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ABSTRACT

This paper analyzes the relationship between MI (musical independence) and placement in college instrumental ensembles and presented from 3 achievement tests administered to 354 excellent postsecondary instrumental students. Findings are presented from three achievement tests administered to 354 instrumentalists participating in Ball State University, Florida State University, and Wichita State University bands. The tests used in the study are the Instrumental College Survey-2 (ICS2), Colwell's Music Achievement Test 3 (MAT3), and Colwell's Music Achievement Test 4 (MAT4). The study's findings address the following four questions: (1) Are the top instrumental ensembles more musically independent than the bottom instrumental ensembles? (2) Is there a natural progression of growth in MI for music majors from freshman to graduate student? (3) Is the non-music major's musical growth influenced by participating in a postsecondary instrumental ensemble? and (4) How could MAT3, MAT4, or GT (grand total) test scores be used to evaluate postsecondary students or programs? (Contains 10 references.) Appendices present study statistical data. (GLR)

CAN A MUSIC ACHIEVEMENT TEST SUCCESSFULLY EVALUATE POSTSECONDARY INSTRUMENTAL STUDENTS AND PROGRAMS?

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I. INTRODUCTION

Bobbett (1989, 1990) evaluated musical independence (MI) and analyzed demographic data in a study of postsecondary instrumental music students and programs at the University of Tennessee-Knoxville and at Ball State University. Some findings of these studies were inconclusive and warranted further research. Recently, the Collegiate Activities Committee of the National Band Association encouraged additional research into the varied factors contributing to postsecondary student musical growth (Scagnoli, et al., 1992 [see Appendix A]).

Researchers have noted a drop in musical growth for music majors during the sophomore and/or junior years. Does this suggest that the better music majors tend to change to major fields other than music after their sophomore or junior years, or that the more MI students drop band while the weaker students continue? Research also showed that postsecondary ensemble classes had little or no positive influence on the musical growth of non-music majors. Since instrumental ensemble classes might be the single music class in which a non-music major enrolls, does it have a positive effect on the student's musical growth?

Ideally, sequenced courses for different grade levels should reflect different levels of academic accomplishment: a graduate student's musical skills should be greater than a freshman's. Should music educators insist that students have identifiable and measurable positive growth from one level to the next? What could be the possible explanation if students do not improve: do they forget musical skills, or are other factors influencing this lack of growth? If a downward trend exists from one year to the next, what might be influencing this phenomenon?

Ensemble classes (band, orchestra, chamber ensembles, etc.) are an integral part of an instrumental music major's curricular requirements. Many states require that a public school instrumental instructor take a prescribed number of ensemble classes, which are generally recognized as a primary way to develop musicianship. Postsecondary ensemble conductors are selected on the basis of musical excellence;

they are recognized experts in musical performance and musicianship. Indeed, scholarship money is awarded to both music and non-music majors for performing in the school's ensemble classes. How do ensemble classes affect MI? Are universities financially and academically supporting (*i.e., facilities, instruments, equipment, music, faculty, etc.*) classes that may not promote musical growth for all participants?

There is a subtle difference between musical independence (MI) and musical achievement. Musical achievement may represent the mastery of any academic skill related to music, but MI is directly related to the actual production and performance of music. The link between knowledge acquisition and knowledge use on performance is the key; music knowledge may exist without MI.

Additionally, there is an ongoing debate between two philosophies in music education. One group believes that it is impossible to measure accurately the student's MI with a conventional test because aesthetics is as elusive to measure as smoke is to hold--no paper-and-pencil test can accurately measure subtle musical nuances. Others believe that musicianship can be measured in a typical testing environment. While postsecondary music faculty routinely evaluate student musicianship through auditions, evaluating the process through which musicianship is attained is similar to taking a trip in the dark. The path may not be clear to the traveler or to an observer, but everyone knows when the destination has been reached --it was no accident or bit of magic. If one is an excellent instrumental musician, the person had to master musical skills. Musicianship implies the mastery of many musical skills such as melody recognition, pitch recognition, chord recognition, musical texture recognition, and cadence recognition. However, measuring musicianship is a complex, multi-faceted issue--the more and varied skills that are identified and measured, the more accurate the assessment becomes.

II. PURPOSE

The purpose of this research study was to analyze the relationship between MI and placement in college instrumental ensembles. The second purpose is to develop percentile norms for the MI of poor, average, and excellent postsecondary instrumental students.

III. METHODOLOGY

A. Research Questions

Four questions guided the inquiry in this study:

1. Are the top instrumental ensembles more musically independent than the bottom instrumental ensembles?
2. Is there a natural progression of growth in MI for music majors from freshman to graduate student?
3. Is the non-music major's musical growth influenced by participating in a postsecondary instrumental ensemble?
4. How could the MAT3, MAT4 or GT test scores be used to evaluate postsecondary students or programs?

B. Instrumentation

The Instrumental College Survey-2 (ICS2) (Appendix B),Colwell's Music Achievement Test 3 (MAT3), and Colwell's Music Achievement Test 4 (MAT4) were administered to 354 instrumentalists participating in Ball State University, Florida State University, and Wichita State University bands.

ICS2 Students were asked in the ICS2 to identify their academic major (music major (MM) or non-music major (NMM)), year in school (freshman, sophomore, junior, senior, graduate student), and the top instrumental ensemble in which they participate (first, second, third).

The instrumental students participate in the Wind Ensemble (1st), Symphonic Bands (2nd), and Concert Band (3rd) at Ball State University and Florida State University, and the Symphonic Band (1st) and Concert Band (2nd) at Wichita State University. The Wind Ensembles and Symphonic Bands are the elite performing ensembles at these schools, with membership determined through auditions with the instrumental music faculty. Membership in the Concert Bands, which function as training and recreational ensembles, is open to all interested students. The most advanced instrumentalists perform in the Wind Ensembles, and the less advanced instrumentalists perform in the Symphonic and Concert Bands.

Colwell's Music Achievement Test 3 (MAT3) and Music Achievement Test 4 (MAT4) The researchers used Richard Colwell's MAT3 and MAT4 to evaluate the musical independence (MI) of instrumental students participating in the Wind Ensemble, Symphonic Bands, and Concert Bands at Ball State University, Florida State University, and Wichita State University. MAT3 was selected for use in this research because the standardization information provided in the Interpretive Manual and the Administrative and Scoring Manual are adequate and the answer sheets are clear, self-explanatory, and easy to grade. Further, it best evaluates the student's musical independence (Bobbett, 1987) and has previously determined reliability estimates. Colwell's MAT4 was also selected because it addresses, more directly, some of the concepts of music history and music theory generally covered in the undergraduate music curriculum. Colwell (1970) used the Kuder Richardson 21 (KR21) to evaluate the internal consistency of MAT3 and MAT4 for grades 9-12. The KR 21 ranged from .87 to .89 for MAT3 and from .84 to .89 for MAT4.

The MAT 3 consists of four subtests:

1. Tonal Memory (e.g., MAT3, subtest #1 [**3ST1**]): (20 items) A chord is played on a piano first in block form, and then arpeggiated. The subject determines which tone of the arpeggiated version (four tones) changed. If the two chords are identical, the subject fills in the blank marked "O." Colwell defines this as "the ability to retain the quality of a chord" (p. 100)

2. Melody Recognition (**3ST2**): (20 items) A melody is first played on a piano and afterward it is placed in a three-part setting. The subject determines whether the original melody is in the high "H," middle"M," or lower "L" voice. If the subject is in doubt or fails to hear the melody, he fills in the blank marked "?" Colwell defines this as "the ability to follow a melody aurally" (p. 102)

3. Pitch Recognition (**3ST3**): (20 items) The subject hears the first tone of two written pitches, and afterward hears three additional pitches. The subject indicates which of the three pitches matches the second written pitch. Colwell defines this as "the ability to mentally hear the pitches seen on a page of music." (p. 104).

4. Instrument Recognition (**3ST4**): (15 items)
   Subtest A: (10 items) After listening to a melody played on a particular instrument, the subject identifies, from the four possible choices, the correct instrument. If the four instrument choices do not match the instrument heard, the subject fills in the blank marked "O." Colwell defines this as "the ability to identify solo instruments . . . from an aural example" (p. 106-7).

   Subtest B: (5 items) After listening to a melody played on a particular instrument within an orchestra setting, the subject identifies from the four possible choices,

the correct instrument. If the four instrument choices do not match the instrument heard, the subject fills in the blank marked "O." Colwell defines this as "the ability to identify . . . accompanied instruments from an aural example" (p. 106-7).

The MAT4[1] consists of "five" subtests:

1. Musical Style: (40 items)
   Subtest A: Composer (**4ST1**): (20 items) After listening to a short orchestral excerpt, the subject selects from four choices the composer whose style most closely resembles that of the musical excerpt. Colwell defines this as "the ability to categorize music as to genre and style" (p. 166).

   Subtest B: Texture (4ST2): (20 items) After listening to a short musical composition played on a piano, the subject marks the blank "M" for monophonic, "H" for homophonic, "P" for polyphonic, or "?" to indicate if she is in doubt. Colwell defines this as "the ability to categorize music as to genre and style" (p. 166).

2. Auditory-Visual Discrimination (4ST3): (14 items) After listening and viewing a four-measure melody, the subject fills in a blank below every measure in which the notion is rhythmically different from the melody he hears. If all the measures are correct, he fills in the blank marked "O". Colwell defines this as "the ability to accurately read rhythmic notation" (p. 169-170).

3. Chord Recognition (4ST4): (15 items) A block chord is played on the piano, and afterwards, three trial chords are played. The subject identifies from the three trial chords the one which sounds like the first chord. If none of the three chords are like the first chord, then she fills in the blank marked "O". If in doubt, she fills in the blank marked "?". Colwell defines this as "the ability to recall the sound of a chord, either by listening for its general harmonic characteristics, by recongnition of the chord as an entity, or by memtally singing the pitches of the chord" (p. 170-71).

4. Cadence Recognition (4ST5): (15 items) After listening to a short musical phrase played on a piano, the subject identifies the cadence by filling in the blank "F" for full cadence, "H" for half cadence, and "D" for deceptive cadence. If the subject is in doubt, he fills in the blank marked question "?". Colwell defines this as "the ability to distinguish among three common kinds of chadence (full, half, deceptive)" (p. 173-174).

C. Research Design

This is not a longitudinal study: the instrumental postsecondary students were evaluated only once during the spring of 1992 . To provide a fuller portrayal of the

1. For this study, researchers divided MAT4 subtest 1 into two subtests (4ST1 and 4ST2).

study's inter-related issues, inferential statistics were used. By using inferential statistics, the researchers realized that several assumptions were ignored: (a) students were not randomly assigned to the groups, (b) scores for each group were not normally distributed for each group, and (c) the variance for each group were not equal (i.e., homogeniety of variance assumption). In addition, the researchers assumed that the in-coming freshman for each of the last five years were equal in terms of musical independence. Finally, instead of using samples, the researchers used the total population of participants. Although the students were evaluated at a single point in time, the researchers attempted to explore issues relating to "growth" or "increase/decrease" of MI skills. Therefore, the terms "growth" or "increase" are used in this study to refer to MAT outcome differences between grade-levels.

For question 1, three analyses were conducted. First, descriptive and inferential analyses were used to evaluate the institution's and ensemble's MAT3 and MAT4 data. Test data were studied by school and collectively (total sample). Mean scores were developed for the subtests (e.g., 3ST2), test scores (e.g., MAT4), and grand total (GT) test scores (combined mean score for MAT3 and MAT4). ANOVA was used to evaluate significant differences between institutions' or ensembles' outcome data, and the Scheffe was used to identify the differences. Second, permutation analysis was used to examine the trend line between ensembles. Third, skew statistical analyses were used to evaluate each ensemble's and institution's subtests, tests, and GT data.

To answer question 2, the non-music majors (n=81) were eliminated from the total participant group (n=354), leaving only the music major (n=273) data. In addition, the MAT3 and MAT4 scores were combined and a Grand Total (GT) test score was developed for each student. Mean GT scores for each institution and the total sample were developed for each grade level (freshmen, sophomores, juniors, seniors, and graduate students). The ANOVA was used to evaluate the differences, and the Scheffe was used to identify the differences. The MAT and GT mean scores were evaluated from each institution's freshmen to graduate students.

In response to question 3, non-music major MI growth was examined. 273 students were music majors, 16 students did not indicate their major, and 65 students indicated they were non-music majors. Mean scores were developed by grade level, and

by outcome data (MAT3, MAT4, and GT scores) for each of the three institutions, and for the total non-music major sample. The ANOVA was used to examine differences between grade levels, and the Scheffe was used to identify the differences.

For question 4, mean scores modes and percentile scores were developed for the study's music majors.

This study used the .05 level of significance.

IV. FINDINGS

Below are the findings pertinent to the research questions.

1. At each institution, is the top instrumental ensemble more musically independent than the bottom ensemble?

Both the MAT3 and MAT4 were administered to all the instrumental students participating in instrumental ensembles at Ball State University, Florida State University, and Wichita State University. Mean scores were computed for all subtests, test scores, and grand total test scores. Table 1 illustrates that the Ball State Wind Ensemble (1st) and Florida State Wind Ensemble (1st)--the top ensembles--earned generally higher subtest, test, and GT mean scores than the instrumental students participating in the middle organizations (i.e., 2nd out of three organizations), and the students participating in the middle ensembles generally received higher mean scores than the student participating in the bottom (3rd) ensembles. The Wichita State Wind Ensemble (1st) scored significantly higher than the Wichita State Symphonic Band (2nd) students which were identified by the college director and/or faculty auditioners as the organization whose students had weaker MI skills. There were several subtests where there were no significant difference between ensembles: 3ST1 (i.e., MAT3, Subtest #1) [*Ball State, Florida St., and Wichita St.*]; 3ST4 [*Florida St., and Wichita St.*]; 4ST4 [*Ball State, Florida St., and Wichita St.*], and 4ST5 [*Florida St.*].

Permutation analysis was used to evaluate outcome data and ensembles. The 3ST4 (Florida St.) and 4ST4 (Florida St. and Wichita St.) were the two subtests where the first ensembles scored lower than the second ensembles. For all other trend-line analyses, the first ensemble scored higher than the second, and the second scored higher than the third for all subtests, tests, and GT mean scores.

Table 1. The ANOVA /Scheffe and permutation (≤16.7%) analysis used to evaluate differences and similarities between Institutions, and ensembles for the Music Achievement Test 3 (MAT3) and Music Achievement Test 4 (MAT4) subtests, test scores, and Grand Total (GT) scores, 1992.

Organization	1st M	2nd M	3d M	F-Score	p	Scheffe	Permutation
BALL STATE UNIVERSITY							
n=	*44*	*52*	*31*				
MAT3							
3ST1	16.52	16.19	15.55	1.25	.2894	--	√
3ST2	14.84	14.21	11.77	8.77	.0003	2, 3	√
3ST3	15.05	14.73	12.10	9.22	.0002	2, 3	√
3ST4	13.43	12.75	12.32	4.08	.0192	2	√
MAT4							
4ST1	*14.77*	*11.75*	*10.32*	*17.65*	*.0001*	*1, 2*	√
4ST2	*17.46*	*16.75*	*15.16*	*7.04*	*.0013*	*2, 3*	√
4ST3	*15.91*	*14.77*	*12.97*	*8.83*	*.0003*	*2, 3*	√
4ST4	*14.02*	*13.42*	*13.32*	*2.30*	*.1048*	--	√
4ST5	*11.32*	*9.83*	*9.03*	*10.95*	*.0001*	*1, 2*	√
MAT3	**59.84**	**57.89**	**51.74**	**10.75**	**.0001**	**2, 3**	√
MAT4	**73.48**	**66.52**	**60.81**	**24.60**	**.0001**	**1, 2, 3**	√
GT	**133.32**	**124.40**	**112.55**	**21.22**	**.0001**	**1, 2, 3**	√
FLORIDA STATE UNIVERSITY							
n=	*34*	*50*	*52*				
MAT3							
3ST1	17.03	16.84	16.81	.12	.887	--	√
3ST2	15.65	14.98	14.10	3.25	.0419	2	√
3ST3	16.82	15.82	14.58	6.09	.003	2	√
3ST4	13.32	13.50	13.15	.89	.4139	--	NO
MAT4							
4ST1	*18.5*	*17.02*	*14.33*	*25.66*	*.0001*	*2, 3*	√
4ST2	*18.65*	*16.82*	*16.35*	*5.48*	*.0052*	*1, 2*	√
4ST3	*16.32*	*16.28*	*14.90*	*4.74*	*.0103*	*2, 3*	√
4ST4	*13.50*	*13.60*	*13.35*	*.18*	*.8387*	--	NO
4ST5	*11.44*	*10.56*	*10.31*	*2.67*	*.0729*	--	√
MAT3	**62.82**	**61.14**	**58.64**	**4.15**	**.0179**	**2**	√
MAT4	**78.41**	**74.28**	**69.23**	**11.48**	**.0001**	**2, 3**	√
GT	**141.24**	**135.42**	**127.87**	**9.17**	**.0002**	**2, 3**	√
WICHITA STATE UNIVERSITY							
n=	*53*	*38*					
MAT3							
3ST1	17.21	16.79		.86	.3567	--	√
3ST2	15.49	13.34		10.65	.0016	1	√
3ST3	15.43	13.08		9.72	.0025	1	√
3ST4	13.51	13.08		2.20	.1416	--	√
MAT4							
4ST1	*16.09*	*12.03*		*28.41*	*.0001*	*1*	√
4ST2	*16.81*	*15.11*		*4.76*	*.0317*	*1*	√
4ST3	*16.79*	*14.92*		*12.74*	*.0006*	*1*	√
4ST4	*13.32*	*13.42*		*.04*	*.85*	--	NO
4ST5	10.96	9.45		8.12	.0054	*1*	√
MAT3	**61.64**	**56.29**		**12.34**	**.0007**	**1**	√
MAT4	**73.94**	**64.92**		**20.10**	**.0001**	**1**	√
GT	**135.59**	**121.21**		**19.15**	**.0001**	**1**	√

Scheffe
1 = 1st and 2nd
2 = 1st and 3rd
3 = 2nd and 3rd

√ = Permutation (Three items ordered from larger (1st) to smaller (3d)) = ≤16.7%, or Two item ordered from larger (1st)to smaller (2nd) = 50%.

Skew analysis was used to examine the ensemble and outcome data (Appendix C). Minium (1970, p. 51) states: " B [a *picture of a positively skewed distribution*] might result from a test which is too difficult for the group taking it, and C [a *picture of a negatively skewed distribution*] from the opposite situation." Skews were developed for each of the subtests, tests, and GT for each ensemble, the institution's total participants, and for the study's participants. Collectively, positive and negative analyses were summed; there were 135 instances of negatively skewed items, and 9 instances of positively skewed items. When an institution's participants or combined participants were collectively evaluated, the skews for all items were negative.

The items with a negative one or smaller skew (i.e., -1.00 to -3.00) were compared to items with a larger skew (-.99 to +1.00). Ball State Wind Ensemble (1st) received four analyses with a small (≤-1.00) skew, Ball State Symphonic Band (2nd) received three, and the Ball State Concert Band (3rd) received two. Florida State's Wind Ensemble (1st) received 4 with a small skew, the Symphonic Band (2nd) received 11, and the Concert Band (3rd) received 2. Maybe, the Florida State's Symphonic Band (2nd) had weaker instrumentalists when compared to the other two Florida State organizations, for these few students greatly affected the skew analysis for the Florida State Symphonic Band. When further evaluating Florida State's participants, the bottom 6 out of 10 GT MAT scores were in the Florida State Symphonic Band. The Wichita State Wind Ensemble (1st) received 10 analyses with a small skew, and the Wichita State Concert Band (2nd) received 2. Using the skew analysis, the instrumentalists in the Ball State Wind Ensemble (1st) and Wichita State Wind Ensemble (1st) were more musically independent than the students in the Ball State Concert Band (3rd out of three ensembles) or Wichita State Concert Band (2nd out of two ensembles).

2. Is there a natural growth in MI for music majors from freshman to graduate students?

The non-music majors were eliminated from the total participant population (n=354), and the 276 music major's (MM) grade level data were evaluated (see Appendix D). Of the 276 music majors, 3 students did not indicate their grade level; thus, 273 music majors were used as the sample for studying grade level. There were

97 Ball State, 110 Florida State, and 66 Wichita State music majors. The MAT3, MAT4, and GT scores were evaluated by grade level. Generally, freshmen and juniors received the lowest mean MAT3, MAT4, and GT scores and seniors and graduate students received the highest mean scores.

Ball State's students mean GT scores increased from freshman to junior, and Florida State's student mean scores decreased from freshman to junior. Florida State's and Wichita State's GT mean test scores made a large increase between the junior and senior year (M=+10, +11, respectively), but Ball State's GT mean test scores decreased slightly (M= -2). The largest drop in the GT mean test score was between the sophomore and junior year for Wichita State (M= -8), and the two largest GT mean test score increases were between Ball State's seniors and graduates (M=+22.5), and between Wichita State's juniors and seniors (M=+23.8). Generally, in every instrumental program, the GT mean score for junior was lower than the same score for freshman.

The ANOVA statistic evaluated the MAT3, MAT4, and GT mean scores for students by grade levels. There were significant differences between grade levels for Wichita State's MAT3 scores, Ball State's and Wichita States mean MAT4 test scores, and for Ball State's and Wichita State's total sample GT test scores. The Scheffe statistic identified differences between music majors for the following grade level combinations: freshman and senior , freshman and graduate, junior and senior , and junior and graduate for both Wichita State and the study's total sample. There was a significant difference between sophomore and graduate MMs for the study's total sample, between Ball State's freshman and graduate MMs GT test scores, and between Wichita State's junior and senior MMs MAT3 test scores. Generally, there were no differences between grade levels for Ball State and Florida State students. There were no significant differences between grade levels for Florida State's MAT3, MAT4, and GT test scores ($p \leq .15, .10, .11$, respectively).

3. Is the non-music major's (NMM) musical growth influenced by participating in a postsecondary instrumental ensemble?

Of the 354 participants, 16 were eliminated because they did not identify their major, and 273 others were eliminated because they identified themselves as music majors. The MAT scores and GT mean scores for 65 non-music majors were evaluated

for each grade level (see Appendix E). Ball State University had 20 non-music majors (NMM), Florida State University had 22, and Wichita State University had 23. The number of NMMs gradually decreased between the freshmen level to the senior level (n=26, 22, 9, 8, respectively). The mean GT scores for Ball State and Wichita State increased from freshman to junior, while Florida State's mean GT test scores dropped from freshman to senior. The mean test scores decreased from junior to senior for Florida State, Wichita State, and for the total NMM sample.

The **ANOVA** statistic was used to evaluate differences between NMM grade levels. The mean GT test scores increased from freshman to the junior level, but decreased slightly from juniors to seniors (M=115, 121, 124, 121, respectively). There was no significant difference among the four postsecondary grade levels for Ball State's, Florida State's and Wichita State's mean GT test scores ($p \leq .051, .568, .700$, respectively).

The **permutation** statistic was used to evaluate the NMM's trend-line between freshmen and seniors. Florida State's NMMs GT mean scores significantly decreased (M=131, 125, 121, 117) (*Permutation: four items ordered from small to large = $p \leq .05$*) from the freshmen to senior year, while Ball State's and Wichita State's GT mean scores (M=101, 115, 156; 114, 121, 125, respectively) increased slightly from the freshmen to the junior year (*[Permutation: three items ordered from large to small = $p \leq .17$]*). The total population's and Wichita State's GT mean score decreased from junior and senior year (M=124 to 121; 125 to 117, respectively).

4. How could the MAT3, MAT4 or GT test scores be used to evaluate postsecondary students or programs?

The three colleges participating in this study are located in three different regions of the United States; Ball State is in the middle west United States, Florida State in the Southeast, and Wichita State is in the West. Mean scores, modes, and percentile scores were developed for music majors MAT3, MAT4, and the GT tests (see Appendix F). The mean and mode for MAT3 were 60 and 62, for MAT4 were 72 and 80, and the mean GT scores were 132 and 133. Note that the mode is slightly higher than the median for all three measures.

Using this study's 276 MMs to develop MI norms, a MM in the top 10 percentile would have to score ≥69 on MAT3, ≥81 on MAT4, and ≥148 on the GT test, while a MM in the bottom 10 percentile would need to score ≤ 50 on MAT3, ≤59 on MAT4, and ≤113

on the GT. To be average, a= MM they would need to score ≈60 on the MAT3, ≈72 on MAT4, and ≈132 on the GT.

V. CONCLUSIONS

1. Colwell's MAT3 and MAT4 successfully evaluated the MI of postsecondary students and programs.

Colwell's MAT3 and MAT4 were designed to evaluate middle and high school students, not postsecondary students. However, many interesting observations and evaluations were made using these musical achievement tests on postsecondary instrumental students. This study evaluated significant differences between ensembles, grade levels (*freshmen to graduate*), and different levels of MI. This study, although *not a longitudinal study*, identified potential areas where MMs might be "at risk." Finally, these tests confirmed that directors and faculty know, understand, and evaluate their students (*through student ensemble placement*) on the important musical skills generally recognized by good musicians.

This study also noted several reasons why Colwell's tests might be inappropriate for postsecondary use. First, several subtests were not as successful (3ST1, 3ST4, and 4ST4) in differentiating good and weak students as other subtests. Neither test *individually* portrayed as accurate a picture of student MI as both tests *collectively* (MAT3 and MAT4) (see Table 1). Second, the tests appear to be too simple for most postsecondary music education students (Appendix C).

In summary, Colwell's music achievement tests generally provides the researchers with the "glasses" to view and examine some of the many relationships surrounding MI (*e.g., MI and the student's grade level, or instrumental ensemble*). Music educators have sometimes argued that aesthetics cannot be measured in a conventional manner. However, as shown through this study, postsecondary instrumental music students do possess measurable and identifiable music skills that relate to the student's growth. Using these tests collectively, postsecondary students' MI were successfully evaluated using auditory paper-and-pencil tests, and therefore, Colwell's MAT3/MAT4 are effective MI tests for evaluating postsecondary students and programs.

2. Some good students appear to be quitting music during their sophomore year.

College students are influenced by their academic environments: music

education classes, private instrument instructor, and school ensembles. When the student's MI scores become smaller from one year to the next, it suggests that something unusual and unwelcome is taking place. The junior MI scores were smaller than the sophomore students (see Appendix D).

What are some of the possible reasons why a student to changes majors and drops out of music? Perhaps some MMs find another college major which might be more professionally lucrative; or they find music performance requires too much work; or these students simply do not have as much fun in band as they did in high school? Such reasons result from speculation, and more research is required to fully answer this question.

Earlier studies (Bobbett, 1990,1991) noted that top MI students are involved in many musical activities while in high school (i.e., all-state band, concert festival, solo-ensemble, and marching contests). Most of these students were recognized by their high school peers, other top students, and band directors throughout their state as excellent instrumentalists. Instrumental music was a fun (Bobbett, 1991b) and rewarding activity. As a high school student, they may never have realized that they were a "big" fish in a "small" pond.

For years, the researchers have talked with many college students. They discussed many aspects of studying music education --their frustrations, fears, angers, and its many rewards. Although not directly part of this study, they freely shared their views regarding their future professional aspirations. Often, they inferred that when they join college instrumental ensembles and major in music education, their lives change dramatically. They never anticipated that college instrumental music would be any different than their exciting and memorable high school experiences. Now, instead of always playing the solo part, they might have to play the second or third part because they are just one of many excellent musicians. Even if these students were the very top instrumentists in the college ensemble, they noted that senior and graduate students might be assigned the solo part--not because of musical excellence, but seniority.

Being a music student and complying with the music education curriculum constraints requires a variety of music activities. For instance, some students noted that instead of practicing whenever they wanted to (*they were the best and didn't need*

to practice with much diligence), practicing became "hard" work. Instead of an hour a night for three or four nights per week, they must practice many hours per night, every night of the week. The students (not this study's participants) noted that serious instrumental students often spend more time practicing for a one-hour credit in applied music than non-music majors spend studying for another three-hour course. In addition, Music Theory courses, often viewed by both music faculty and college instrumental students as a "weeding out" activity, may strongly influence student decisions (Bobbett, 1990) regarding the music education program. They might observe students in other academic majors making good grades and graduating in fewer years than most music majors. They may realize that many other college majors are more financially rewarding.

These speculations suggest only a few of the many reasons students might be dropping out of instrumental music. If the remaining students have lower MI while the better MI students are changing majors, what impact will this phenomena have on tomorrow's music education programs? Since many factors might be contributing to this phenomena (*ego, money, hard work/practicing, assignment of solos, or adjustment of the "real"life of music education*), many factors need to be jointly evaluated in such further research.

3. It is questionable to what extent non-music majors (NMM) benefit from participating in postsecondary instumental ensembles.

Ideally, there should be a measure of accountability in each course activity: teachers should teach something that is valuable and relevant to the student's professional or personal aspirations; and the students, from both the college and students perspective, should learn something that is identifiable, measurable, and relevant to students academic growth. Is it reasonable to expect students to learn something--musical independence--from the experience of taking an instrumental ensemble class? Should the learned musical skills be directly related to MI, instead of musical achievement (knowledge) that may not be related to MI? If students take a college course and make a good grade, this should imply that the students learned something (musical skills or MI). Postsecondary instrumental ensemble conductors are, theoretically, master musicians and master teachers. There is no evidence (statistical) suggesting that the non-music majors studied in this research project, along

with NMMs studied in previous projects (University of Tennessee-Knoxville (1989), Ball State (1990)) benefited musically by participating in postsecondary ensembles. Although this study along with the past research projects evaluating NMMs "growth," were not longitudinal studies, this phenomena has been repeatedly observed. Collectively, it seems that NMMs are not benefitting by participating in postsecondary ensembles (see Appendix E).

As unsubstantiated conjecture, there could be many explanations why non-music majors do not make positive musical growth: (1) too much time studying on their academic course-work, (2) no private lessons, or if they do take lessons, the students do not see the relevance or urgency in improving their musical skills, (3) there is no linkage (*significant correlation*) between the student's ensemble grade and MI (Bobbett, 1992), (4) seniority might dictate that since music majors are assigned all the solos (fun/recognition), the NMMs are not musically challenged, and (5) low expectations by their peers and faculty members. Non-music majors are an essential part of a "large" college marching band (*more of a fun-and-entertainment activity rather than an art form requiring advanced musical skills*). The music used in marching bands is generally not as challenging as serious concert band repertoire. Because of the size of the marching band, faculty expectations for individuals are too low for non-music majors to develop meaningful musical growth.

While the total sample of non-music majors shows a slight increase (*but not significant*) in musical growth from freshman to senior, it is interesting to note that the NMMs at Ball State and Wichita State show an increase (*MAT mean score increased each successive year*) from their freshman through junior years, while the NMMs at Florida State decline through the same periods (see Appendix E). These disparities might be due to differences in departmental missions and emphasis (music performance *vs.* music education; undergraduate *vs.* graduate students; music majors *vs.* the overall student body; or large enrollments that requires a department to weed-out some of the students *vs.* smaller enrollments that need NMMs).

VI. SUMMARY

Many of the previously mentioned considerations may be influencing the declines of these student groups (no more fun, financial/professional considerations, the time demands of practicing every night all year, student-faculty interaction, and difficulty in course work). Finally, and perhaps most importantly, the professional reality is that most amateur or professional ensembles (bands, orchestras, chamber ensembles) need fewer brass performers than are presently enrolled in college. Alternatively, if the college directors are pressured to maintain a very large "sports" marching band, they need rigorously to recruit *many* brass student performers. The needs of a large university marching band program and the student's professional aspirations are not congruent. Further study is warranted to identify the problems that might be influencing many of the best music majors in ther decision to drop out of music or change their major.

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Authors Notes

The authors would like to thank Dr. James Croft, Director of Bands at Florida State University, Dr. Joseph Scagnoli, Director of Bands at Ball State University, Dr. Victor Markovich, Director of Bands at Wichita State University, and their instrumental students for participating in this research project. The authors would like to make a special thanks to Dr. Richard Colwell for developing these music achievement tests plus his enthusiastic sponsorship and encouragement of this project. Finally, the authors would like to thank Dr. Charles M. Achilles for his unwavering assistance and numerous suggestions regarding past and present educational research projects.

Additional research papers will be forthcoming from this study examining other post-secondary issues such as: (a) **Gender and instrument family** (*Does gender or the instrument family influence the student's MI growth?*), (b) **College courses and related activities** (*Which college courses and other related music activities most influence the students musical independence?*), (c) **High school music activities** (*How important is All-state Band, Concert Festival, private lessons, etc.?*), (d) **College music activities** (*How important during practice/private lessons are activities such as scales, etudes, thirds/arpeggios, band music, sight-reading, etc.?*), and (e) **Musicianship** (*What do good musicians emphasize (i.e. tone, intonation, phrasing, technique, dynamics, rhythm, form, etc.) to develop musicianship during practicing, band rehearsals, and private lessons?*).

Intercollegiate Activities Committee

Joseph R. Scagnoli, Chairman
Gordon C. Bobbett, Educational Researcher
Wayne F. Dorothy, Member

Band Accountability and Assessment [1]

As many of you are aware, during the past summer President Bush unveiled his National Education Goals as represented in his "America 2000" program. This national program is currently being implemented throughout the country as a trickle down program represented at state level as "State 2000." As music professional and institutions involved in the preparation of music teachers you need to be aware of the fact that music and the Fine Arts were not originally mentioned as being an integral part of the new National Education Goals. Because of the new education goals, changes in current laws related to educational requirements are being amended or reconsidered in many states. Changes in curricular priorities are currently being proposed and considered in many states. It is my feeling that these changes will have a negative impact on our school band programs and our music programs in general.

Accountability is a major issue in education. One of the assumptions in "America 2000" is that academic excellence is linked to specific, identifiable, and measurable skills. It is important to remember that "band" is a certified course that is recognized and funded by State money. Each student receives a credit toward the student's graduation. Through the certification process, the state and the school assumes that skills need to be mastered. Should a music course (band) be treated differently than any other academic course? Standards of excellence need to be set and measured. Without accountability there is no creditability. Not every band student will be or should be a professional musician, but alternatively, today's educational process should not become a academic environment where the student becomes musically impotent because of the heavy emphasis on *fun and entertainment.* Gordon Bobbett and Wayne Dorothy have initiate research investigations on the phenomenon of musical independence and the related academic / musical experiences that contribute to this educational process. This process and its evaluation should be of particular importance to band directors at this time when there is so much emphasis being placed on program assessment and evaluation. While there are several measures of assessment locally, nationally, and statewide in language arts, math, social studies, and science, assessment in instrumental music (band) is restricted or not included. Current state accreditation standards (PBA) do not thoroughly assess the level of achievement in our band programs.

The assessment instruments being utilized by Gordon Bobbett in his current research into the area of how music students develop their musicianship (musical independence) will be of great use and importance to band directors during the decade of the 90's. Accurate assessment of the educational growth of band students, while they are participating in band programs, is critically needed at this time. This type of band student assessment will prove to be an invaluable asset to the survival of school band programs at all levels in the near future.

Past research data has been provided by the University of Tennessee and Ball State University Band programs. Additional data will be forthcoming from the Florida State University and the Wichita State University Band programs. Sample copies of the assessment survey are attached for your review. The MAT3 and MAT4 evaluative materials are the property of Dr. Richard Colwell, Boston University. Use of these materials require permission and purchase from Dr. Colwell. Hopefully, we will see more band programs at all levels volunteering their students to generate a larger data base for a more accurate assessment of our band programs.

1. **National Band Association Journal, Volume XXXII, No. 3, (pp 63-64) May, 1992.**

INSTRUMENTAL COLLEGE SURVEY-2

A. General

Social Security Number_____ **Instrument** _____

1. Instrumental Organization _____
2. College rank: (Fr) (So) (Jr) (Sr) (Masters) (Doctoral)
3. College major: Music ( ), Non-music ( )
4. Total years you have played your band instrument (*grade school to present*): _____
5. What grade did you start band?_____

- Gender (M) (F)
- College GPA _____
- Age _____

B. College Course Work

1. How many hours a week do you:
   a. Practice Instrument _____
   b. Study non-music course work _____
2. Number of semester (quarter) classes you have completed in each area
3. Your average grade in each area (*A-B-C-D-F*)

*Using the following scale for Questions 4-5, **RATE** each activity as to its importance in:*

	Private (Inst.) Lessons	Ear training	Theory	Keyboard/Piano	Music History	Conducting	Music Education	Voice/Choir	Inst. Ensemble	General Academic
4. Developing musicianship										
5. In your opinion, how would the music faculty **RATE** each area's importance?										

5 VERY important 4 Important
3 Somewhat Important
2 Little Importance 1 NOT important

6. The music course(s) that helped your musicianship the **most**? _____
   _____ **Least**? _____

C. High School Music Activities

1. High school GPA _____
2. ACT score _____ SAT score _____
3. Excellent high school musicians emphasize _____
4. How many **YEARS** did you participate in each of these high school activities?

*Using the following scale for Questions 5-6, **RATE** each activity as to its importance in developing **MUSICIANSHIP**:*

	All-State Band	All-State Orchestra	All-State Jazz Band	All-State Choir	Concert Festival	Solo-Ensemble	Marching Contests	Private Lessons	Church/Community Choir	High School Jazz Band	Community Band
5. Your **Musical Development**											
6. In your opinion, how would your high school **Band Director** rate each area's importance?											

5 Very important 4 Important 3 Somewhat Important
2 Little Importance 1 Not important

OVER

D. College Music Activities

1. The percentage (%) of time you use a metronome during practicing?_____

Make sure Questions 2 and 3 each add up to 100%
What percentage (%) of time do you spend on the following activities during:

2. **Individual Practicing**

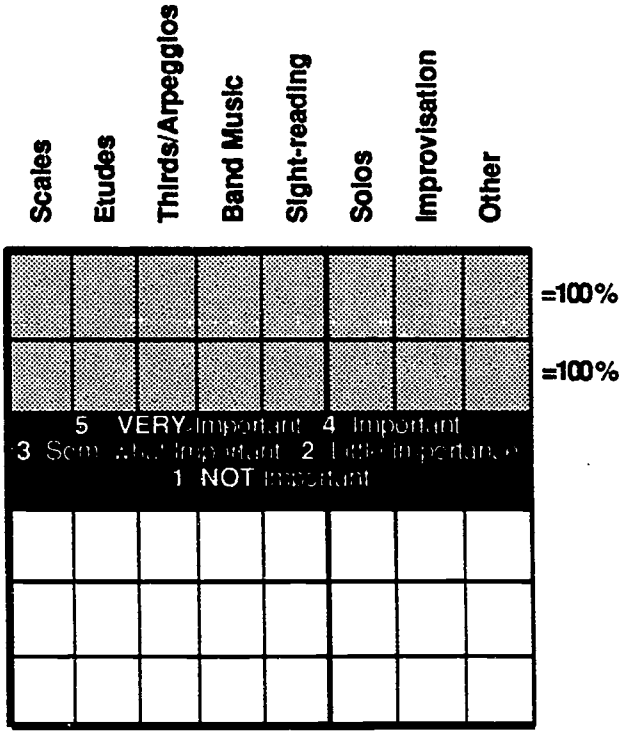
3. **Private Lessons** (*Major Inst.*)

Using the following scale for Questions 4-6, give YOUR PERCEPTION of how the following individuals would **RATE** each activity's importance in developing **MUSICIANSHIP**:

4. **Yourself**

5. Your private instrumental **Teacher**

6. Your college **Band Director**



7. Number of minutes per month you make a audio/video recording of your playing _____
8. Number of minutes per week you ask a **classmate/friend/faculty member** (*exclude private instrument teacher*) to listen/critique your instrument playing _____

E. Musicianship

Make sure Questions 1, 2, and 3 each add up to 100%
What percentage (%) of time is spent practicing / thinking about these music items during:

1. **Individual Practicing?**

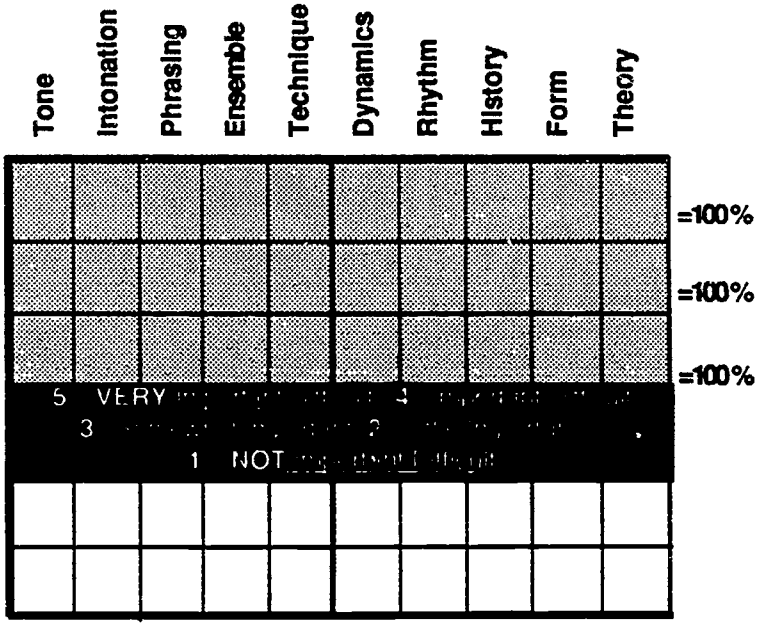
2. **Band Rehearsal?**

3. **Private Lessons ?**

*Using the following scale for Questions 4-5, **RATE** each activity in developing musicianship from the following perspectives:*

4. Its **Importance**

5. How **Difficult** is it to learn/master

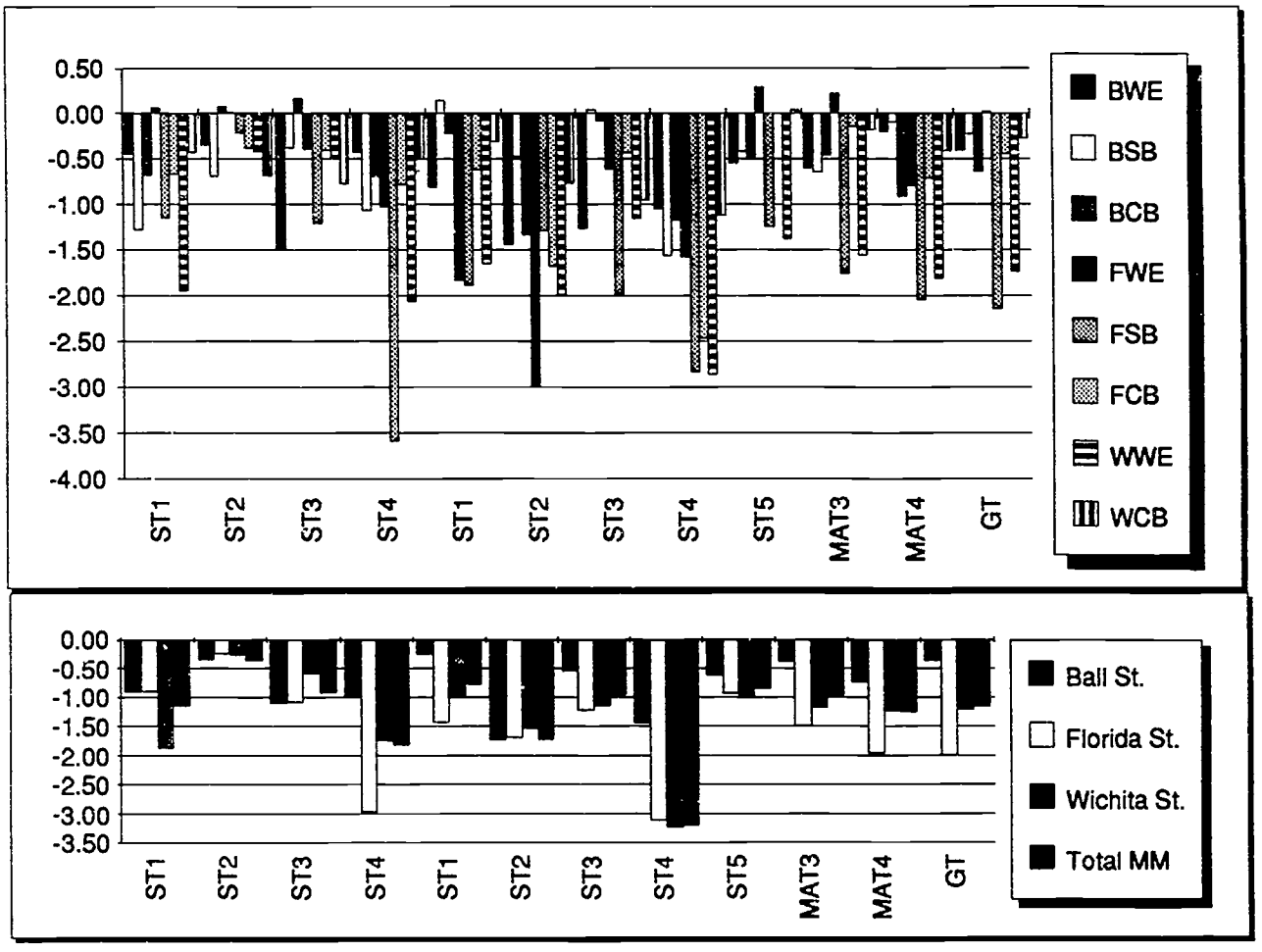


6. When Performing, **excellent** instrumental musicians listen to/emphasize _____
while **poor** instrumental musicians listen to/emphasize _____

Skewness

Music Majors

SCHOOL		MAT3				MAT4					Tests		
Ball State	*n*	**ST1**	**ST2**	**ST3**	**ST4**	**ST1**	**ST2**	**ST3**	**ST4**	**ST5**	**MAT3**	**MAT4**	**GT**
Ball WE	*41*	-0.45	-0.35	**-1.50**	-0.43	-0.81	**-1.44**	**-1.26**	**-1.05**	-0.55	-0.61	-0.21	-0.41
Ball SB	*42*	**-1.28**	-0.70	-0.38	**-1.07**	-0.15	-0.48	0.04	**-1.56**	-0.43	-0.64	-0.10	-0.23
Ball CB	*15*	-0.69	0.08	0.17	-0.70	-0.23	**-1.34**	-0.08	**-1.16**	-0.50	-0.46	-0.91	-0.64
Florida State													
Florida WE	*32*	0.07	0.02	-0.39	**-1.02**	**-1.84**	**-2.99**	-0.61	**-1.58**	0.29	0.22	-0.80	0.03
Florida SB	*45*	**-1.15**	-0.22	**-1.22**	**-3.59**	**-1.89**	**-1.29**	**-1.99**	**-2.83**	**-1.24**	**-1.77**	**-2.05**	**-2.15**
Florida CB	*34*	-0.67	-0.38	-0.41	-0.78	-0.62	**-1.68**	-0.44	**-2.46**	-0.01	-0.15	-0.72	-0.45
Wichita State													
Wichita WE	*47*	**-1.95**	-0.42	-0.51	**-2.07**	**-1.66**	**-2.00**	**-1.15**	**-2.87**	**-1.38**	**-1.56**	**-1.81**	**-1.74**
Wichita CB	*20*	-0.43	-0.69	-0.77	-0.51	-0.31	-0.77	**-0.96**	**-1.12**	0.05	-0.18	-0.42	-0.28
PROGRAMS													
Ball St.	*98*	-0.90	-0.35	**-1.10**	**-1.00**	-0.25	**-1.74**	-0.54	**-1.44**	-0.61	-0.39	-0.74	-0.36
Florida St.	*##*	-0.89	-0.24	**-1.08**	**-2.97**	**-1.43**	**-1.69**	**-1.23**	**-3.11**	-0.93	**-1.48**	**-1.96**	**-2.00**
Wichita St.	*67*	**-1.87**	-0.26	-0.58	**-1.74**	**-0.99**	**-1.53**	**-1.15**	**-3.23**	**-1.02**	**-1.18**	**-1.23**	**-1.21**
Total MM	*##*	**-1.14**	-0.36	-0.91	**-1.83**	-0.78	**-1.72**	**-0.96**	**-3.20**	-0.84	**-0.96**	**-1.25**	**-1.16**

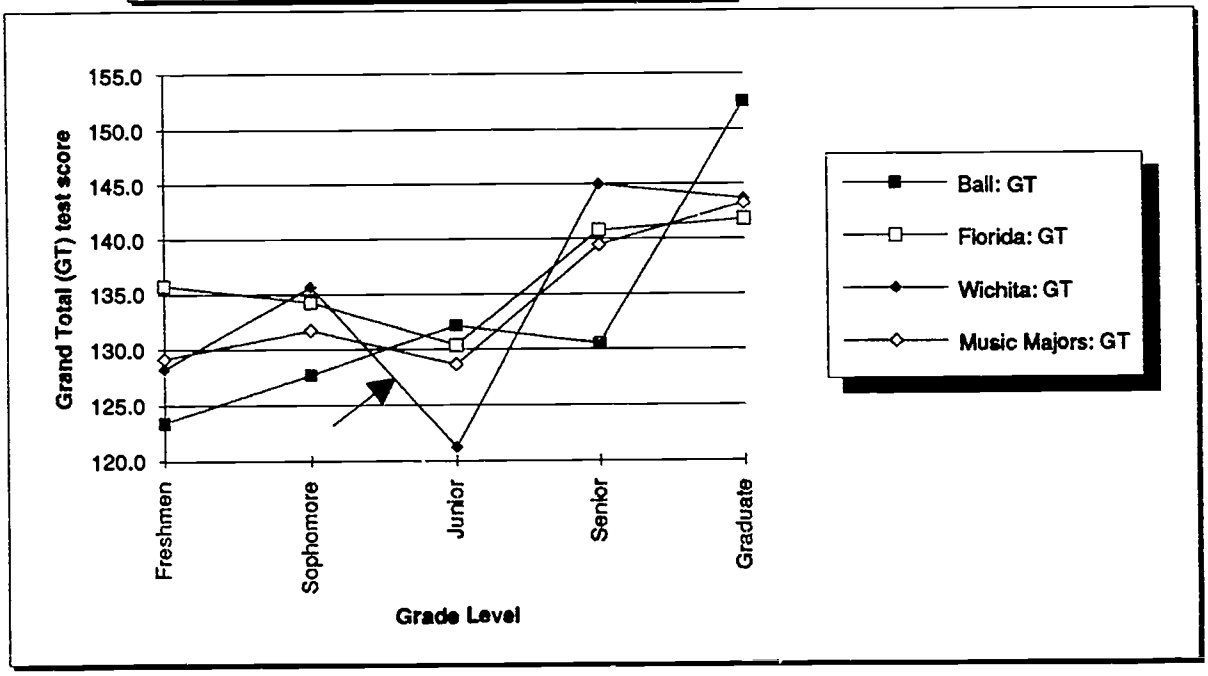


Institution & Grade Level
Music Major

		Grade Level					ANOVA		
		Freshmen	Sophomore	Junior	Senior	Graduate	F-Score	p	Scheffe
Ball State	n= *97*	36	33	16	10	2			
	MAT3	56.9	58.6	60.4	56.9	70.5	2.21	.0740	
	MAT4	66.5	69.1	71.8	73.6	82.0	3.81	.0065	
	GT	123.4	127.7	132.1	130.5	152.5	3.64	.0084	4
Florida State	n= *110*	33	24	26	13	14			
	MAT3	62.4	59.8	59.2	63.3	63.2	1.71	.1532	
	MAT4	73.4	74.5	71.2	77.5	78.6	1.98	.1028	
	GT	135.8	134.3	130.4	140.8	141.8	1.90	.1168	
Wichita State	n= *66*	15	18	14	13	6			
	MAT3	60.0	61.8	55.3	66.1	62.5	5.43	.0008	8
	MAT4	68.2	73.9	65.9	78.9	81.2	7.49	.0001	3,4,8,9
	GT	128.2	135.7	121.2	145.0	143.7	7.61	.0001	3,5,8,9
Total Sample	n= *273*	84.0	75.0	56.0	36.0	22.0			
	MAT3	59.6	59.8	58.6	62.5	63.7	3.28	.0119	
	MAT4	69.5	72.0	70.1	76.9	79.6	9.71	.0001	3,4,7,8,9
	GT	129.1	131.7	128.6	139.4	143.3	7.75	.0001	3,4,7,8,9

Scheffe

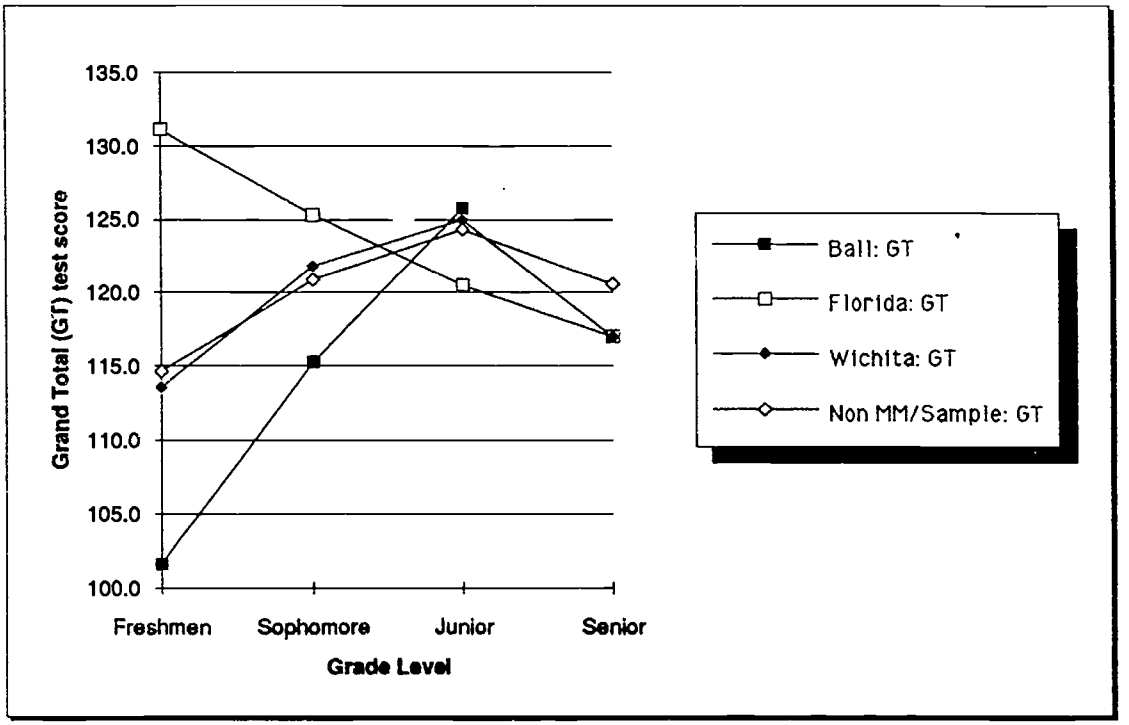
1 Fresh. vs. Soph.	6 Soph. vs. Senior
2 Fresh. vs. Junior	7 Soph. vs. Graduate
3 Fresh. vs. Senior	8 Junior vs. Senior
4 Fresh. vs. Graduate	9 Junior vs. Graduate
5 Soph. vs. Junior	10 Senior vs. Graduate



Institution and Grade Level
Non-Music Major

		Grade Level					ANOVA			
		Freshmen	Sophomore	Junior	Senior	Graduate	F-Score	p	Scheffe	Permutation
Ball State	n= *20*	*8*	*8*	*4*						
	MAT3	45.8	52.3	60.8			4.41	0.018		
	MAT4	55.9	63.0	65.0			1.95	0.160		
	GT	101.6	115.3	125.8			3.18	0.051		
Florida State	n= *22*	*7*	*9*	*2*	*4*					
	MAT3	60.6	55.4	56.0	54.5		0.91	0.456		≤.05
	MAT4	70.6	69.9	64.5	62.5		0.73	0.547		≤.05
	GT	131.1	125.3	120.5	117.0		0.69	0.568		≤.05
Wichita State	n= *23*	*11*	*5*	*3*	*4*					
	MAT3	53.2	56.2	58.0	54.8		0.35	0.792		
	MAT4	60.4	65.6	67.0	62.3		0.49	0.691		
	GT	113.5	121.8	125.0	117.0		0.48	0.700		
Total Sample	n= *65*	*26*	*22*	*9*	*8*					
	MAT3	52.9	54.5	59.6	56.3		1.19	0.320		
	MAT4	61.7	66.4	65.6	64.2		0.84	0.480		
	GT	114.6	120.9	124.3	120.6		0.86	0.470		

Box = Smallest mean score
Shade = Largest mean score



Percentile Scores

Music Majors

MAT3

# Correct	Count	Percent
28	1	0.4%
29	0	0.4%
30	0	0.4%
31	1	0.7%
32	0	0.7%
33	0	0.7%
34	0	0.7%
35	0	0.7%
36	0	0.7%
37	0	0.7%
38	0	0.7%
39	2	1.4%
40	1	1.8%
41	0	1.8%
42	1	2.2%
43	1	2.5%
44	2	3.3%
45	0	3.3%
46	2	4.0%
47	1	4.3%
48	2	5.1%
49	8	8.0%
50	2	8.7%
51	7	11.2%
52	6	13.4%
53	8	16.3%
54	4	17.8%
55	3	18.8%
56	18	25.4%
57	16	31.2%
58	10	34.8%
59	15	40.2%
60	19	47.1%
61	14	52.2%
62	26	61.6%
63	21	69.2%
64	12	73.6%
65	12	77.9%
66	8	80.8%
67	11	84.8%
68	13	89.5%
69	12	93.8%
70	4	95.3%
71	5	97.1%
72	5	98.9%
73	2	99.6%
74	0	99.6%
75	1	100.0%

Box = Mode
Shade = Mean

	MAT3	MAT4	GT
Mean	60.2	72.1	132.3
SD	7.1	9.1	14.7
n	276	276	276
MIN	28	31	59
MAX	75	88	163

MAT4

# Correct	Count	Percent
31	1	0.4%
32	0	0.4%
33	0	0.4%
34	0	0.4%
35	0	0.4%
36	0	0.4%
37	0	0.4%
38	0	0.4%
39	0	0.4%
40	0	0.4%
41	0	0.4%
42	3	1.4%
43	1	1.8%
44	0	1.8%
45	2	2.5%
46	0	2.5%
47	0	2.5%
48	0	2.5%
49	0	2.5%
50	0	2.5%
51	1	2.9%
52	3	4.0%
53	0	4.0%
54	1	4.3%
55	2	5.1%
56	3	6.2%
57	2	6.9%
58	3	8.0%
59	1	8.3%
60	5	10.1%
61	4	11.6%
62	3	12.7%
63	5	14.5%
64	5	16.3%
65	10	19.9%
66	11	23.9%
67	6	26.1%
68	10	29.7%
69	9	33.0%
70	9	36.2%
71	5	38.0%
72	13	42.8%
73	13	47.5%
74	11	51.4%
75	20	58.7%
76	8	61.6%
77	12	65.9%
78	14	71.0%
79	18	77.5%
80	23	85.9%
81	16	91.7%
82	5	93.5%
83	9	96.7%
84	3	97.8%
85	3	98.9%
86	1	99.3%
87	1	99.6%
88	1	100.0%
89	0	100.0%

GT: (MAT3 plus MAT4)

# Correct	Count	Percent	# Correct	Count	Percent
59	1	0.4%	112	3	9.4%
60	0	0.4%	113	1	9.8%
61	0	0.4%	114	4	11.2%
62	0	0.4%	115	2	12.0%
63	0	0.4%	116	3	13.0%
64	0	0.4%	117	2	13.8%
65	0	0.4%	118	3	14.9%
66	0	0.4%	119	4	16.3%
67	0	0.4%	120	2	17.0%
68	0	0.4%	121	6	19.2%
69	0	0.4%	122	7	21.7%
70	0	0.4%	123	6	23.9%
71	0	0.4%	124	7	26.4%
72	0	0.4%	125	6	28.6%
73	1	0.7%	126	5	30.4%
74	0	0.7%	127	8	33.3%
75	0	0.7%	128	1	33.7%
76	0	0.7%	129	3	34.8%
77	0	0.7%	130	9	38.0%
78	0	0.7%	131	5	39.9%
79	0	0.7%	132	9	43.1%
80	0	0.7%	133	17	49.3%
81	1	1.1%	134	5	51.1%
82	0	1.1%	135	8	54.0%
83	0	1.1%	136	9	57.2%
84	0	1.1%	137	11	61.2%
85	0	1.1%	138	4	62.7%
86	0	1.1%	139	8	65.6%
87	0	1.1%	140	4	67.0%
88	0	1.1%	141	4	68.5%
89	0	1.1%	142	8	71.4%
90	0	1.1%	143	10	75.0%
91	0	1.1%	144	8	77.9%
92	1	1.4%	145	13	82.6%
93	0	1.4%	146	7	85.1%
94	0	1.4%	147	9	88.4%
95	1	1.8%	148	8	91.3%
96	0	1.8%	149	6	93.5%
97	1	2.2%	150	3	94.6%
98	0	2.2%	151	4	96.0%
99	1	2.5%	152	3	97.1%
100	1	2.9%	153	0	97.1%
101	1	3.3%	154	2	97.8%
102	1	3.6%	155	0	97.8%
103	0	3.6%	156	3	98.9%
104	1	4.0%	157	2	99.6%
105	1	4.3%	158	0	99.6%
106	1	4.7%	159	0	99.6%
107	3	5.8%	160	0	99.6%
108	1	6.2%	161	0	99.6%
109	4	7.6%	162	0	99.6%
110	0	7.6%	163	1	100.0%
111	2	8.3%	164	0	100.0%