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ABSTRACT

The purpose of this year-long study was to explore the effectiveness of the Trychall system of music dictation instruction (particularly Trythall's small-step, programmed method) in the training of aural skills--error detection, melodic dictation, rhythmic dictation, harmonic dictation, chord identification, and sight singing. For this study, the freshman class of music majors (60) at Northeast Louisiana State College was randomly divided into a control and an experimental group. The control group received instruction in the aural skills in the traditional manner for 2 class hours each week, while the experimental group received an equivalent amount of training but with the Trythall method of instruction. Reliability of the data-gathering instrument was confirmed by administering test items to students at two other colleges. Test results favored the Trythall experimental group, which showed significant gains in written skills (e.g., melodic and harmonic dictation) but not in sight singing. (Recommendations, references, sample tests, and tables of test results are appended.) (MF)

FINAL REPORT

Project Number 0-G-C03

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AN INVESTIGATION OF THE INSTRUCTIONAL EFFICIENCY OF THE TRYTHALL METHOD OF MUSIC DICTATION PROGRAMMING

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The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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Bureau of Research

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APPENDIX

Introduction.

General Problem. The one area of music theory which does not have a generally accepted content or methodology is training of the aural skills. The problem toward which this study aimed was exploring the validity of the Trythall system[1] of music dictation instruction in achieving the intended educational objectives[2] in the classroom situation. This study focused particularly on the relative effectiveness of Trythall's small-step, programmed method of instruction in comparison with traditional classroom procedures as practiced by experienced instructors. There is considerable need to identify an effective approach to programmed instruction in the aural skills which will insure a high level of development for the student and at the same time will release overworked senior faculty members from the repetitious task of drilling students in musical dictation. This study strived to determine how effective the Trythall system is in accomplishing this objective. In addition, the activities related to this study involved implementation of instructional procedures new to Northeast Louisiana State College which may have implications beyond this campus.

Related Literature and Research. There are diverse studies of various aspects of the problem to be studied but apparently no comprehensive investigation. As early as 1953, Cookston[3] related that he obtained a level of proficiency 200% of that expected through classroom techniques in harmonic and melodic dictation by utilizing tape recorded materials with college students. In 1954, Hansen[4] asserted that ear-training courses ought to emphasize behavioral objectives relevant to the practicing educator such as the detection of errors in performance. Spohn's efforts[5] in utilizing proven programmed instructional techniques, though limited to intervallic dictation, are notable. His comments on the neglected usefulness of recorded instructional materials are particularly relevant to this study. Ihrke[6] focused on a deficiency of numerous studies by advocating a return to the simple elements inherent in small-step instructional procedures.

Carlsen[7] criticized Cookston and Spohn for not having fully implemented the techniques of programmed instruction in their studies. He found that for melodic dictation the recorded and instructor presentation are equally effective but that the released teacher time in the approach technique. Carlsen, in a later work[8], introduced a multiplicity of variables in rapid sequence in defiance of the small-step axiom basic to programming. Jeffries[9], however, found programmed and taped instruction decidedly superior in his study on the perception of melodic intervals. Ashford's[10] study of programmed instruction seems well conceived but is of limited value because of the brevity of the experimental period.

After a review of the related literature, Thostenson[11] asserts that there is yet considerable room for investigation in the area of aural skills. The Spohn and Poland[12] publication is of great practical value in that it represents the fruits of many years of careful work on the problems of intervallic dictation.

Three principal conclusions of the Sherman and Hill studies[13] are significant to an application of Trythall's concepts. It was found that aural and visual perception learned in an atonal context will transfer to the tonal context; that no significant support is to be found for giving preference to selected or constructed response; and that tape recorded instruction is equally acceptable for weak and strong students.

Of the several practical handbooks recently published for use in the classroom for teaching the aural skills, Benward's recently republished work[14] is the most carefully constructed of those aspiring to be comprehensive. However, this handbook unhappily reveals its author to be futilely grasping for the small-step approach so essential to programmed instruction. He occasionally, as at the beginning of the work, is able to sustain a consistent small-step procedure for a significant portion of this work.

Trythall seems to be the only person working in this area who has effectively combined small-step programmed instructional procedures with a comprehensive approach to ear training. Still, his ideas have been supported only by hypotheses and judgments based on common sense, non-scientific observations. Nonetheless, the fortunate combination of small-step programming with a comprehensive approach in his program may signal a breakthrough in this discipline which has stubbornly evaded standardization of content or instructional procedure.

Objectives. The Trythall system of training in the aural skills has been subjected to a year-long study. This study focused primarily on an evaluation of Trythall's methods to determine their educational effectiveness in comparison with traditional instructional procedures. A secondary but important consideration was the establishment of innovative instructional methods at Northeast Louisiana State College which can indicate new directions of curricular design for other institutions.

Methods.

The Sample and the Procedure Tested. The freshman class of music majors at Northeast Louisiana State College (N=60) was randomly divided into a control group and an experimental group. The control group received instruction in the aural skills in the traditional manner two class hours each week. The experimental group received an equivalent amount of training but with the Trythall method of instruction. A statistical design was developed to evaluate the relative educational efficiency of the two methods considered in terms of the overall effectiveness of each and in terms of each of the component skills (i.e., the level of skill in harmonic dictation, in melodic dictation, etc.). The programmed materials presented to the two sections of the experimental group was presented by audio tape. The taped and written materials required for each program step were designed and produced by Dr. Trythall.

The testing instrument utilized for this project (see appendix) reflects the instructional objectives of each instructional program. Trythall's small-step program, linear with loop potential, was utilized for the experimental application and has the following behavioral objectives.*

At the conclusion of one year of in-class programmed instruction, the student should perform the following tasks with 90% accuracy.

1. Sight sing in tempo (quarter = MM 60) and in a single trial tones in treble or bass clef; distributed over one octave; randomly selected; presented from one of the following keys: C, G, F, D, D^{b}, Major and a, e, d, b, and g minor; and in configurations of quarter notes.

2. Notate 12 pulses of melodic dictation in treble or bass clef delivered in tempo (quarter = MM 48) using tones as above in durations of half, quarter, dotted quarter, and eighth notes; in simple meters; and in a single trial.

3. Notate 12 pulses of harmonic dictation by notating the chord symbols. The materials are selected from all primary triads in root position and first inversion in one of the keys indicated above; dictated in tempo (quarter = MM 42) and in a single trial.

4. Detect and correct errors in 12 pulses of melody in treble or bass clef; in tempo (quarter = MM 56) and in a single trial; rhythm as in number 2 above.

Materials and Equipment. A standard stereo half track tape recorder with amplifier and speakers appropriate to a medium-size classroom and duplicated individual copies of response sheets are required.

Program Construction. Sight singing requires that the student construct a tone response from a visual stimulus. Dictation requires that the student construct a written response to an aural stimulus. Continuous responses to stimuli of graded difficulty will aid the student in learning the desired responses. Although there is little evidence that sight singing and dictation mediate each other, their associated presentation may be of value and is convenient.

Pitch--the number and selection of tones used in each program is chosen from one of the 10 major and minor scales listed above. Beginning with the three tones of the tonic triad, the possible stimuli and responses are gradually and systematically extended to include all of the seven scale tones. The tones chosen for each program step are

*This description is taken from an unpublished paper by Dr. Trythall. Certain editorial liberties have been taken.

presented randomly to focus attention on the general context of scale and key and away from immediate context in any particular configuration.

Duration--the program begins with quarter notes and expands in dictation problems to half, quarter, dotted quarter, and eighth notes in simple meters.

Harmony--the program begins with I, I_6, IV, and V chords and expands gradually to all primary chords in root position and in first inversion. The chords chosen for any program step are presented randomly for the reasons set forth above.

Allowed trials-- since the program goal is correct response in a single trial, all training trials are to be single. When class error rate rises above an acceptable level, a looping procedure may be begun in which earlier program steps are repeated. This allows second trials over the same material but not in the same training period.

Program Presentation. Each program step requires approximately 25 minutes; thus two steps can be made in a class hour. All tempi are as specified in objectives.

1. There is the announcement of beginning of training step; the explanation of variables to be used in the training period; and the demonstration of tonal center. Then the metrical count is given with metronome to set speed of delivery and response. Begin.

2. The sight singing consists of two pages of ten staff lines each, 12 pulses per line. The class responds on the pulse to the written notation; one half pulse later the correct tone is sounded by the tape as reinforcement.

3. Melodic dictation uses the same variables as sight singing with additions in the duration area. Five examples are played once each. The instructor then halts the tape while the student checks his answer against the correct one written on the following page.

4. Harmonic dictation begins with an explanation of variables to be used. Three examples are played once each with pauses for the checking of answers which are provided on the following page.

5. Error detection requires the student to detect and correct discrepancies between the melodies played and those notated on the fourth and final page of the response sheet. The correct answer is given verbally for checking.

6. A test of the materials covered in the programmed step is then delivered without answers. A single line each of melodic dictation, error detection, and harmonic dictation is given once. The students then respond individually one line at a time to the sight singing exercises assigned from one of the first two pages. This is done in tempo, in one trial. In the test, any error in pitch, duration, or in sight singing tempo is a complete error.

Data Gathering. The freshman class of music students at Grambling College, Grambling, Louisiana (N=38) were made available for a test-retest examination of the reliability of the data-gathering instrument (Table I).

Though the r was high, an item analysis revealed that eleven questions were unreliable and eight others were marginal. Twenty such items from the Grambling reliability testing were then given to the freshman class of music students at Peabody College (N=32) to re-examine reliability (Table II).

The Grambling sample was taken at the beginning of the academic year. The Peabody sample was taken at the beginning of the second semester. Hence the Grambling freshmen had virtually no training in the aural skills while the Peabody freshmen had one semester of training using the Trythall method.

The instrument was administered in precisely the same way every time. The written test and instructions were pre-recorded on audio tape. Printed materials were identical (see appendix). The sight-singing testing was administered by individuals who were coached to follow a standardized routine. Responses to the sight-singing test were tape recorded to be evaluated at a later time. Scoring was done with careful attention given to uniformity of evaluative criteria. Scorers for the written examination had clear guidelines and ongoing supervision. Because of the difficulty of assuring uniformity in evaluating sight singing, one scorer was used throughout for each sample (i.e., one scorer evaluated all of the responses in the reliability analysis and another did all of the evaluations for the experiment).

Data were assembled in the fall, at mid-year and in May. The mid-year testing was thought advisable because some students who were available at the end of the fall semester would not be available at year's end. This decision has proven wise. Attrition from fall registration (N=70), to the first testing in September (N=60), to winter (N=49), to spring (N=32), was much greater than anticipated. However, this potentially bothersome circumstance seems not to have been as detrimental as it could have been. At mid-year, the control group (N=25) and the experimental group (N=24) were balanced but at year's end (N=32) the control group had 20 while the experimental had only 12 individuals.

Format of the Instrument. The test was constructed with nine sections. The appendix contains the test and the fragment given at Peabody. A table of contents provided directly preceding the test reveals the length and nature of each section. The red notes show the student response desired on each item. Practice examples were provided for each section of the test. The format for these is illustrated in the Peabody fragment. There were no practice examples for the sight singing examination.

All items which are in sections indicated as favoring the experimental group were presented one time only. Control group materials received multiple presentations. The control type of melodic dictation received three playings. First, the example was played in its entirety, then section by section, and finally repeated non-stop. Rhythmic dictation and chord identification received two playings. The harmonic dictation examples favoring the control group were played twice also. Five of the sections favor the type of instruction utilized by the control group and four favor the experimental group. This type of construction was seemed necessary because of the difference in the instructional procedures and content between the two groups.

The formulas used for calculating regressions R are as follows:

$$R = \frac{\sum_{i=1}^{N} (X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^{N} (X_i - \bar{X})^2 \sum_{i=1}^{N} (Y_i - \bar{Y})^2}}$$

Where -- N: the number of the data for each group

X_i: the data for first group; there are X_1, X_2, X_3, and X_4.

Y_i: the data for second group; there are Y_1, Y_2, Y_3, and Y_4.

$\bar{X}$: the mean of the first group data.

$\bar{Y}$: the mean of the second group data.

The formulas used for calculating T test (unpaired) are as follows:

$$T = \frac{\bar{Y} - \bar{X}}{\sqrt{S^2 \frac{(N_1 + N_2)}{N_1 \cdot N_2}}}$$

Where -- $\bar{X}$: the mean of group one data.

$\bar{Y}$: the mean of group two data.

N_1: the number of group one.

N_2: the number of group two.

$$S^2 = \frac{\Sigma X_i^2 - (\Sigma X_i)^2/N_1 + \Sigma Y_i^2 - (\Sigma Y_i)^2/N_2}{N_1 + N_2 - 2}$$

X_i: the data for the first group.

Y_i: the data for the second group.

Findings and Analysis

Reliability and Validity. Reliability for the data-gathering instrument was established through use of a test-retest with the freshman class of music majors at Grambling College (N=38). The value of r for the test was 0.84616.

An item analysis (Table IV) revealed eleven unreliable questions and eight showing marginal strength. An item analysis was thought advisable because every test item requires multiple responses. Several hypotheses were posed and examined in an effort to discover the reason for the weakness of these items. An examination of the test (see appendix) reveals that certain of the unreliable items appear at or near the end of the easiest portion of sub-tests (i.e., numbers 4, 15, 19, 23, 43, and 54). Interestingly, all of the items which were reliable but weak appeared either at the end of a section or at or near the beginning of a section. This reveals that learning or the impact of a change in mode of testing played a large part in determining the strength of each question. Because of the extremely low level of accuracy on some of these items a retesting of the unreliable items was thought advisable. A test-retest of twenty items at Peabody (N=32) yielded an r value of 0.89503. (See appendix).

These two results indicate that the test as a whole was sufficiently reliable for meaningful utilization. Face validity was established through the use of experts in the field. The theory staff at Northeast and Peabody were involved to some extent. However, final responsibility for the instrument rests with the principal investigator.

Initial Difference. The initial difference between the group as they were constituted at mid-year (N=49) was found to be negligible (t=-0.251).* The final groups (N=32) were also found to have no significant initial difference (t=-0.439). This data confirms that the randomization procedures utilized was effective.

Results of Experiment. Data have been analyzed in several ways. Scores to mid-year (N=49) and to year's end (N=32) have been compared. The test was analyzed section by section and as a whole.

*Minus values favor the control group. A t value of 2.000 is required for significance at .05 for N=49 while a t of 2.042 is required for N=32.

When comparing scores for the entire test over the full year (Table V), the value of t is 2.180** and significantly favors the Trythall group at the .05 level. An analysis of improvement to mid-year (N=49) shows the experimental group was not significantly greater at that point on the test as a whole. With 2.000 the critical t at the .05 level of significance, a 1.728 t value was obtained. A t of 1.105 (N=32) for the last part of the year is well below the 2.042 required for significance at .05.

A comparison of mean gain reveals that the experimental group gained more during both terms. A larger gain was made by each group during the first semester. Improvement fell off sharply during the second semester as measured by mean gain. The standard deviation of the experimental group was slightly but consistently higher than that of the control group.

An analysis of the improvement shown by the control and the experimental groups on each of the nine major sections of the test was undertaken (see appendix, table of contents preceding the test). The four primary comparisons (see Table VI) consist of an analysis of comparative gain on the control-favoring materials and experimental-favoring materials of each group and three sets of data on comparative gain in areas which were common to both groups. Analyses of gain in content not common to both groups on control- and experimental-favoring materials is compared in the six possible ways.

The data (Table VI) show that over the entire year (chart A-1) the control group did better on control materials than on experimental materials (line A), significantly*** so in the comparison of experimental sections versus control sections (column 1). Line F of the same chart shows us that the experimental group did better on experimental materials than control materials, but significantly better only on harmonic dictation. Line D shows that when each group's improvement of its own materials is compared, the only significant t shows that the experimental group improved significantly better on its type of harmonic dictation than did the control group on its section of harmonic dictation. There was no significant difference in the improvement of either group on control-type materials (line E). Column 1 of lines B and C shows that the experimental group improved significantly more on control materials than the control group on experimental materials.

The secondary comparisons in chart A-2 (Table VI) contain values on line A which reveal that the control group gained significantly more overall on those materials which were peculiarly its own. In line C, column 1, see that the experimental group made significantly greater gains on control materials than the control group made on experimental materials.

Charts B-1 and C-1 in Table VI show t values for comparative gains

** 2.042 is the significant t at the .05 level. The positive figures favor the experimental group.

*** Significance is at the .05 level when asserted in the ensuing discussion.

for the first semester and the second semester. While the control group gained significantly more on its own materials (line A, column 1) during both terms, its gain during the first semester yielded a larger t. The experimental group gained significantly more on its materials (line F, column 1) during the first term, but its gain during the second semester was not significant at .05. Gain by the experimental group on control materials (line D) shows that comparative gain was larger during the first semester and favored the experimental group in every case, significantly in three cases. Difference in gain was greater in the first semester in twenty-one of the twenty-four instances examined in Charts B-1 and C-1.

Conclusions and Recommendations.

Conclusions. The initial differences on the samples reported are not significant. The different levels of gain for the control and the experimental group are attributed to the difference in the instructional mode. Student learning outside of the classroom could mitigate the data. However, out-of-class practice for ear training is not required at Northeast Louisiana State College and was discouraged for the purpose of consistency in the instructional application.

The significant difference between control-group and experimental group gain could be attributed to several factors. It could be asserted that the Trythall method is significantly superior because the Trythall group made significantly greater improvement on the test as a whole. This contention does not take into account the complexities inherent in an examination of the interaction and cross-over characteristics of the two distinctive instructional strategies examined. For example, the mode of instruction for the experimental group required instantaneous responses while the control group was trained utilizing multiple hearings. The significant t (Table VI, Chart A-1, line C, column 1) showing that the experimental group improved more on control materials than the control group improved on experimental materials is supportive of the assertion that the experimental mode of instruction developed skills which had greater cross-over potential. This seems to be the most likely explanation for the differences in gain herein reported. Interestingly, the gain by the experimental group on experimental materials as compared with the gain made by the control group on control materials (Table VI, Chart A-1, line D, column 1) is not significant.

Another factor which may be contributory is the difference in the number of responses required of a student and the frequency of evaluation with each method. The Trythall system is clearly more intensive in both instances if training time is constant. Though the control group instruction was handled very competently, another factor which may favor the Trythall method is its programmed format and its explicitly behavioral conception. These are important considerations but not as critical as the cross-over characteristic.

Significant differences in gain on melodic dictation and harmonic dictation favor the experimental group when these sections are compared using each group's gain on its own materials as a basis for comparison. However, gain on sight singing is not significantly different.

This suggests that the Trythall system performs more efficiently in training written skills than sight singing skills as it is presently constituted. This is misleading, however, because the Trythall method devotes proportionately less time to training sight singing.

The question of desired educational outcomes must be raised. If one desires to train musicality or tonality or to utilize a relaxed pace, the Trythall method is inappropriate. If one desires to focus upon narrowly specified skill areas in a largely atonal context at an intensive pace, this method is appropriate.

Recommendations. The Trythall system of music dictation programming is less expensive than traditional procedures. This study shows that it is efficient in attaining its instructional goals. It is recommended as a desirable component of an effective instructional program in music.

The Trythall instructional program is an integrated approach to teaching several ear training skills. Each program step includes instruction and testing for each of these skills This introduces an element of inflexibility into the program in that individual variation in each skill area is not taken into account. It would be useful to develop an individualized application of this program and to compare the efficiency of this program with the present disposition of the Trythall design.

The harmonic dictation element of the Trythall program seems the least useful. The harmonies chosen are based upon the system of functional harmonies crystallized during the baroque period. However, logically following the randomizing feature of the other sections, the harmonic materials are randomly ordered. The vocabulary of functional harmony is used but the aural logic basic to the system is negated. If harmonic dictation is to be based upon common practice vocabulary and content, it would be more appropriate for the harmonic dictation element of this program to be oriented toward a developmental exposition of this style.

It is important that scholars of Dr. Trythall's stature continue to work in this field. There is still need to specify more precisely the skills that are important and the methods useful in ear training. In the present situation, many hours of time are required of senior professors for the task of providing repetitious drill. With greater knowledge in this area, graduate assistants can assume these responsibilities effectively in a way that professors will feel confident in the quality of the educational product.

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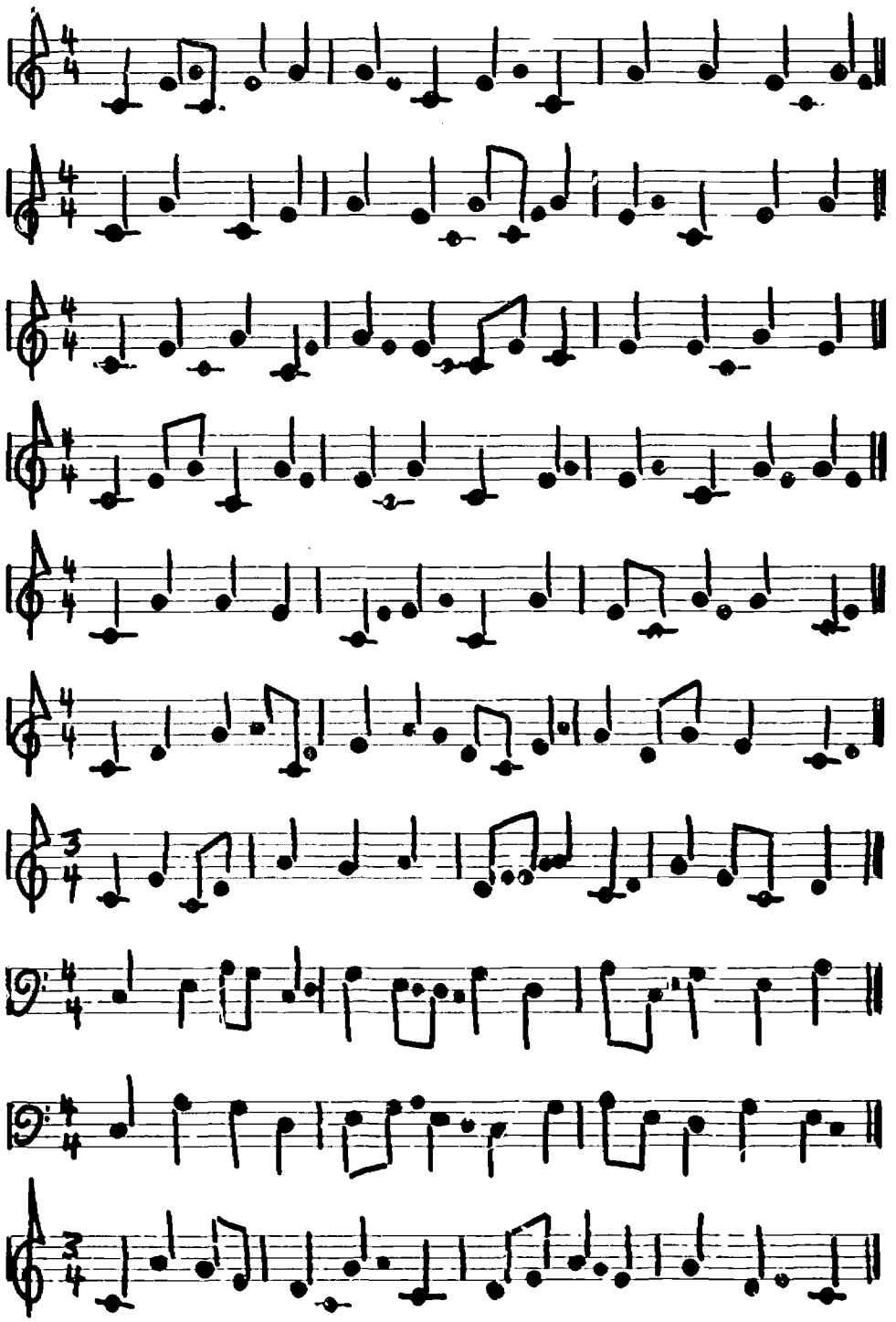
Complete Testing Instrument

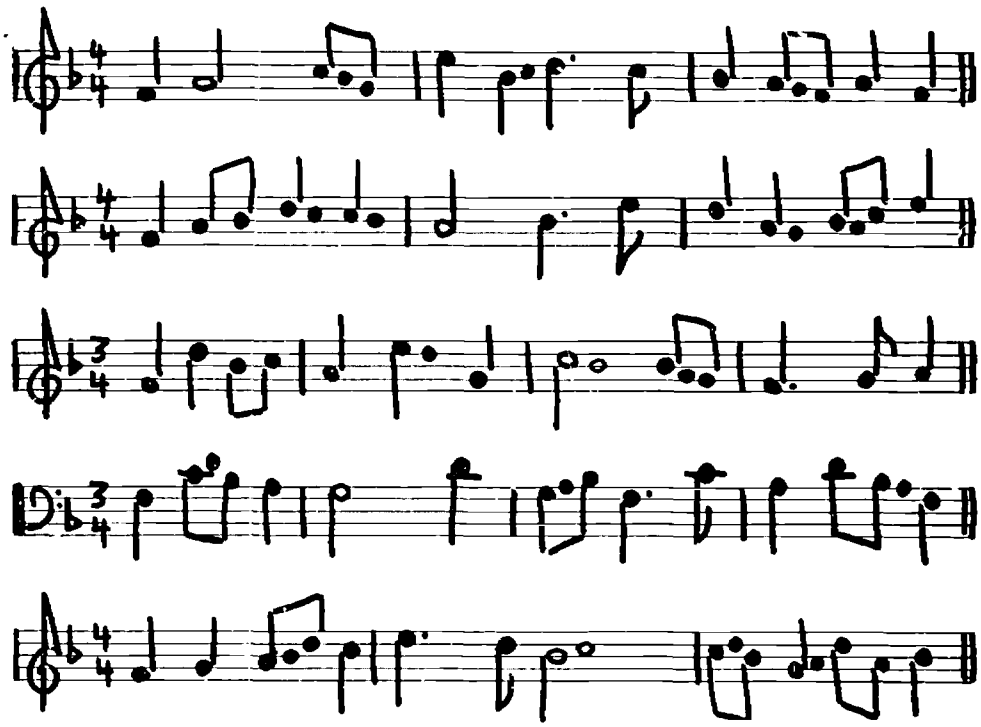
Testing Instrument - Peabody Fragment

Key: C Major Error Detection



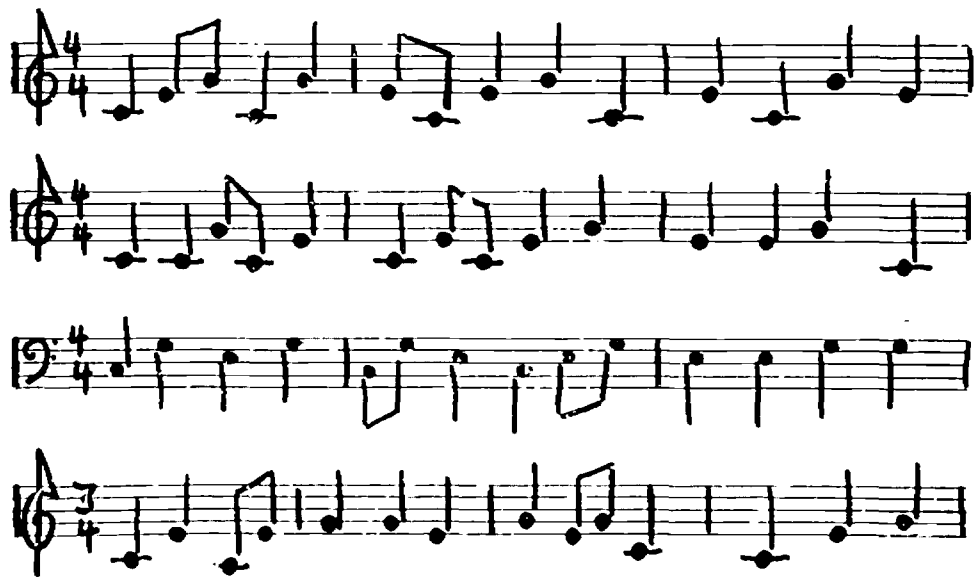
2

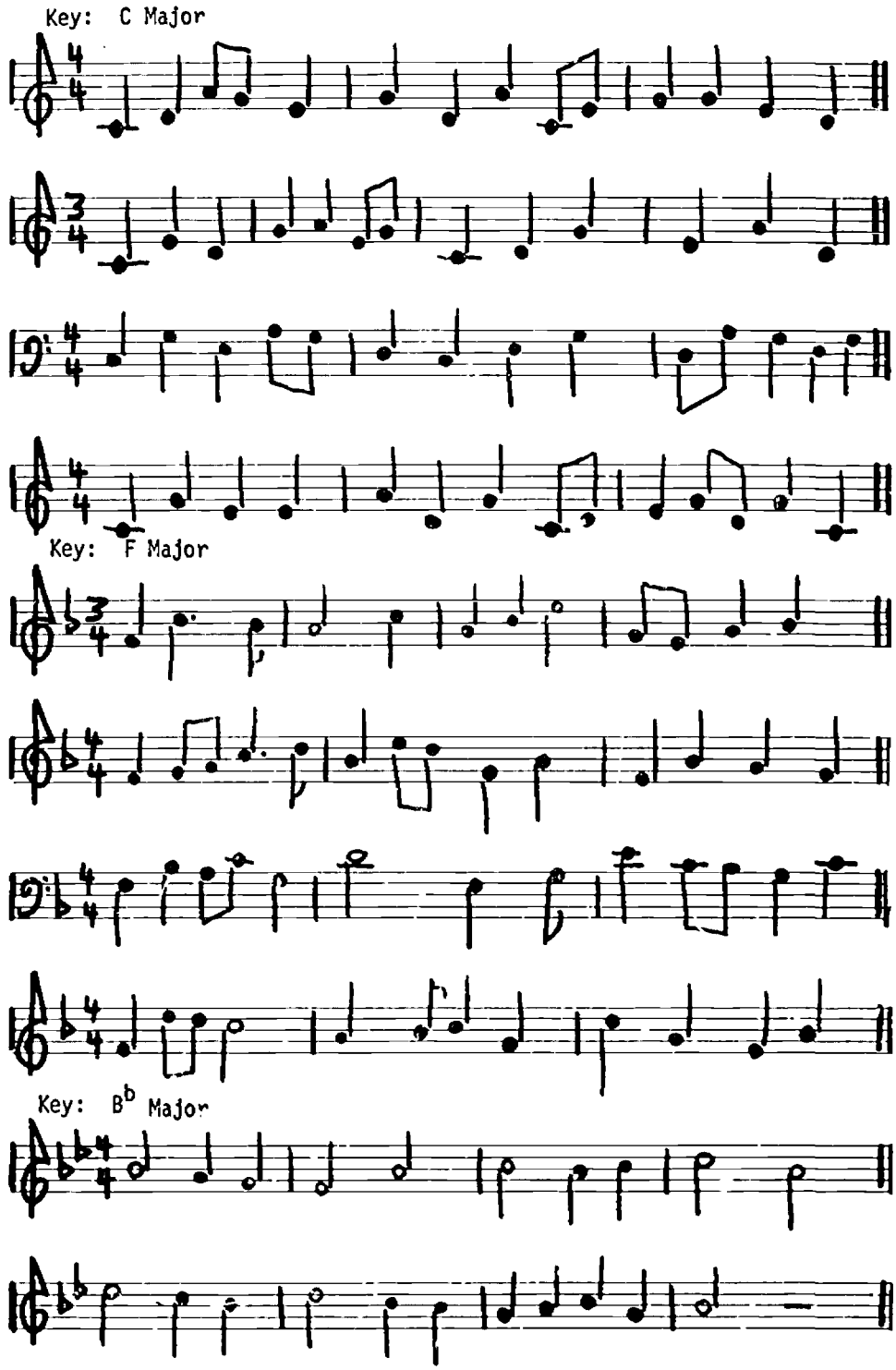
Key: F Major



Key: C Major

Melodic Dictation

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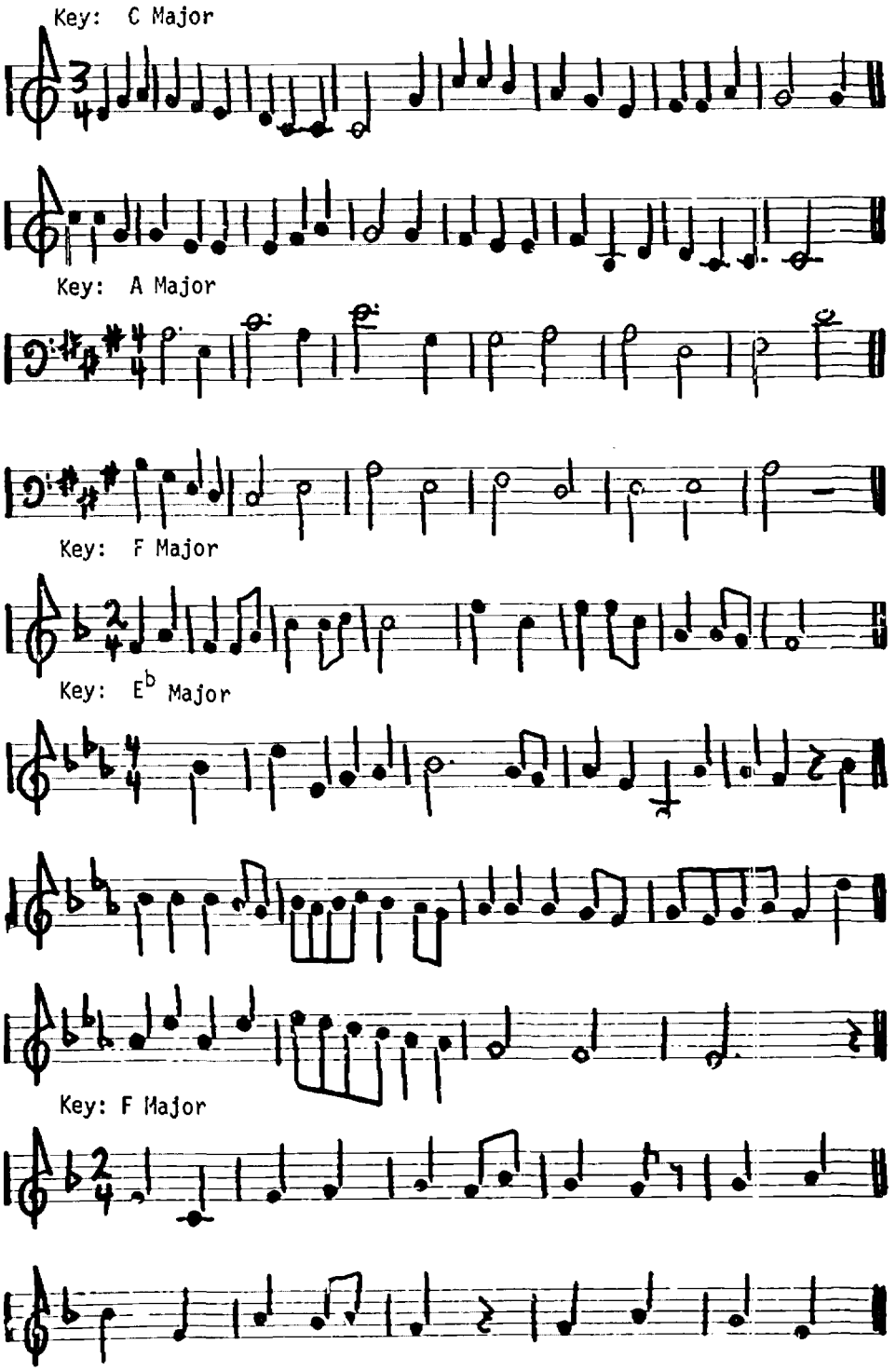
Key: B♭ Major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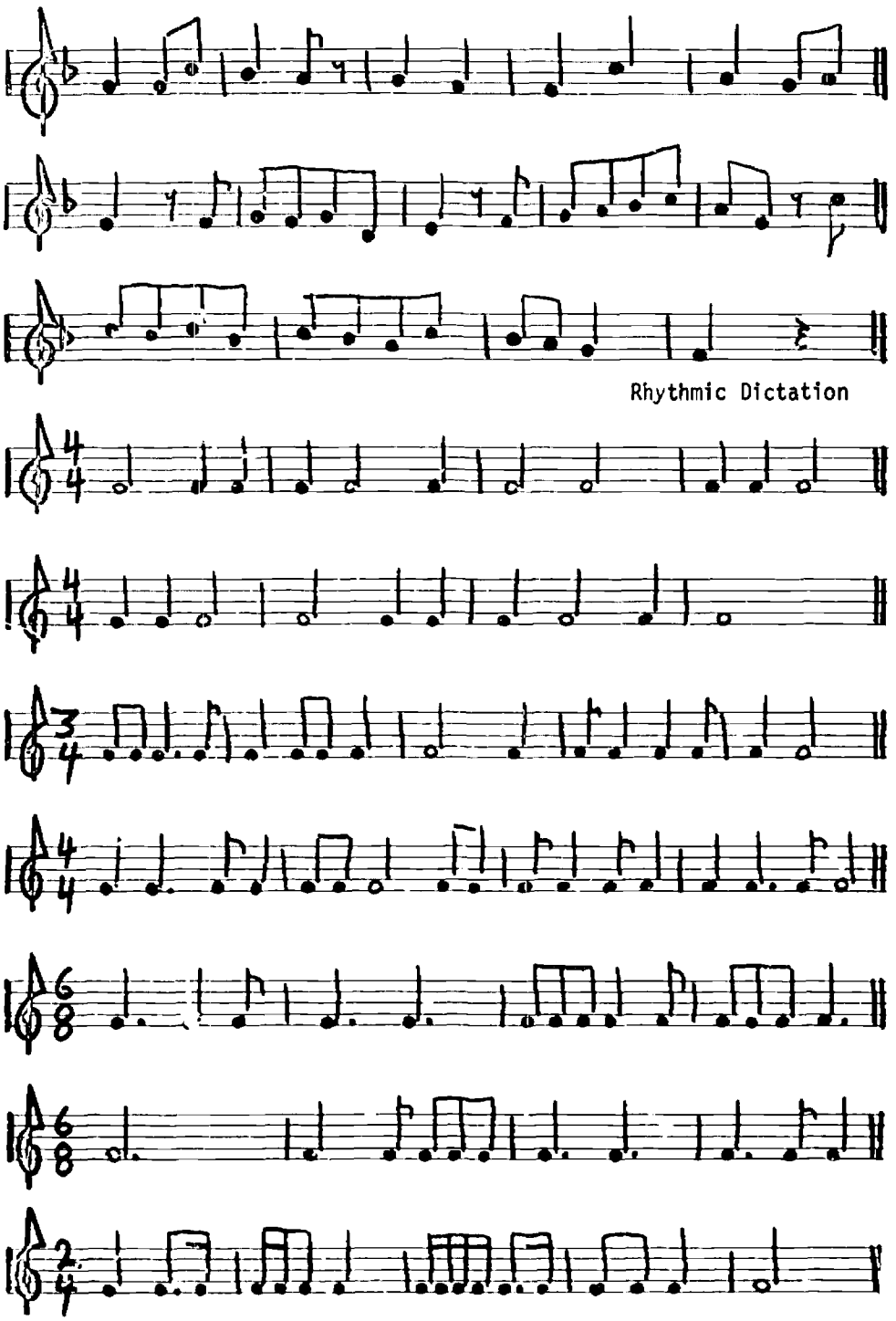
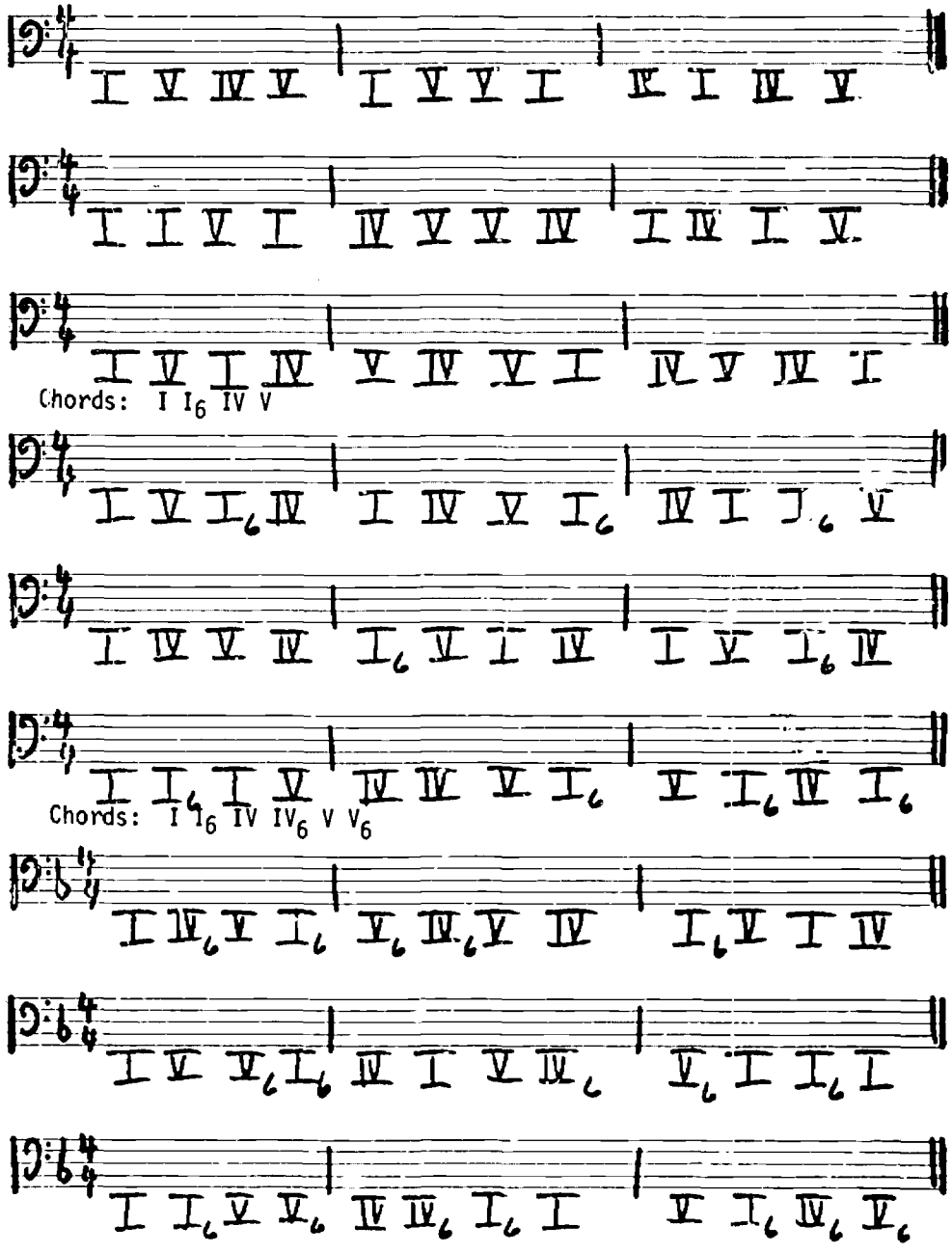


Rhythmic Dictation

6

Chords: I IV V

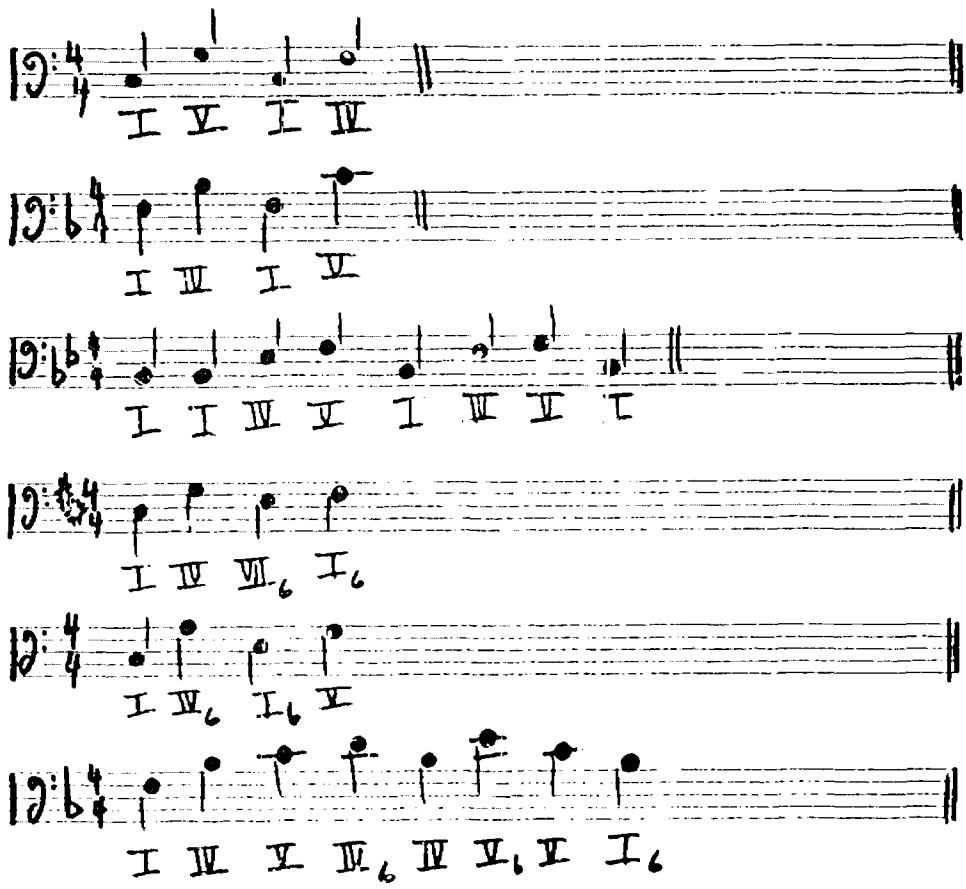
Harmonic Dictation



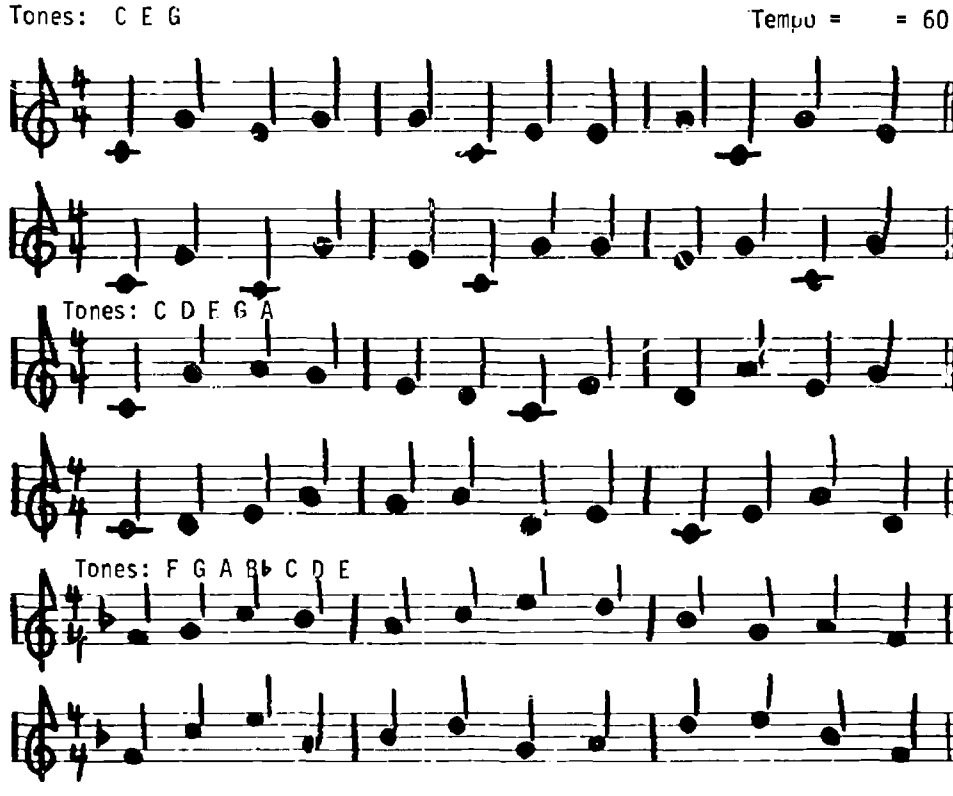
IDENTIFY CHORD TYPE (Major, Minor, Augmented or Diminished)

Test: 1. A 2. D 3. M 4. D 5. m

1. M 2. m 3. M 4. A 5. D

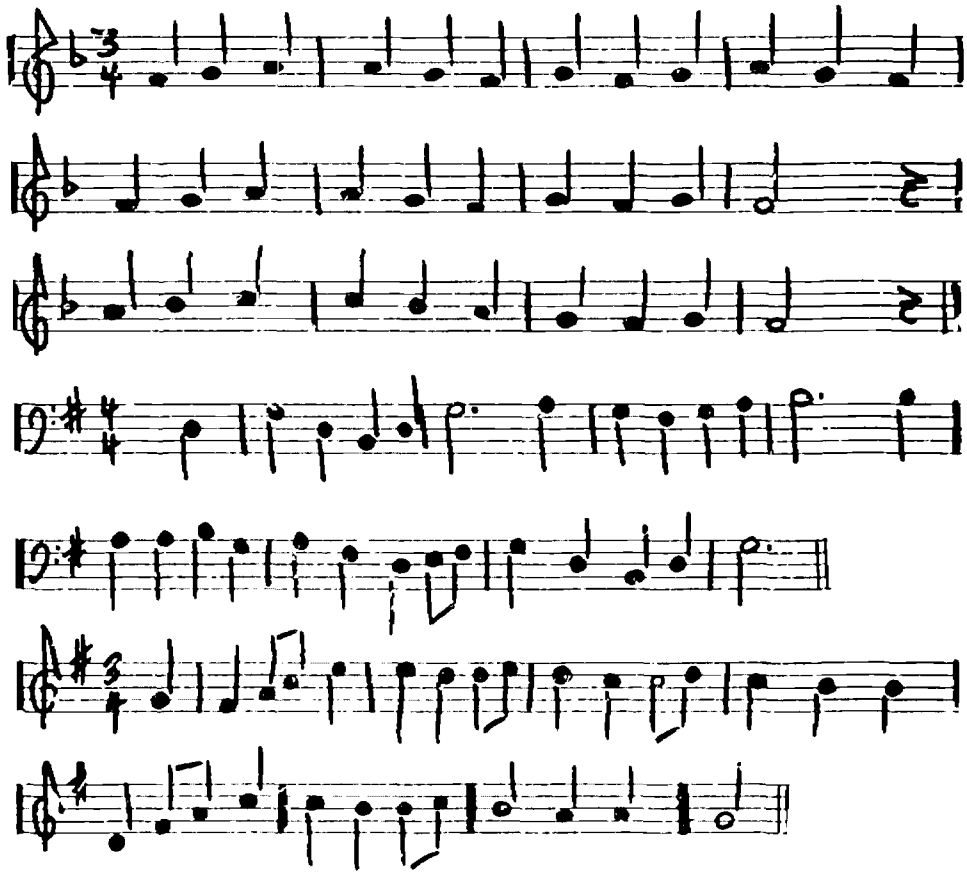


Sight Singing

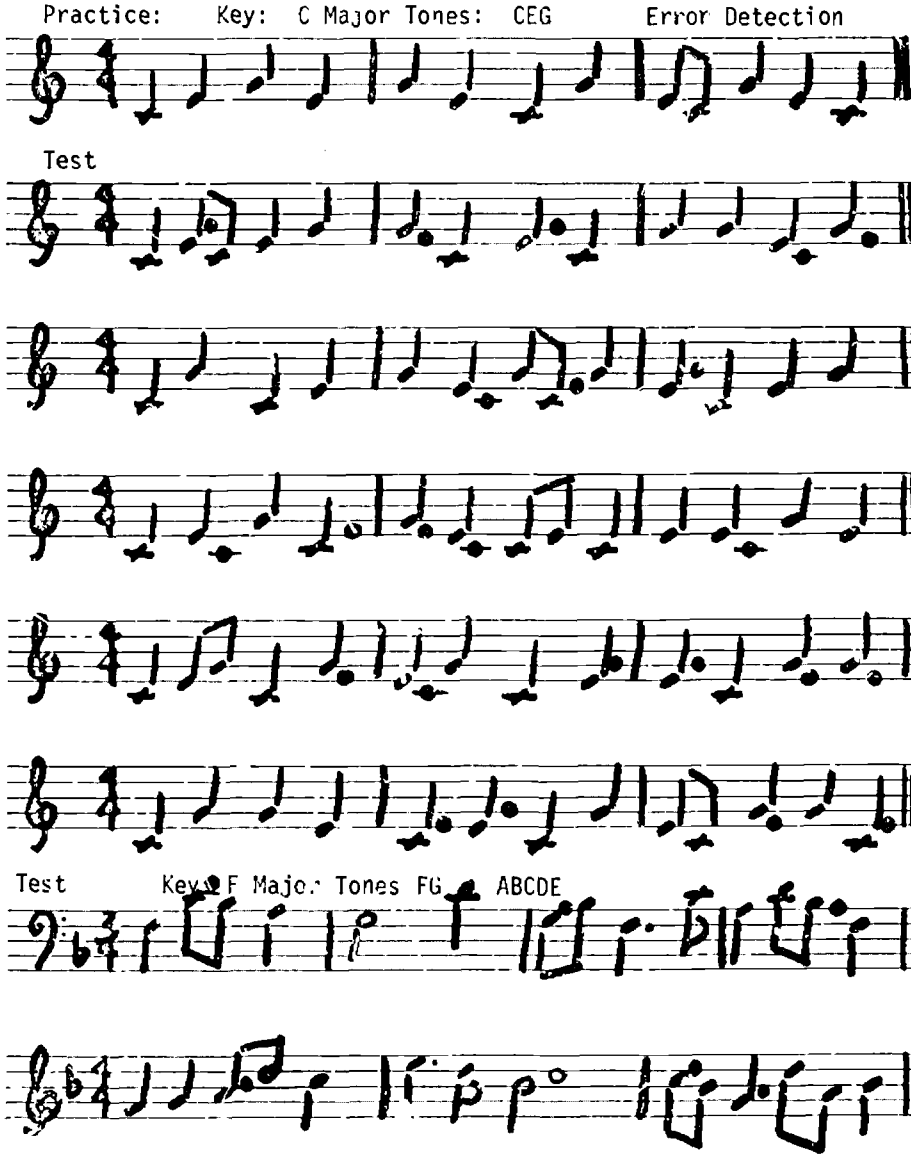


9

Sight Singing



ETP - TEST


Practice: Key: C Major Tones: CEG
Error Detection
Test
Test
Key: F Major Tones FG ABCDE

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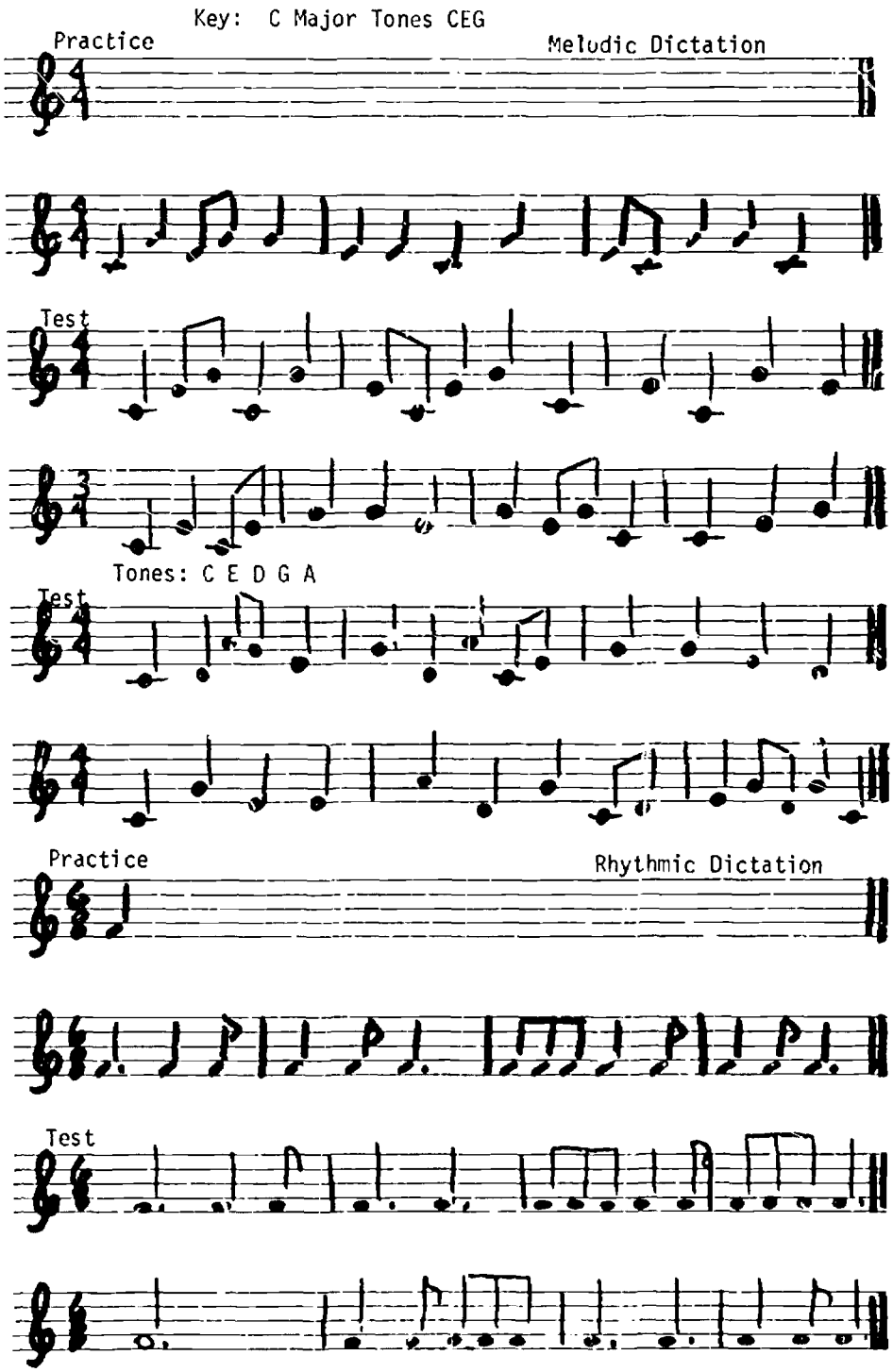
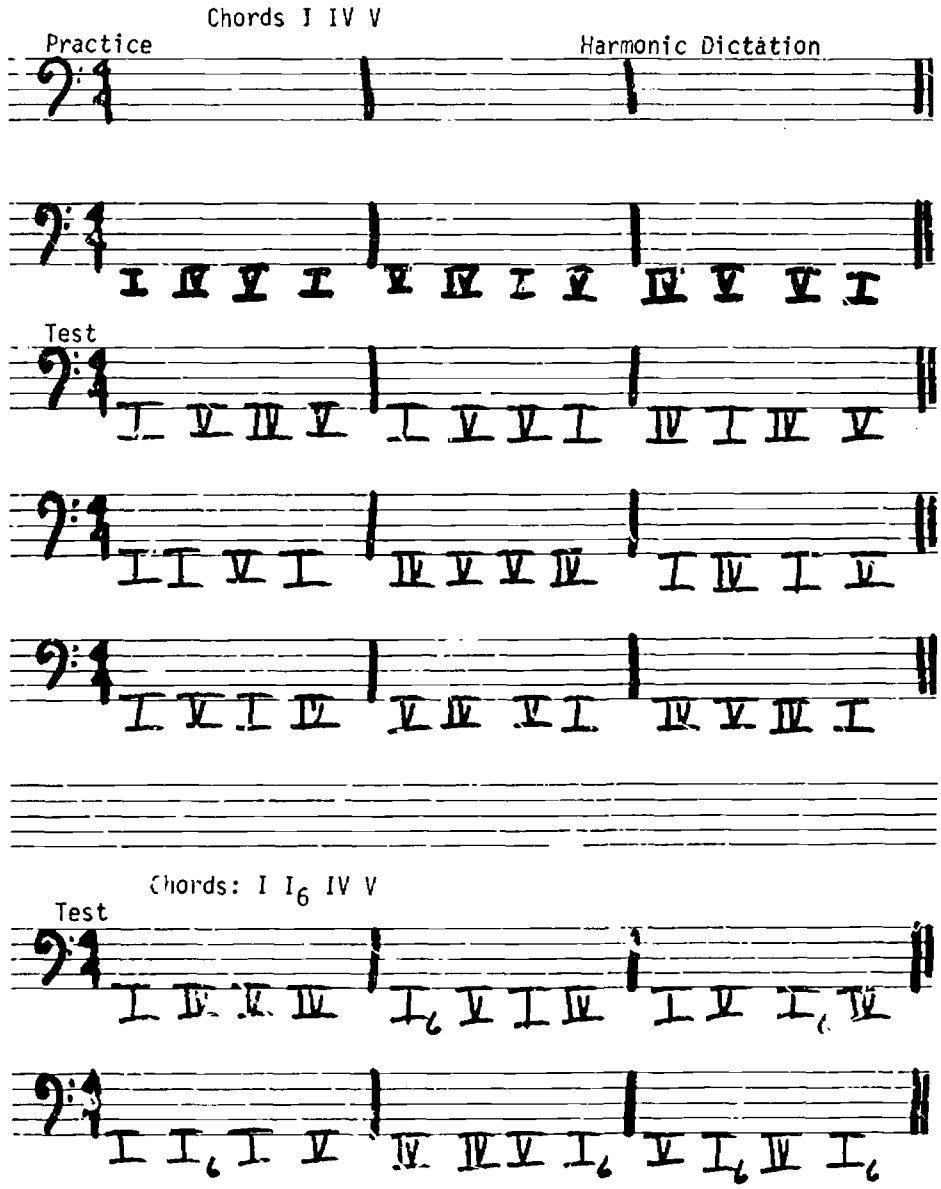

Key: C Major Tones CEG
Practice
Melodic Dictation
Test
Tones: C E D G A
Test
Practice
Rhythmic Dictation
Test


Chords I IV V
Practice
Harmonic Dictation
Test
Chords: I I_6 IV V
Test

Sight Singing

Tones: C D E G A

Tempo: = 60

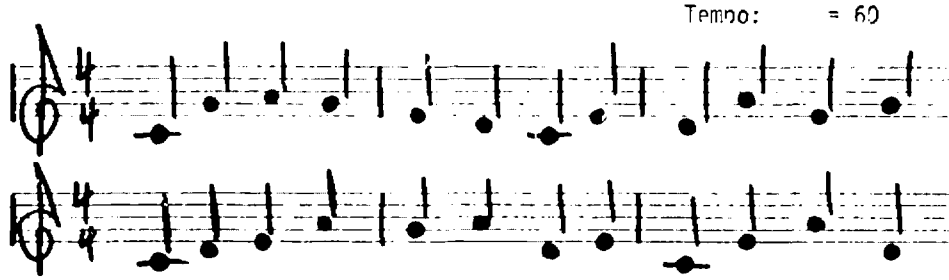


TABLE I

Reliability Analysis--Grambling Freshman Music Majors (N=38)

	Items Numbered	Identification	Group Favored	Mean, Test 1	Mean, Test 2	Standard Deviation Test 1	Standard Deviation Test 2	Value of r
All Questions				139.89746	118.17948	75.41342	67.41294	0.84616
Section 1	1-15	Error Detection	Trythall	8.41025	6.07692	8.78010	6.68612	0.76330
Section 2	16-27	Melodic Dictation	Trythall	13.10256	8.51282	13.34715	10.93489	0.41289
Section 3	28-33	Melodic Dictation	Control	8.76923	8.30769	10.89291	10.00038	0.54711
Section 4	34-40	Rhythmic Dictation	Control	24.07692	19.66666	17.47534	15.03561	0.56226
Section 5	41-49	Harmonic Dictation	Trythall	42.43589	34.58974	21.33291	17.89251	0.56009
Section 6	50-51	Chord Ident.	Control	3.94871	3.87179	2.29356	2.41899	0.27863
Section 7	52-57	Harmonic Dictation	Control	6.30769	4.89743	6.27506	5.75277	0.64532
Section 8	58-60	Sight Singing	Control	13.51282	14.64102	13.07843	13.60626	0.77612
Section 9	61-66	Sight Singing	Trythall	19.33333	17.61538	13.73685	12.61913	0.90691

TABLE II

Reliability Analysis--Peabody Freshman Music Majors (N=32)

(Twenty Questions Only)

	Mean, Test 1	Mean, Test 2	Standard Deviation Test 1	Standard Deviation Test 2	Value of r
All Questions	169.90628	167.71878	15.16650	19.65545	0.89503

TABLE III

Initial Difference - Mid-Test Personnel (N=49)*

	Mean	Standard Deviation
Control Group	3.427	1.628
Experimental Group	3.309	1.633

t equals -0.251

Initial Difference - Group Taking Final (N=32)**

	Mean	Standard Deviation
Control Group	3.699	1.654
Experimental Group	3.479	1.159

t equals -0.439

* t of 2.000 significant at .05.
** t of 2.042 significant at .05.

TABLE IV

Grambling Test-Retest (N=38) Item Analysis***

Item	t* Value	Item	t Value	Item	t Value
1	1.259355	6	0.723142	11	-0.702500
2	2.583732	7	1.863834	12	0.297968
3	1.145192	8	0.572351	13	0.529568
4	2.169584	9	-0.442579	14	0.000000
5	1.741428	10	-0.255085	15	2.588000

*** t of 2.021 is significant at .05 level. Underlined values indicate questions repeated at Peabody.

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Item	t* Value	Item	t Value	Item	t Value
16	1.430590	33	-0.963697	50	0.713746
17	0.815766	34	0.786824	51	-0.751701
18	1.362770	35	0.319368	52	1.198738
19	3.031616	36	1.318819	53	1.198738
20	1.746706	37	1.155735	54	2.163784
21	0.627520	38	2.769095	55	0.758607
22	0.454138	39	0.864661	56	-0.702500
23	2.241537	40	0.404904	57	-1.085960
24	0.678386	41	2.267148	58	-1.778540
25	1.901436	42	1.657722	59	0.058679
26	-0.190057	43	2.368514	60	1.093834
27	0.347141	44	1.106961	61	-0.403855
28	2.116868	45	1.318396	62	0.058887
29	-0.401979	46	1.833261	63	1.741428
30	-0.352324	47	1.376342	64	0.524868
31	-0.719615	48	0.483855	65	0.524868
32	0.000000	49	0.642943	66	0.000000

* t value of 2.021 is significant at .05 level. Underlined values indicate questions repeated at Peabody.

TABLE V

N=32 for charts A and C. A t value of 2.042 is significant at the .05 level.
N=49 for chart B. A t value of 2.000 is significant at the .05 level.
Positive t's favor the experimental group.

A. Comparative Gain for the Academic Year on Test

	Mean Gain	Standard Deviation
Control	3.192	0.995
Experimental	3.996	1.017

t equals 2.180.

B. Comparative Gain for First Semester

	Mean Gain	Standard Deviation
Control	2.436	0.673
Experimental	2.858	0.998

t equals 1.728.

C. Comparative Gain for Second Semester

	Mean Gain	Standard Deviation
Control	0.701	0.799
Experimental	1.032	0.933

t equals 1.105.

TABLE VI

Section by Section Analyses of Mean Gain

A. During Year (N=32)*
   1. Primary Comparisons
   2. Secondary Comparisons
B. During First Semester (N=49)**
   1. Primary Comparisons (as A above)
C. During Second Semester (N=32)*
   1. Primary Comparisons (as A above)

* t value of 2.042 is significant at the .05 level.
** t value of 2.000 is significant at the .05 level.

A-1 Primary Comparisons

	1	2	3	4
A	2.36053*	0.82267	0.37788	1.40974
B	4.53234	4.67720	2.40480	0.98218
C	3.32171	2.04486	0.49292	0.32399
D	1.48809	2.00115	2.65979	-0.75588
E	0.89528	0.88279	0.24959	-0.77711
F	-0.46100	-0.96671	-2.56081	-0.26572

A-1 Secondary Comparisons

	5	6	7
A	5.02462*	4.95717	-6.24276
B	1.76735	1.76735	1.76735
C	2.09120	2.18945	-5.96358
D	-0.46907	-0.41778	2.97837
E	0.21678	0.26360	-0.38177
F	0.49975	0.50744	-3.01331

B-1 Primary Comparisons

	1	2	3	4
A	3.64712*	-0.61777	2.76301	-2.19599
B	4.86032	2.80266	3.67115	-1.42664
C	0.85866	-1.31325	2.49192	-0.76451
D	2.04093	3.35707	2.15788	0.43266
E	-2.15520	-0.80224	-0.30262	1.63003
F	-3.55380	-3.59437	-2.22815	0.84873

*Positive t values favor the second component and negative figures favor the first component of comparisons A throuth F.

C-1 Primary Comparisons

	1	2	3	4
A	2.79390*	0.18941	1.39322	0.83675
B	4.61946	4.28299	2.39427	0.45802
C	2.15230	0.54449	1.24558	-0.09572
D	1.88710	3.25718	1.82247	-0.57209
E	-0.03787	0.35087	-0.13741	-0.63879
F	-1.61502	-2.28638	-1.83269	-0.23046

* Positive t values favor the second component and negative figures favor the first component of comparisons A through F.

A = Control group improvement on experimental materials versus control group improvement on control materials.
B = Control group improvement on experimental materials versus experimental group improvement on experimental materials.
C = Control group improvement on experimental materials versus experimental group improvement on control materials.
D = Control group improvement on control materials versus experimental group improvement on experimental materials.
E = Control group improvement on control materials versus experimental group improvement on control materials.
F = Experimental group improvement on experimental materials versus experimental group improvement on control materials.

1 = Test sections 1, 2, 5, and 9 compared with test sections 3, 4, 6, 7, and 8 (i.e., those sections utilizing the experimental mode of testing versus those using the control mode of testing).
2 = Test section 2 (experimental melodic dictation) compared with section 3 (control melodic dicatation).
3 = Test section 5 (experimental harmonic dictation) compared with section 7 (control harmonic dictation).
4 = Test section 9 (experimental sight singing) compared with section 8 (control sight singing).
5 = Test section 1 (experimental error detection) compared with test sections 4 and 6 (control rhythmic dictation and chord identification).
6 = Test section 1 (experimental error detection) compared with test section 4 (control rhythmic dictation).
7 = Test section 1 (experimental error detection) compared with test section 6 (control chord identification).