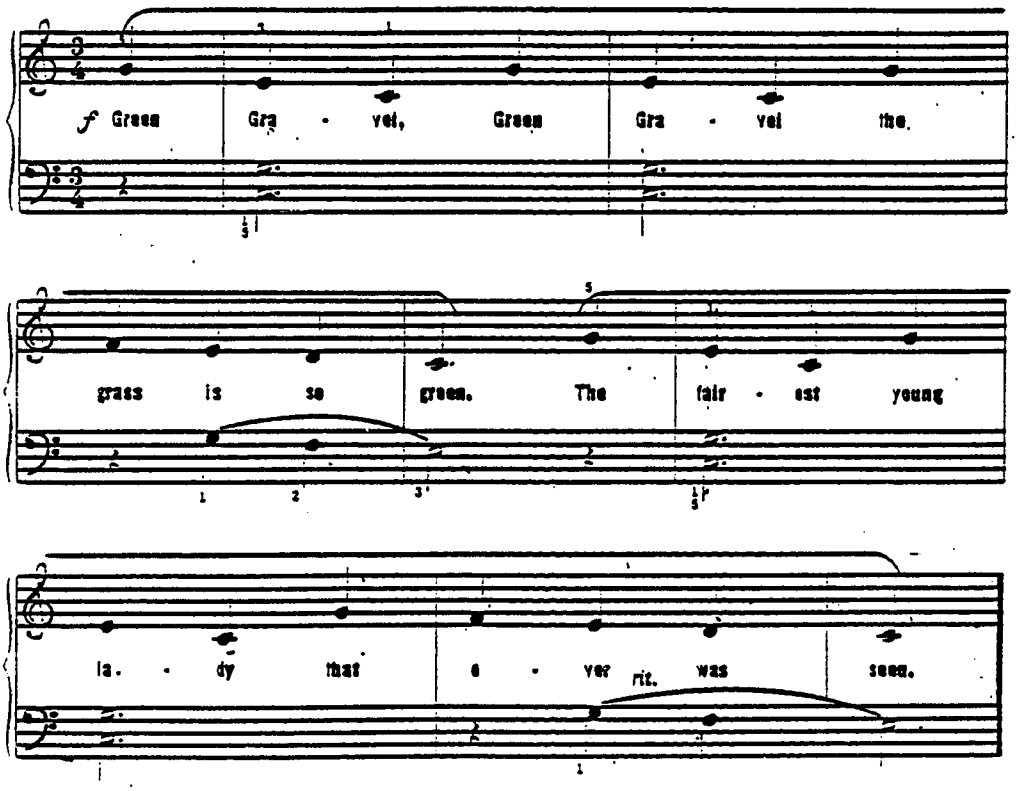
Paul Sheftel, Sounds and Shapes, Book 1 (Midland, N.J: The University Society, Inc., 1970), p. 20.

PILOT TEST, EXAMPLE 4



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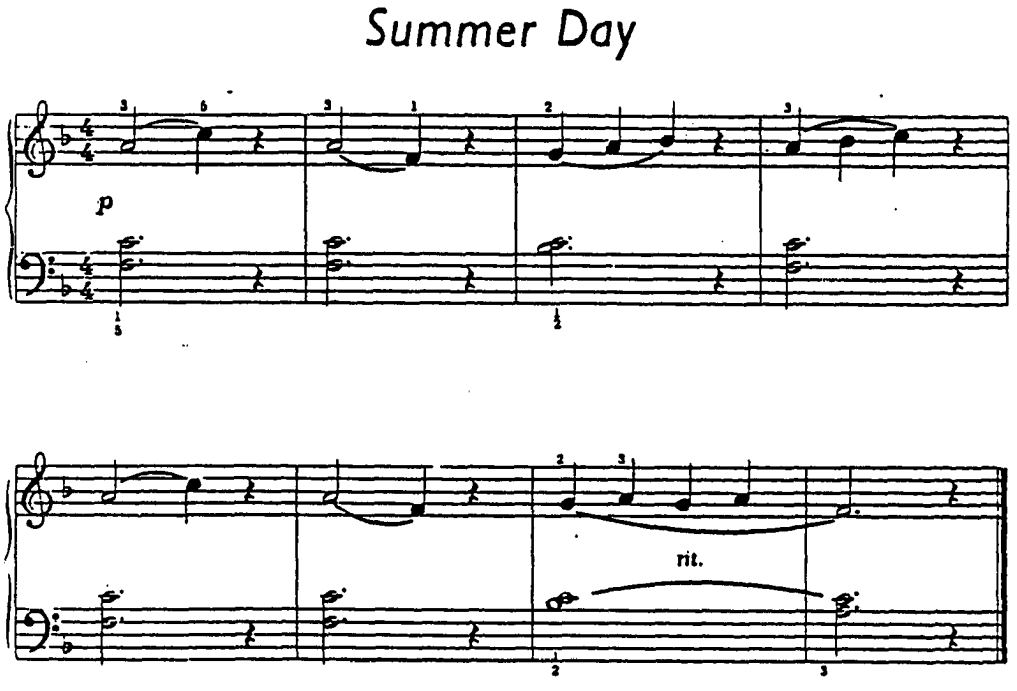
PILOT TEST, EXAMPLE 5



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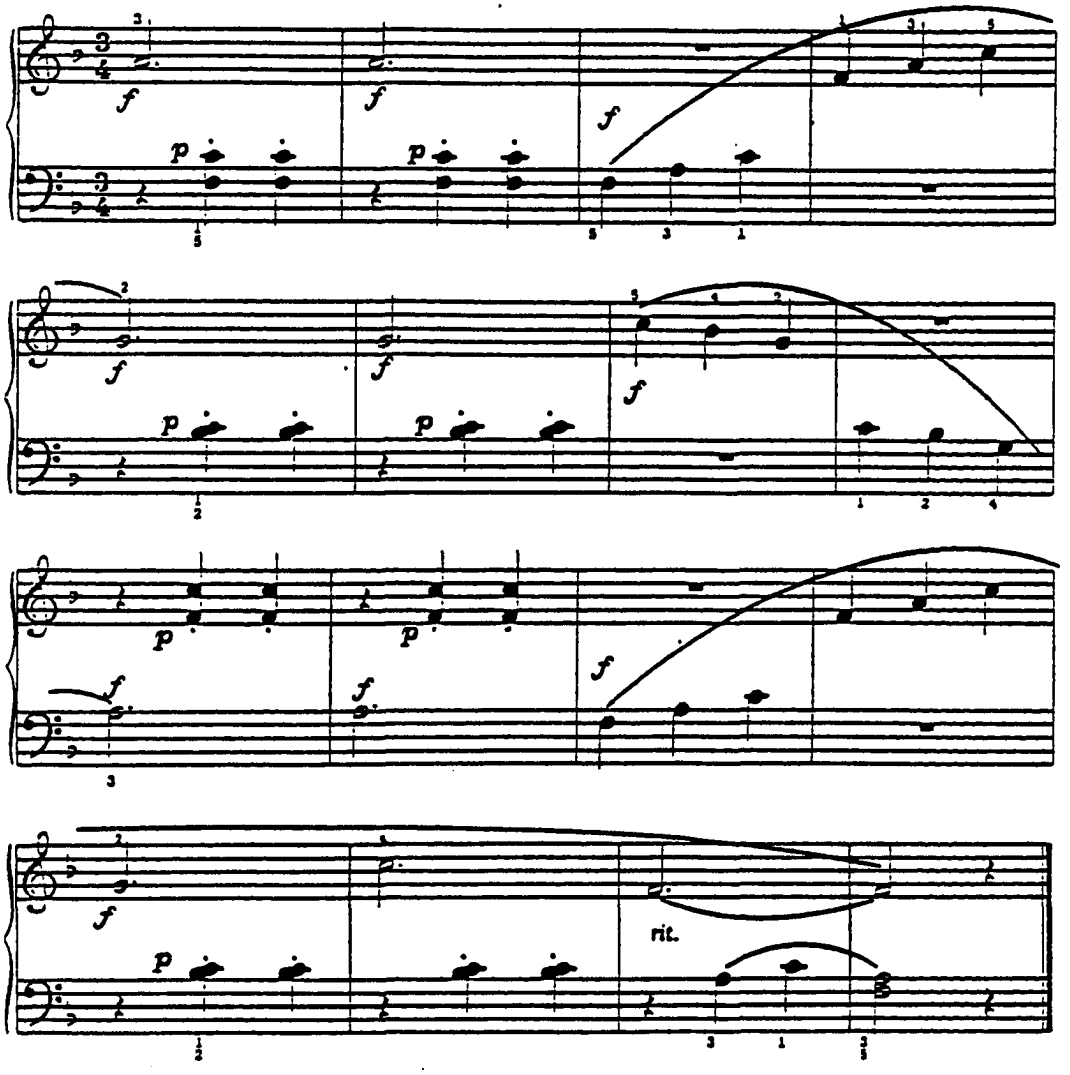
PILOT TEST, EXAMPLE 6

GLOVER



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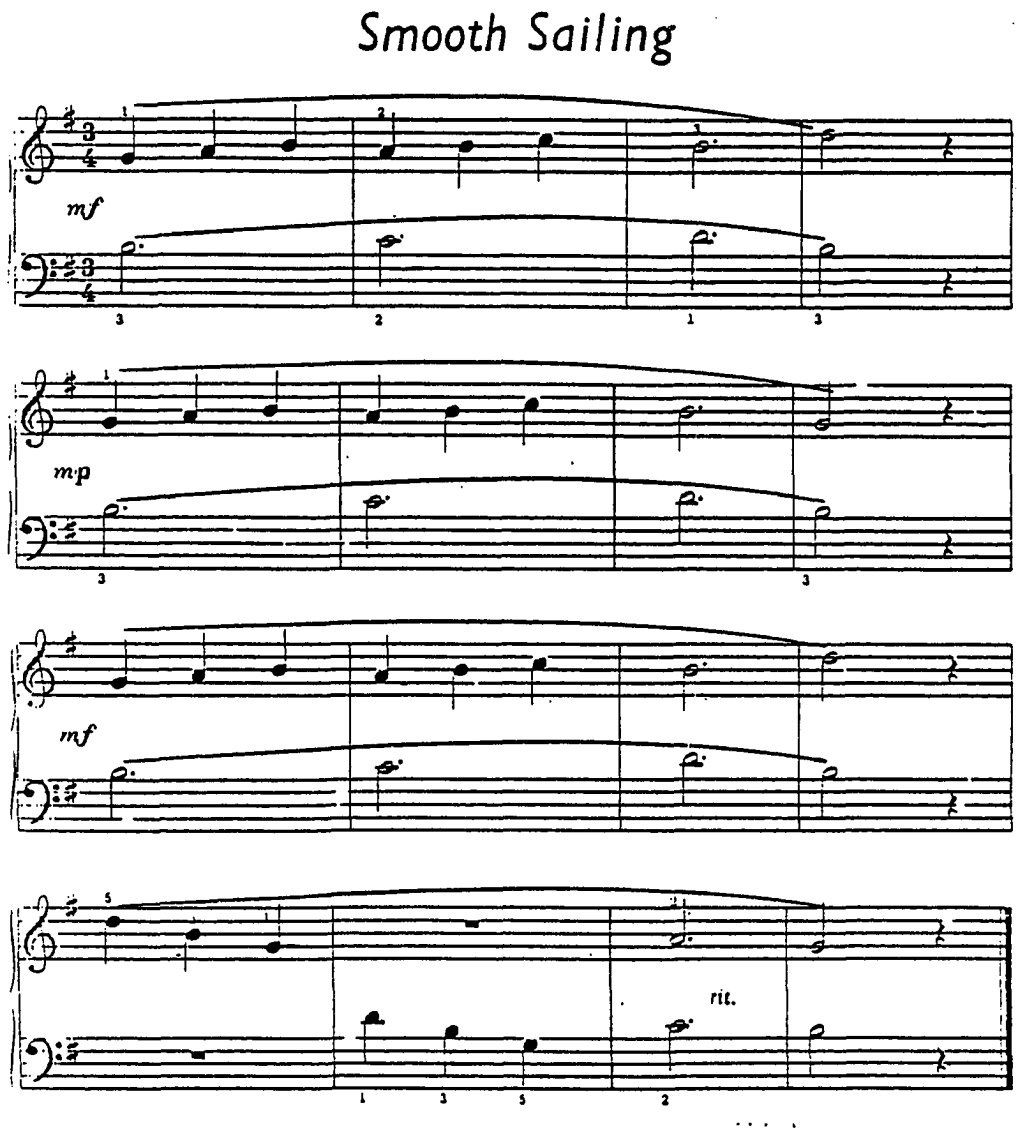
PILOT TEST, EXAMPLE 7



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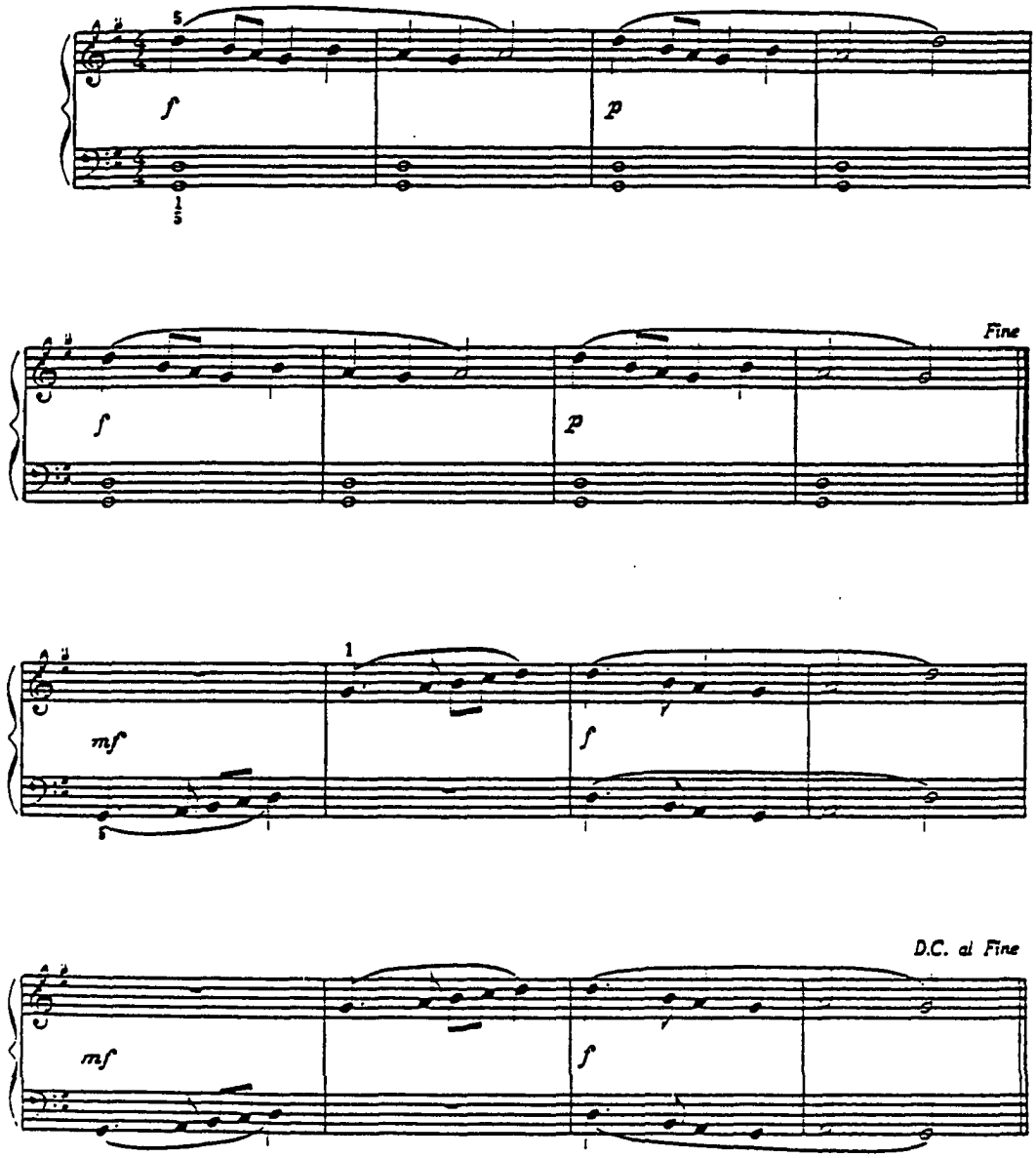
PILOT TEST, EXAMPLE 8



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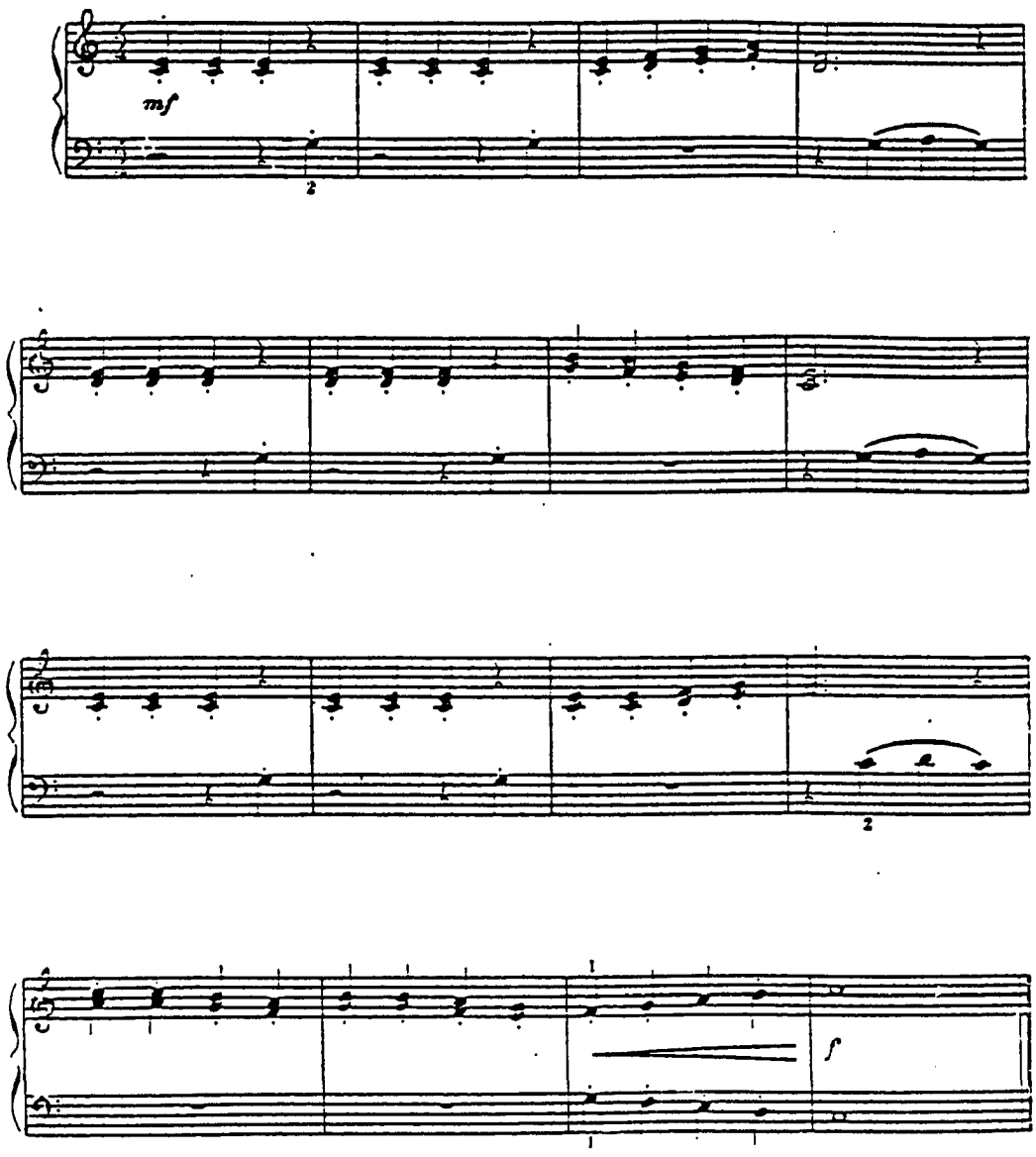
PILOT TEST, EXAMPLE 9



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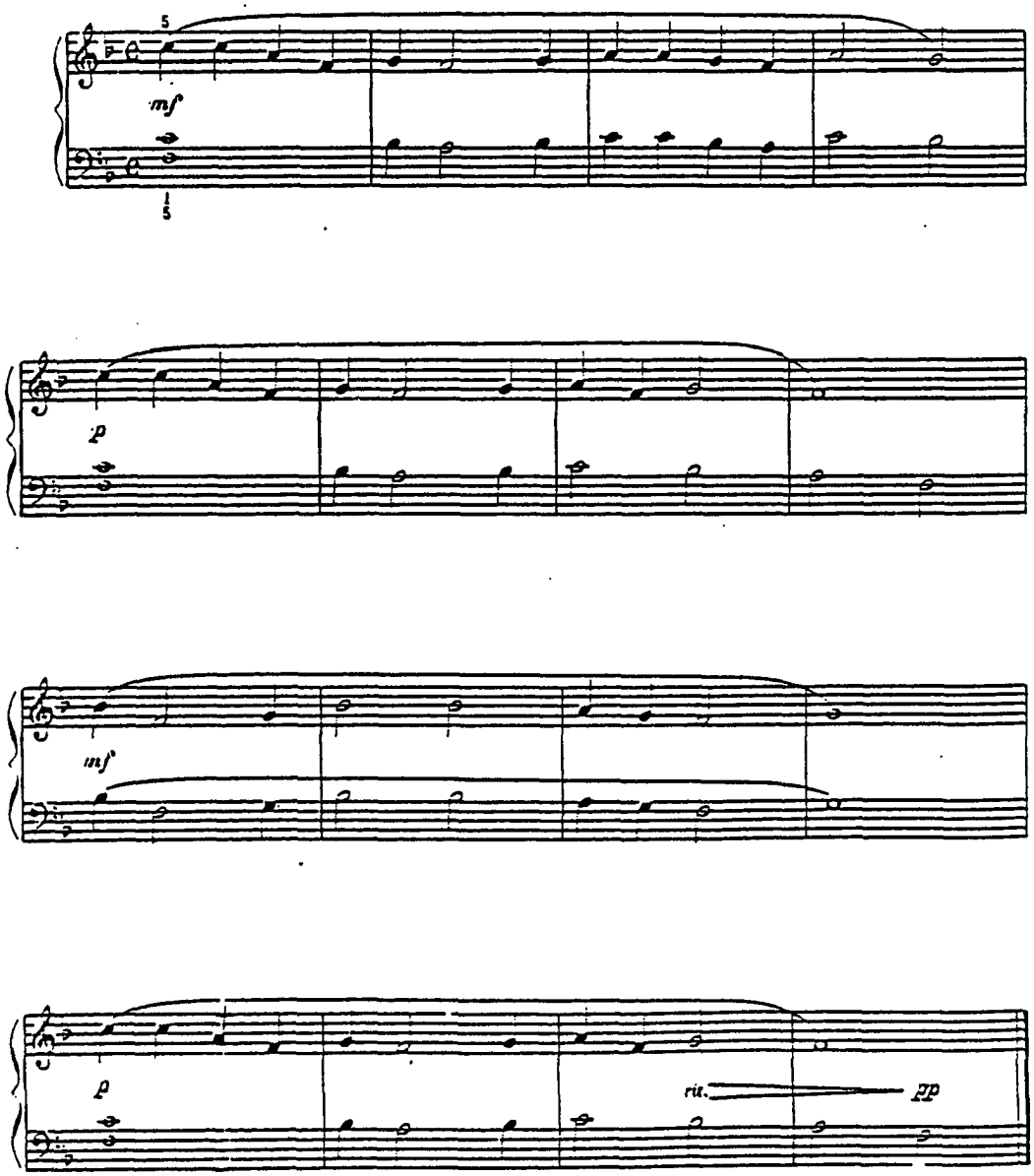
PILOT TEST, EXAMPLE 10



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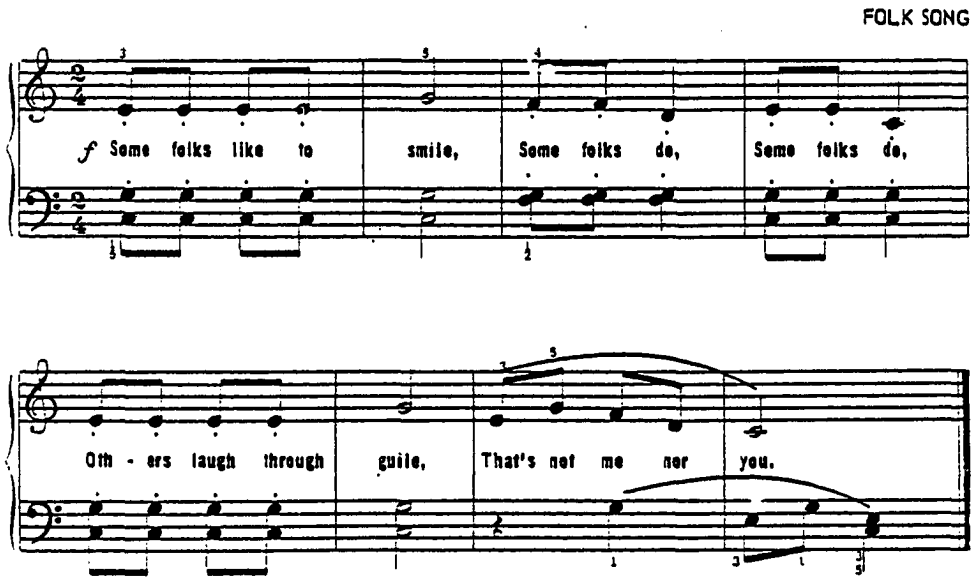
PILOT TEST, EXAMPLE 11



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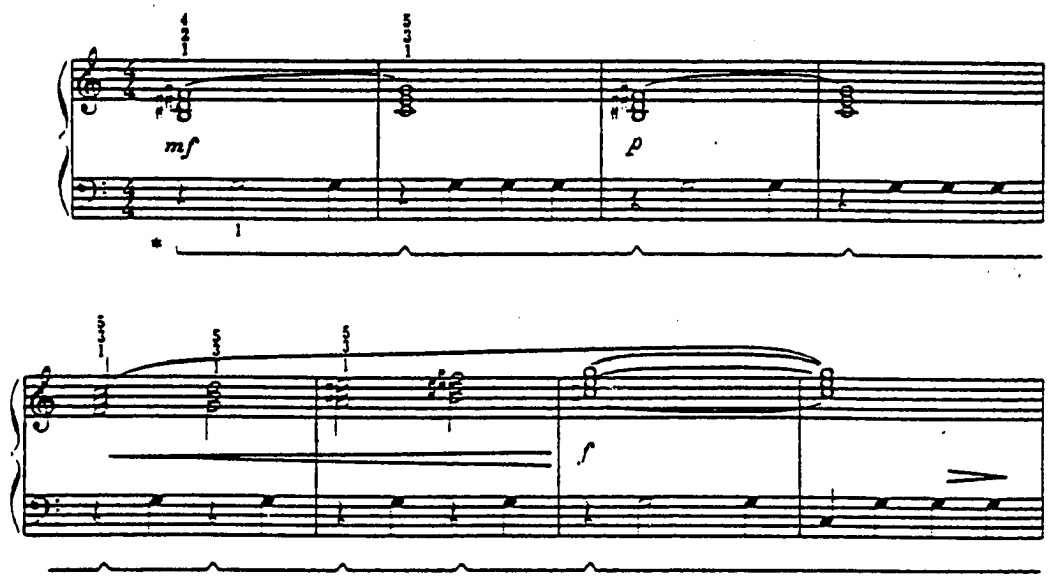
PILOT TEST, EXAMPLE 12



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APPENDIX B

PRETEST AND POSTTEST

Administration

Scoring Directions

Scoring Sheet

Examples

ADMINISTRATION OF THE PRETEST AND POSTTEST

Each student was tested individually, and each performance was recorded on a tape recorder. No more than one minute was allowed for analytical prestudy. Each student was read the following directions before he began to play:

> Play the following three pieces at the piano. A tape recorder will record your performance. Hold each note its correct rhythmic value. If you make mistakes, keep on playing. Do not back up, or try to correct mistakes. Before you begin to play, I will set the tempo for each piece with a metronome. You should maintain that tempo. Start when you are ready. I will turn the metronome off after the first measure.

SCORING DIRECTIONS

Errors will be valued in terms of negative points: one point for each rhythmic error, and one point for each pitch error. The judges may listen to the performances as many times as they wish. Accuracy of pitch and accuracy of rhythm will determine the score. The objective for the student will be to achieve the highest possible score. Errors will be summed and subtracted from the total amount of possible points. A description of the two error types (pitch and rhythm) is given below. These rules are similar to those given in the Watkins-Farnum Performance Scale.[1]

1. A pitch error is
   a. a note played on the wrong pitch.
   b. a note that is omitted.
   c. a note that is repeated.
   d. playing two notes at once rather than an intended single note.
2. A rhythmic error is
   a. a note or rest that does not occur where it is indicated.
   b. a note or rest not given its correct value.

---

[1]John Watkins and Stephen Farnum, The Watkins-Farnum Performance Scale (Winona, Minn: Hal Leonard Music, Inc., 1954), p. 7.

c. a note or rest that is not held long enough. A sustained note must be held within one count of the correct beat. A whole note in 4/4 meter held for three counts should be marked wrong. It must extend over into the beginning of the fourth count to be considered correct. If it extends past the end of the fourth count, into the beginning of the fifth, it again becomes wrong. Count to yourself and mark an error if the tone stops before you start to say the word "four" or after you have started to say the word "five".

d. when there are two eighth notes per beat, and one or both are played incorrectly. Mark only one error.

e. failure to hold a tied note its correct value. If is not held for five beats, in 4/4 meter, that is one rhythm error.

f. if there is a marked increase or decrease in tempo. If the increase or decrease in tempo within an exercise is less than twelve (12) beats per minute, no errors should be marked. Before evaluating the tests, you are asked to practice with the metronome to determine these limits and then use your judgment when assessing a student's performance. Where the increase or decrease is in excess of twelve beats per minute, mark wrong all beats played at the retarded or accelerated tempo for a maximum of four measures. After four measures, stop the student and inform him that he is going too slow or too fast. Indicate the correct tempo with the metronome and let him start again at that point. If he again excessively changes the tempo, say nothing but score each beat wrong which is played at the wrong tempo. (A return to normal tempo at any time is not counted as an error.)

g. going back in a piece to correct an error. After the error is marked, the judge will cease scoring until the student reaches the point where he stopped.

h. failure to hold  its correct value. Mark only one error, although there are two notes. If the two notes are not played simultaneously, mark only one error.

i. if a situation occurs for which no rule has been written, then all three judges will meet jointly with the researcher to decide the most appropriate rule for an unusual occurrence.

POSTTEST SCORING SHEET

Student's number_____ Judge's name_____

Composition No. 1

	Total possible points	Number of Errors	Score
Pitch	36	_____	_____
Rhythm	29	_____	_____

Composition No. 2

	Total possible points	Number of Errors	Score
Pitch	52	_____	_____
Rhythm	41	_____	_____

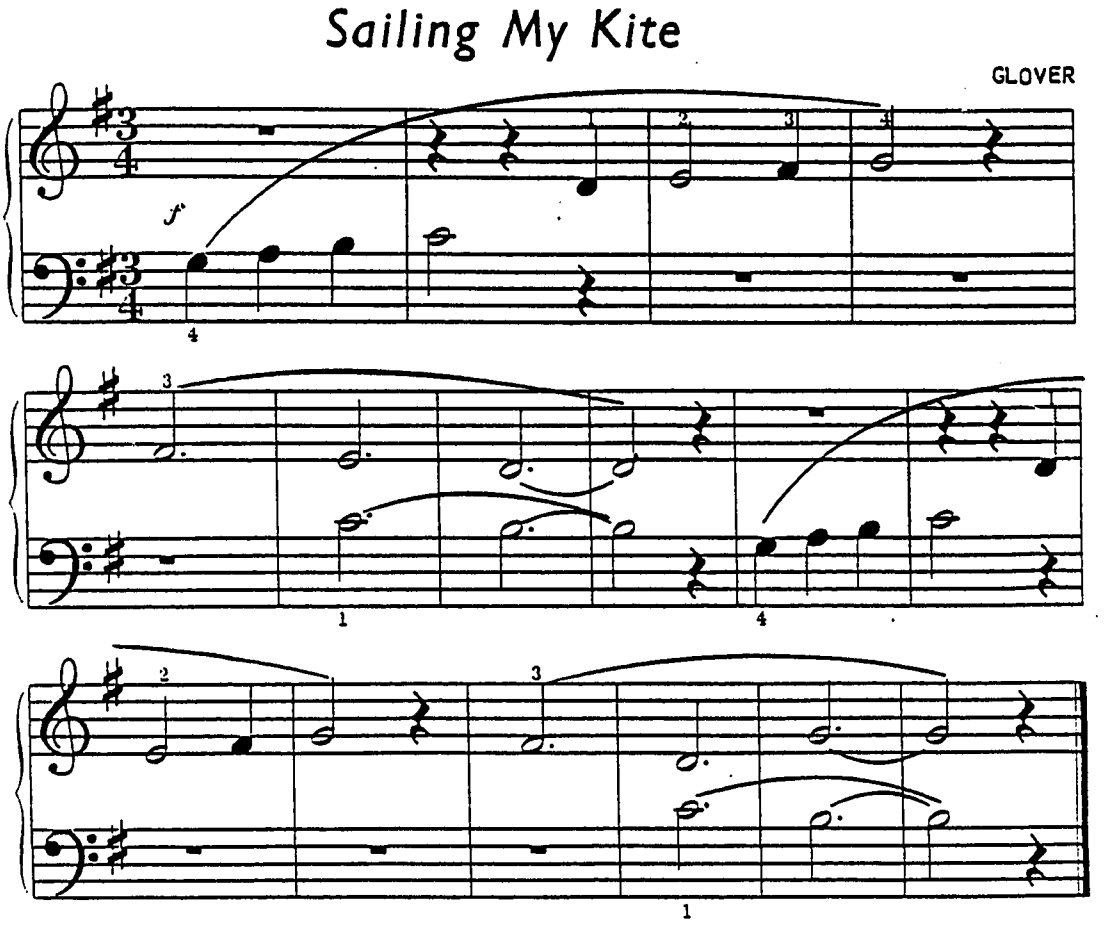
Composition No. 3

	Total possible points	Number of Errors	Score
Pitch	82	_____	_____
Rhythm	53	_____	_____

Total Pitch Score _____ (170 possible)

Total Rhythm Score_____ (123 possible)

PRETEST, EXAMPLE 1



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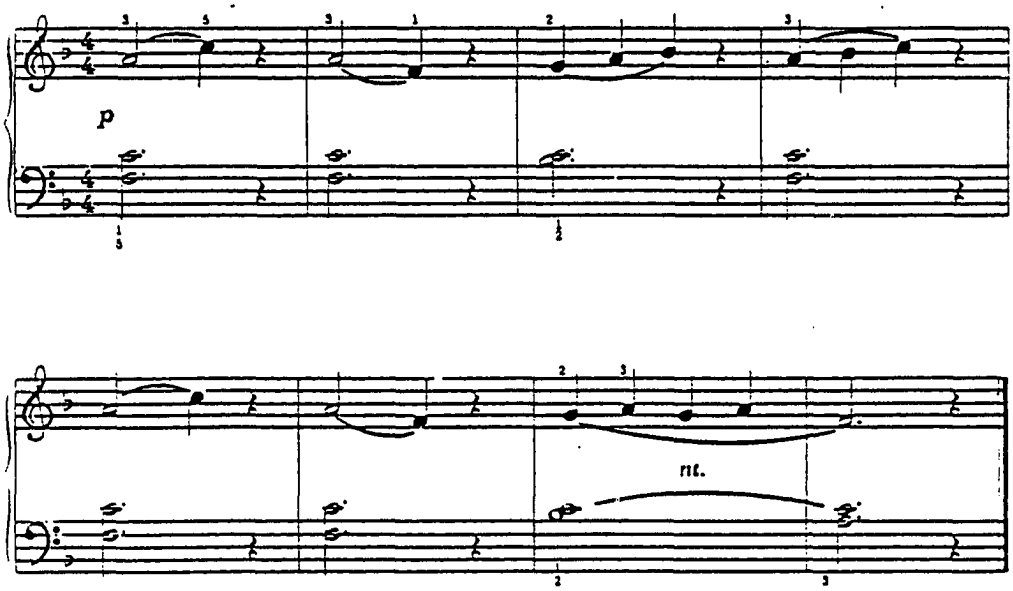
PRETEST, EXAMPLE 2

Summer Day



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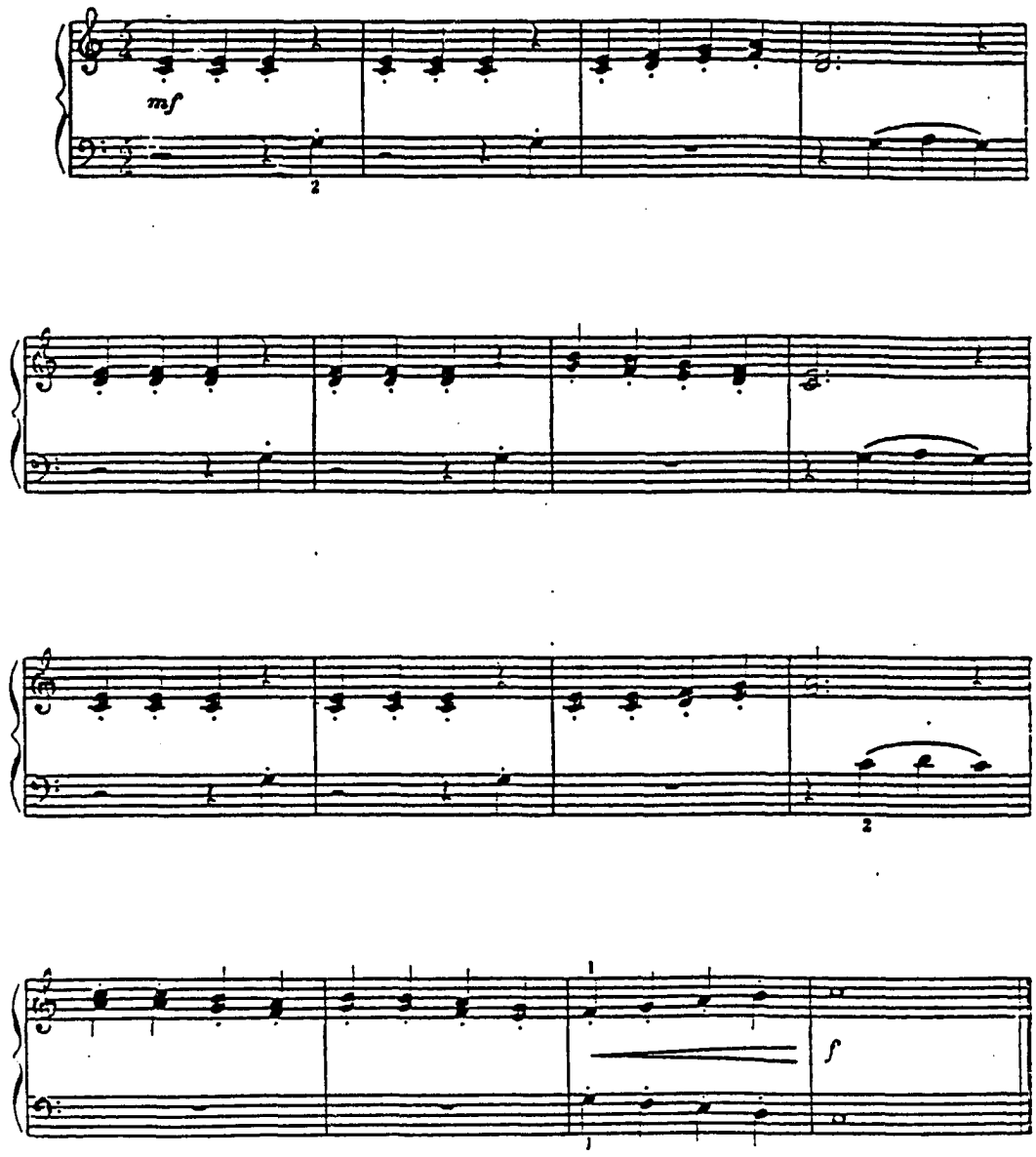
PRETEST, EXAMPLE 3



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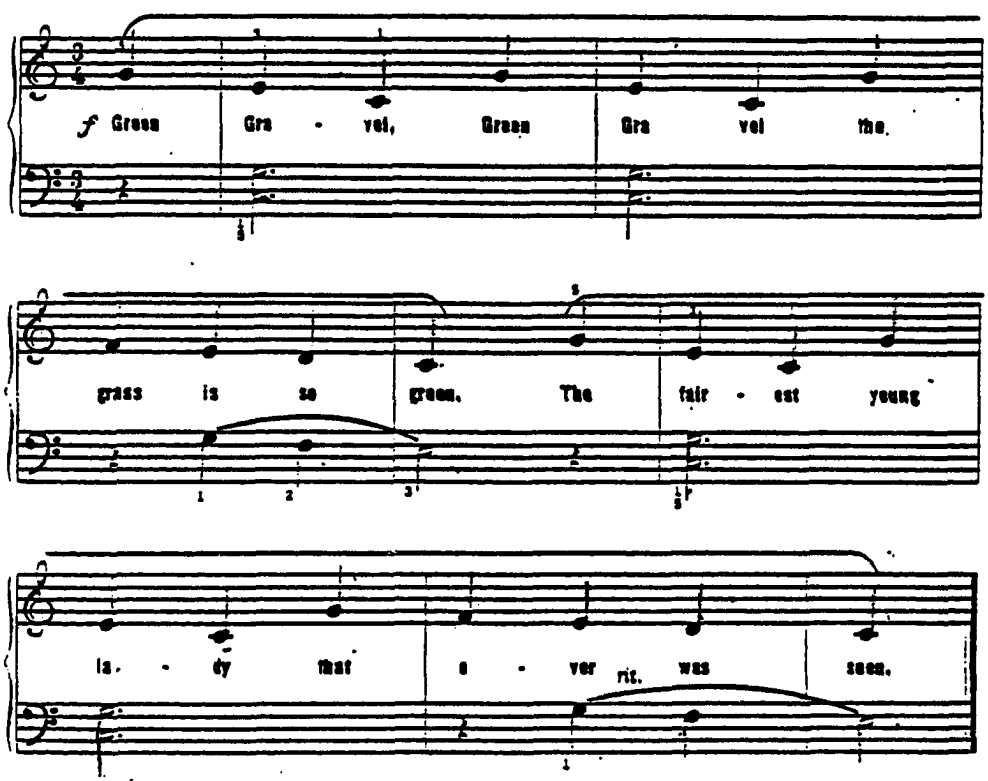
POSTTEST, EXAMPLE 1



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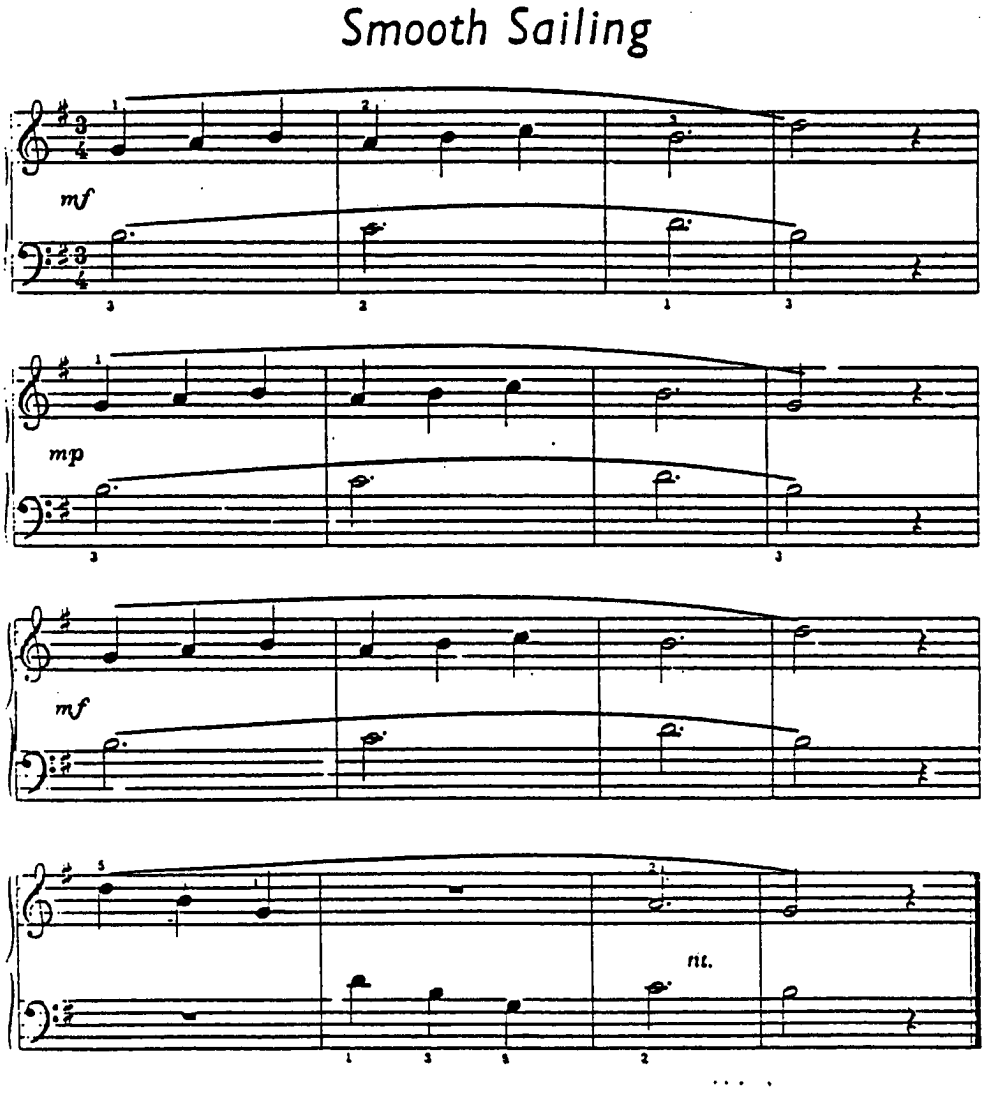
POSTTEST, EXAMPLE 2



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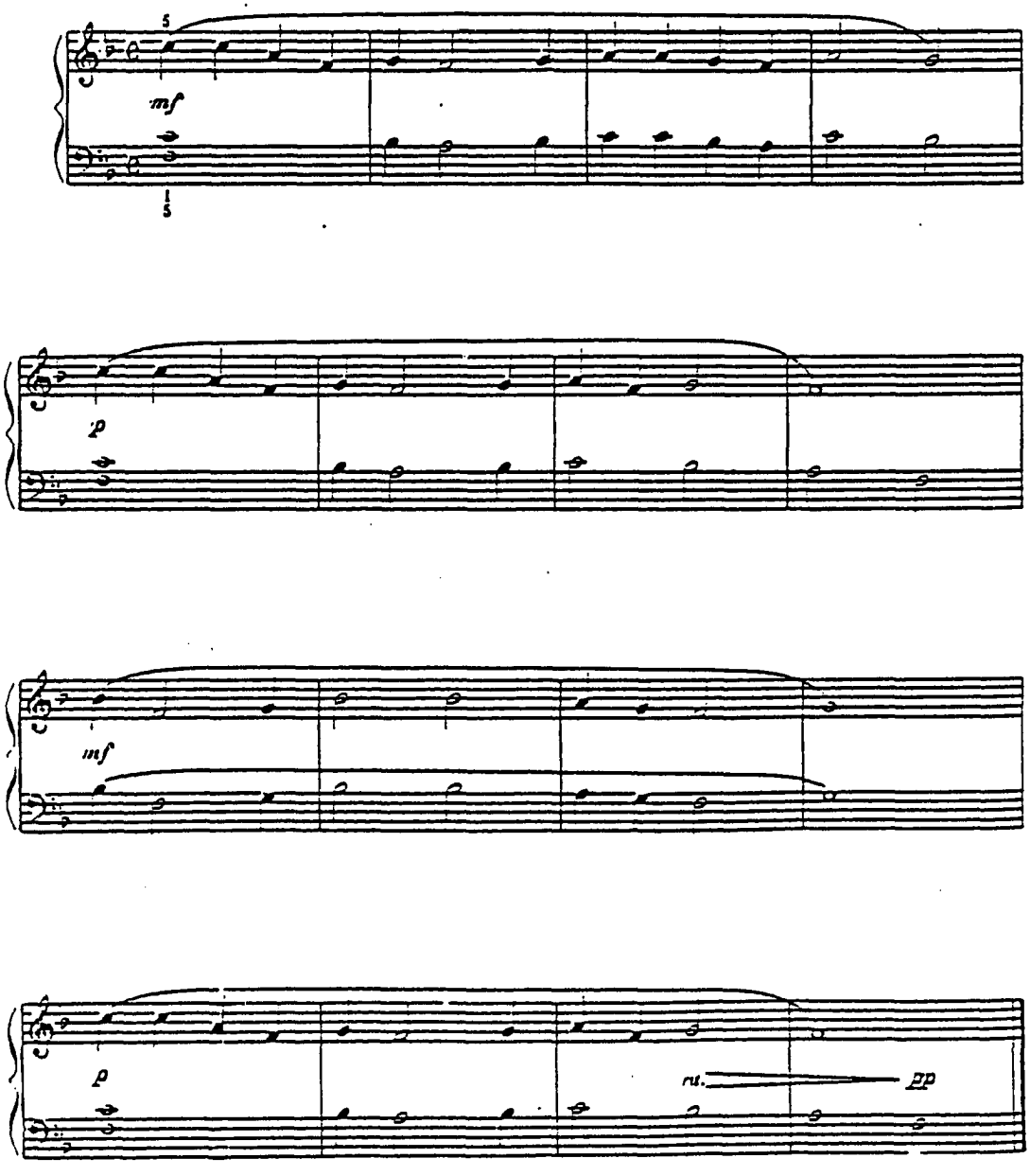
POSTTEST, EXAMPLE 3



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APPENDIX C

VALIDITY SURVEY OF THE READINESS TEST

Betty Fincher
Rose State College
6420 S.E. 15th Street
Midwest City, Oklahoma

Dear Colleague:

I am investigating the effects of rote playing on the development of sight-reading skills at the piano. This research study is a part of the requirements for my Ph.D degree at the University of Oklahoma. Related to the main thrust of my research is the construction of a test measuring those skills that beginning piano students need to sight-read a very simple piece at the piano.

I am seeking your assistance in determining the degree of relationship of each of the following skills to sight reading easy beginning pieces. The following questions have been constructed to facilitate quick completion. Your response to each item and the prompt return of the questionnaire to me at the above address will greatly enhance the quality of my study and hopefully will contribute significantly to the field of piano pedagogy.

Thank you for your assistance.

Sincerely,

Betty Fincher
Instructor of Piano

Validity Survey

How closely related are the following skills to sight reading easy beginning pieces? Rate each skill on a scale of 1 through 5 by drawing a circle around the number.

1. The student should be able to letter name the very first note in the piece.

   Not Related Closely Related

   1 2 3 4 5

2. The student should be able to letter name the notes found in easy beginning pieces.

   1 2 3 4 5

3. The student should be able to correctly tap the rhythm of rhythm patterns found in easy beginning pieces.

   1 2 3 4 5

4. The student should be able to write the correct number of beats under the notes in simple rhythm patterns found in beginning pieces.

   1 2 3 4 5

5. If given a letter (such as G or Bb), a student should be able to locate the corresponding key at the piano.

   1 2 3 4 5

6. The student should be able to relate notation to the correct keys. For example, he should be able to draw a line from a given note on the staff to the corresponding key on the piano diagram.

   1 2 3 4 5

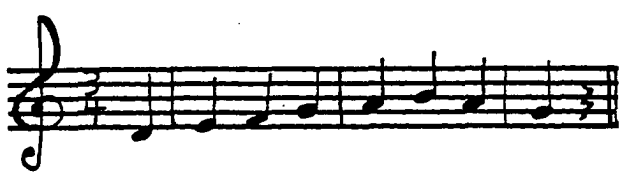
7. The student should be able to compare simple one-line melodies that he hears on a recording to printed notation, and recognize rhythmic errors. See example below:

Student Sees Student Hears

1 2 3 4 5

8. The student should be able to compare simple one-line melodies that he hears on a recording to the notation, and recognize pitch errors. See example below:

Student Sees



Student Hears

1 2 3 4 5

TEACHER IDENTIFICATION FOR VALIDITY SURVEY

1. Denise Nannestad, Adjunct Instructor of Piano, Rose State College, Midwest City, Oklahoma

2. Karen Albrecht, Adjunct Instructor of Piano, Rose State College, Midwest City, Oklahoma

3. Mei Ling Kou, Adjunct Instructor of Piano, Rose State College, Midwest City, Oklahoma

4. John Hillabolt, Instructor of Music, Rose State College, Midwest City, Oklahoma

5. Sherri Alley, Adjunct Instructor of Piano, Rose State College, Midwest City, Oklahoma

6. Deborah Jenkins, Adjunct Instructor of Piano, Rose State College, Midwest City, Oklahoma

7. Carole Johnson, Instructor of Music, Rose State College, Midwest City, Oklahoma

8. Shalah Smothers, Adjunct Instructor of Piano, Oklahoma City Community College, Oklahoma City, Oklahoma

9. Eileen Fox, Adjunct Instructor of Piano, Oklahoma City Community College, Oklahoma City, Oklahoma

10. Dave Archer, Professor of Piano, Oklahoma City Community College, Oklahoma City, Oklahoma

11. Dr. E. L. Lancaster, Assistant Professor of Piano, University of Oklahoma, Norman, Oklahoma

12. Dr. Jane Magrath, Assistant Professor of Piano, University of Oklahoma, Norman, Oklahoma

13. Dr. Digby Bell, Professor of Piano, University of Oklahoma, Norman, Oklahoma

14. Dr. Todd Welbourne, Assistant Professor of Piano, University of Oklahoma, Norman, Oklahoma

15. Jan Pokorny, Professor of Piano, Central State University, Edmond, Oklahoma

APPENDIX D

READINESS TEST

READINESS TEST

SUB-TEST 1

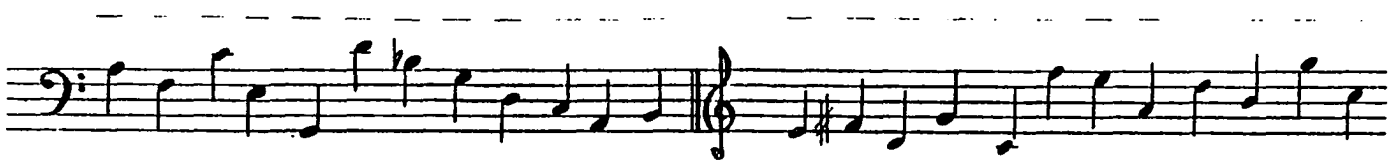
Under each of the following notes, write the correct number of beats for each note.

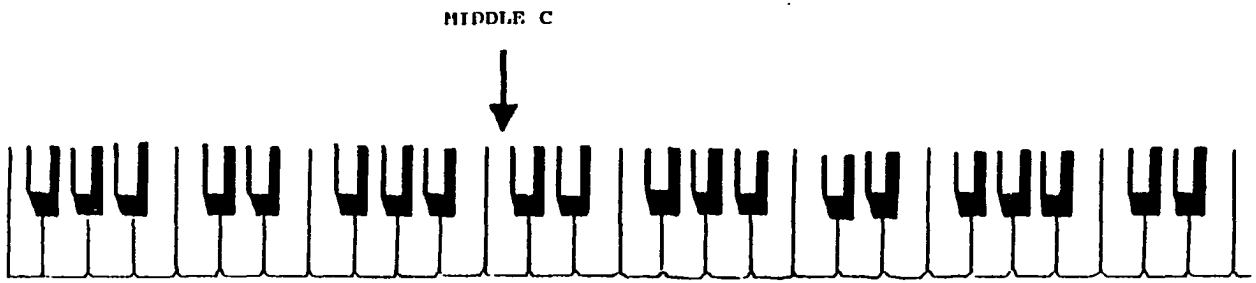
READINESS TEST

SUB-TESTS 2 and 3

SUB-TEST 2. Letter name the following notes.

SUB-TEST 3. Draw a line from each note to the keyboard.





READINESS TEST

SUB-TEST 4

You will be shown seven flash cards, each showing a letter. You then have four seconds to locate that key on the piano. Find the key as quickly as possible.

C

A

Bb

D

G

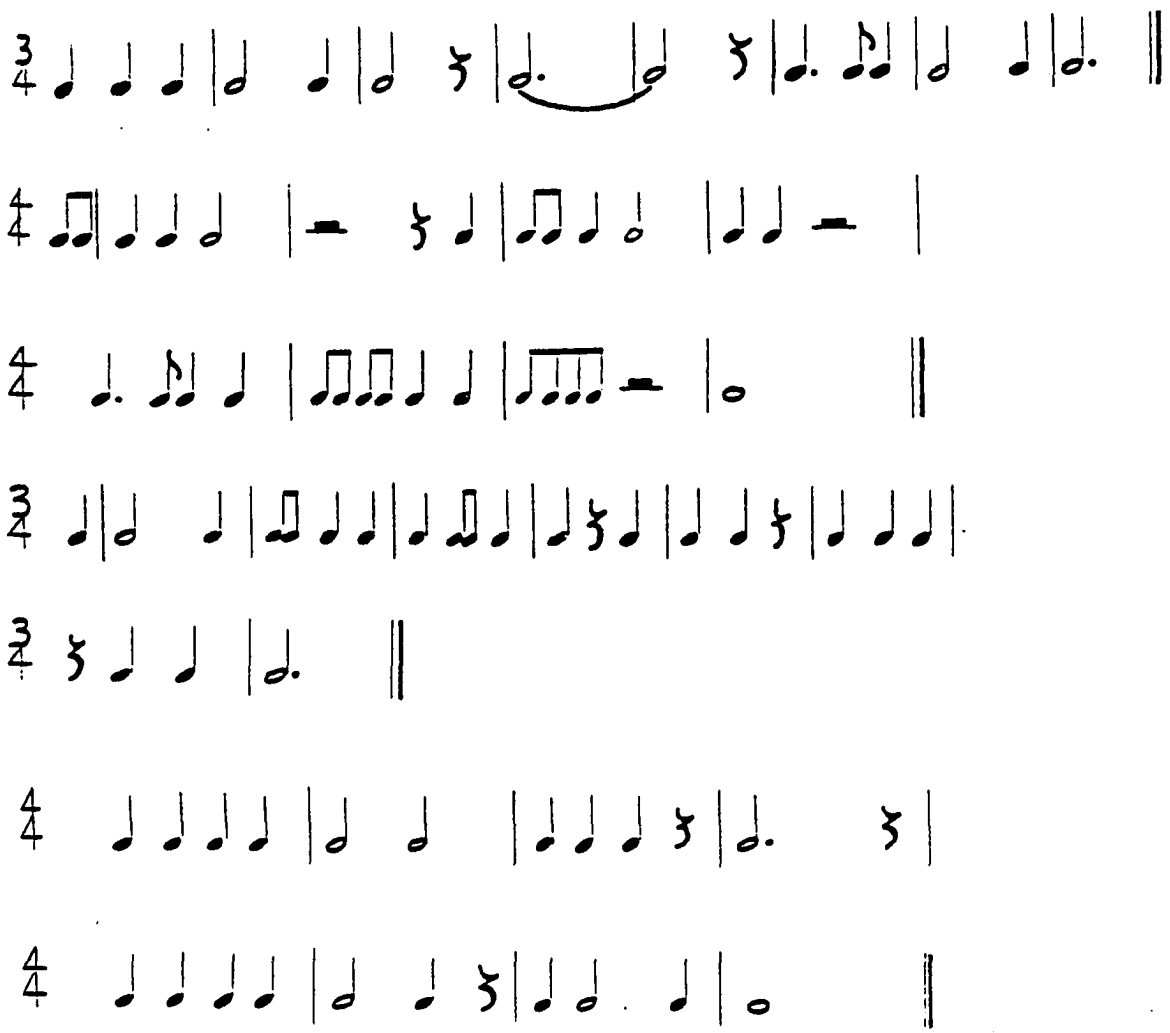
F#

E

READINESS TEST

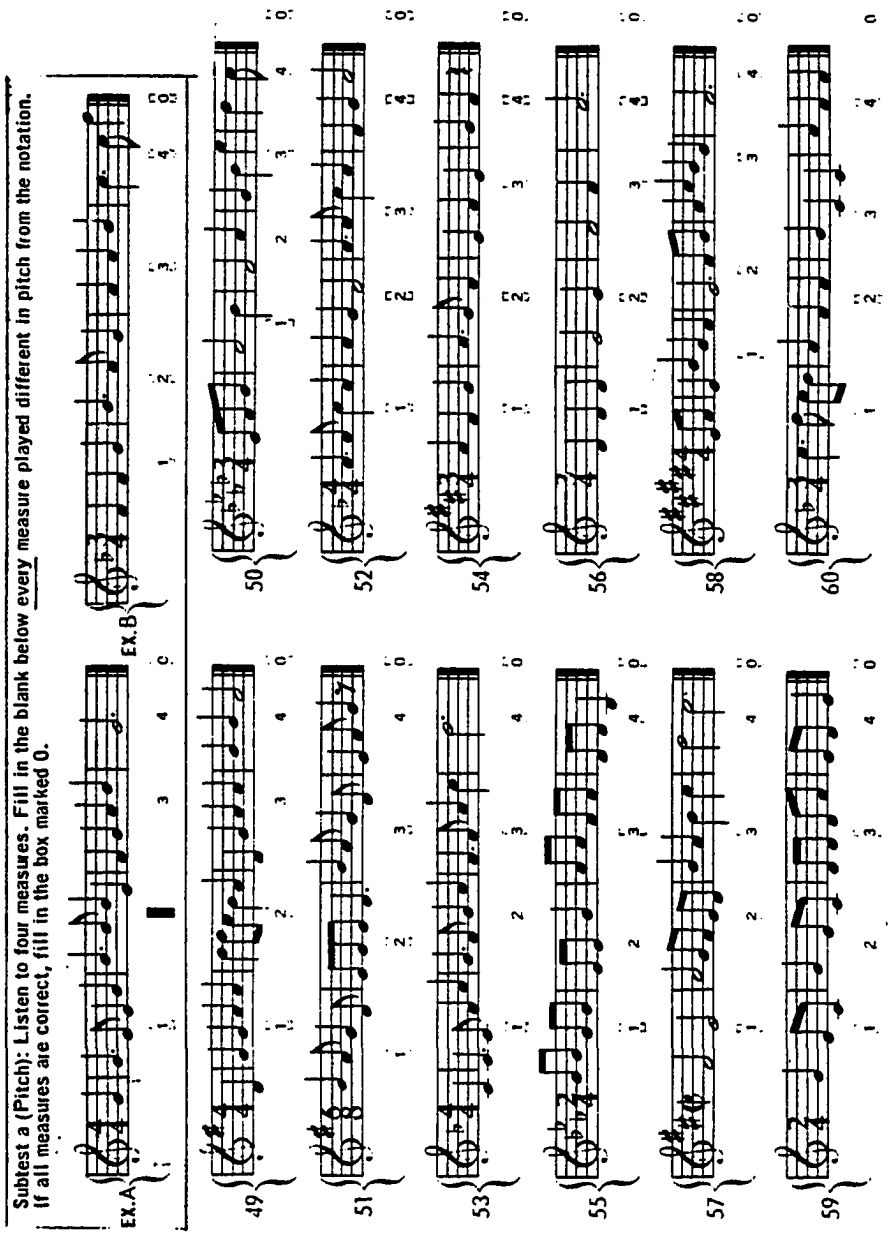
SUB-TEST 5

Tap the following rhythms by tapping middle C. You may pause after each example if you wish. A tape recorder will record your tapping. Hold each note its correct rhythmic value. If you make mistakes, keep on tapping. Do not back up or try to correct mistakes. Before you begin to tap, I will set the tempo for each example with a metronome. You should maintain that tempo. Start when you are ready.



READINESS TEST

SUB-TEST 6

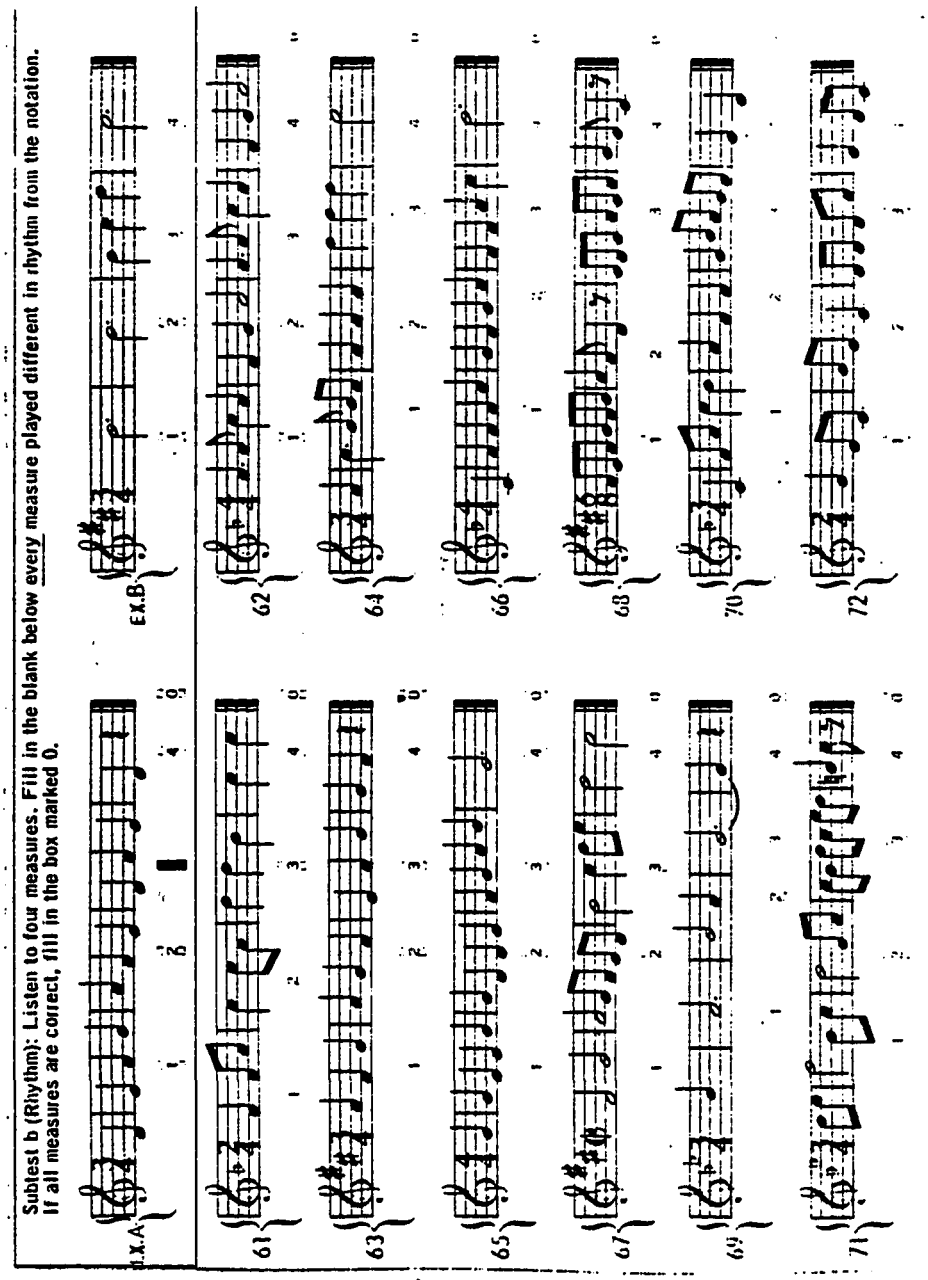


Permission granted by RICHARD COLWELL

Richard Colwell, Music Achievement Test (Chicago: Follett Educational Corporation, 1970).

READINESS TEST

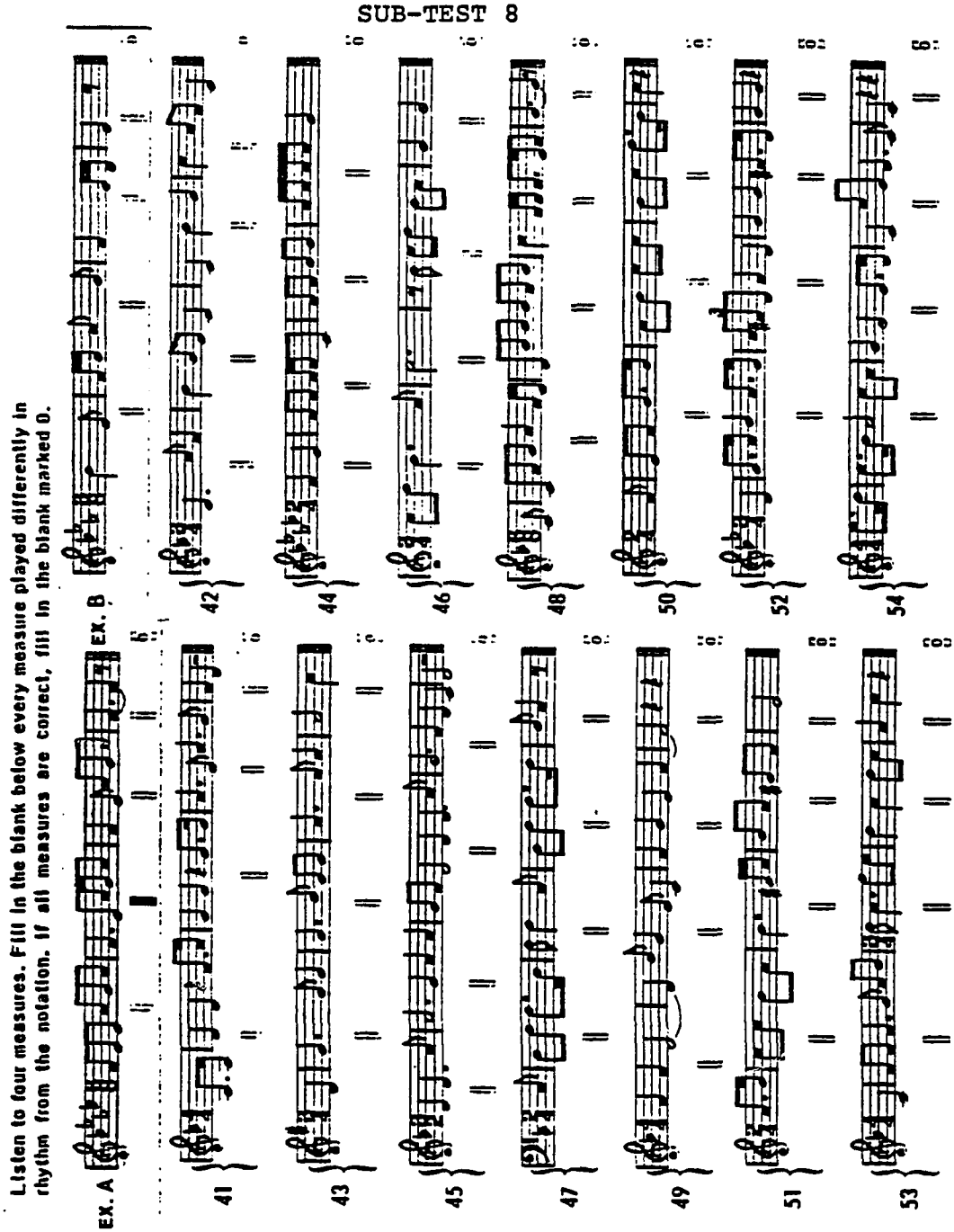
SUB-TEST 7



Permission granted by RICHARD COLWELL

Richard Colwell, Music Achievement Test (Chicago: Follett Educational Corporation, 1970).

SUB-TEST 8



Permission granted by RICHARD COLWELL

Richard Colwell, Music Achievement Test (Chicago: Follett Educational Corporation, 1970).

APPENDIX E

ADDITIONAL POSTTEST DATA

SUMMARY TABLE OF THE KRUSKAL-WALLIS TEST FOR THE COMPARISON OF PITCH READING BETWEEN EXPERIMENTAL AND CONTROL GROUPS ON THE POSTTEST AND FOR THE COMPARISON OF RHYTHM READING BETWEEN EXPERIMENTAL AND CONTROL GROUPS ON THE POSTTEST

SOURCE	F VALUE	p(F)
DEPENDENT VARIABLE: PITCH RANK		
Type	71.38	0.0001
DEPENDENT VARIABLE: RHYTHM RANK		
Type	108.47	0.0001

SUMMARY TABLE OF THE KRUSKAL-WALLIS TEST FOR THE COMPARISON OF PITCH READING BETWEEN DAY AND EVENING GROUPS ON THE POSTTEST AND FOR THE COMPARISON OF RHYTHM READING BETWEEN DAY AND EVENING GROUPS ON THE POSTTEST

SOURCE	F VALUE	p(F)
DEPENDENT VARIABLE: PITCH RANK		
Time	0.00	.99
DEPENDENT VARIABLE: RHYTHM RANK		
Time	0.00	1.00

SUMMARY TABLE OF THE FRIEDMAN TEST FOR THE COMPARISON OF PITCH READING BETWEEN EXPERIMENTAL AND CONTROL GROUPS ON THE POSTTEST AND FOR THE COMPARISON OF RHYTHM READING BETWEEN EXPERIMENTAL AND CONTROL GROUPS ON THE POSTTEST

SOURCE	DF	ANOVA SS	F VALUE	p(F)
DEPENDENT VARIABLE:		PITCH RANK		
Type	1	1397.52	70.31	0.0001
DEPENDENT VARIABLE:		RHYTHM RANK		
Type	1	1587.00	106.11	0.0001

SUMMARY TABLE OF THE FRIEDMAN TEST FOR THE COMPARISON OF PITCH READING BETWEEN DAY AND EVENING GROUPS ON THE POSTTEST AND FOR THE COMPARISON OF RHYTHM READING BETWEEN DAY AND EVENING GROUPS ON THE POSTTEST

SOURCE	DF	ANOVA SS	F VALUE	p(F)
DEPENDENT VARIABLE:		PITCH RANK		
Time	1	0.00	0.00	1.00
DEPENDENT VARIABLE:		RHYTHM RANK		
Time	1	35.02	0.74	0.39

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