A COMPARISON OF THE SIGHT READING OF THIRD GRADE STUDENTS WHO HAVE BEEN TAUGHT TO SIGHT SING BY THE TONIC SOL-FA METHOD AND THOSE WHO HAVE BEEN TAUGHT THE NUMBERS METHOD;
THE DIFFERENCE IN SIGHT READING ACHIEVEMENT OF GIRLS AND BOYS, AND THE RELATIONSHIP BETWEEN MUSIC ACHIEVEMENT AND ACADEMIC ACHIEVEMENT

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Abstrak :

Tulisan ini merupakan hasil penelitian terhadap sistem membaca notasi musik pada siswa tingkat III dimana siswa membaca notasi tanpa mencoba untuk melatih terlebih dahulu, system membaca cepat dalam notasi ini di bedakan antara siswa perempuan dengan siswa pria dan dihubungkan antara pengalaman musik dengan pengalaman akademik.

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Introduction

Sight singing is defined as the ability to read and sing music at first sight without preparatory study (Harvard Dictionary of Music 1972). It is one the most important objectives for the music teacher who wishes to develop musically independent singers. In the choice of method considerations should be made regarding the special needs of boys who

tend to lag behind girls in music achievement. Many researchers have states that girls are more accurate singers (Anderson 1937, Bentley 1968, Goetz and Horri 1989, Burwick 1993), and that they tend to perform with a greater degree of accuracy on rhythm tests (Schleuter and Schleuter 1984). This occurrence is probably due to maturation. Which is most generally f aster in girls (DeCarbo 1982, and Schleuter and Schleuter 1985).

A comparison of the relationship between music achievement and academic achievement may also provide insight into the choice of methods that are the most beneficial. Some researchers have implied that music achievement may enhance academic achievement (Hurwitz and Wolf 1975, Birdsong 1992). Hurwitz and Wolf found that first grade students who received the Kodaly method of music instruction, scored significantly higher on the Metropolitan Achievement Test.

Brown (1974) has reported that there are five methods foe teaching sight reading in general use in Europe, the United States, and Canada. These are the Letter System, the Syllable System with Fixed Do, the Syllable system with Moveable Do (Tonic Sol – Fa), the Number System and the Interval System (p. 53). The most commonly used procedures are Moveable Do and Moveable Numbers. A review of four different authors of sight singing method books has revealed that each of the four authors specifically suggest the use of either Tonic Sol – Fa or Numbers in practicing sight singing (Gould 1979, DeLone 1981, Benward 1986, and Henry and Mobberley 1986).

Tonic Sol – Fa is an approach in which the names of the notes of the scale are replaced with the syllabic names Do, Re, Mi, Fa, Sol, La, and Ti. In the moveable Numbers approach. The scale steps are identified as the numbers one through seven. 'Benward (1986) described the Moveable Numbers system as follows:

> In the Moveable Do system the tonic pitch is Do whether it be C, A flat, or F sharp. In some Moveable Do procedures the tonic pitch of minor keys is represented by La. The advantage of this system is that the Mi – Fa syllables represent a half-step interval in major and minor keys.
> Moveable Numbers is similar in design to Moveable Do. Numbers most often one through seven are substituted for the solfegio syllables; the tonic note becomes "one".

The use of syllables for the names of scale steps, as in the Movable Do System, is known as solfege, which by definition is a vocal exercise or a vocaliese (Harvard Dictionary of Music, 1972). Many musicians believe that using the syllables of solfege increase the clarifications of tonality (Choksy 1981, Macknight 1975). This being the case, it would seem that boys who have problems with pitch accuracy would benefit greatly from the use of solfege. Middleton (1984) stated that the preferred vocal characteristic and ease of singing can be accommodated best by solfege. Benward (1986) reported that advocates of the Moveable Do system prefer it because it establishes the same syllable pattern regardless of the key; therefore, it is more effective, especially for beginning students. In addition, antagonists of the Moveable Do system sometimes agree that its initial results are favorable but contend that in the long run students are forced into complicated procedures that inhibit the natural flow of sight singing.

The advantage in the using the Moveable Numbers system is that beginning sight singing students are not required to learn a new language. Hefferman (1986) has written that "Numbers are at once meaningful to young children; interval study is clarified by the use of numbers. Numbers are already well within the child's general experience. (p. 44).

Statement of the Problem

The purpose of this study is to determine if there is difference in the sight singing ability of students who have been taught to sight sing by the Tonic Sol Fa method and those who are thought to sight by numbers. It is also the purpose of this study to determine if there is any difference in the sight reading achievement of girls and boys and to determine whether or not there is a relationship between music achievement and academic achievement.

Rational for the study

One of the most important objectives of a music teacher is to develop musically independent students. Sight reading is a skill that music students need if they wish to continue to perform after high school (Elliot, 1982). Music students are more successful sight readers if they begin to learn sight singing skills while they are children.

A study to determine if there are differences in the music achievement of girls and boys may provide new insight into the needs of one versus the other. Research has shown that girls are often higher achievers in music than boys (Schleuter and Schleuter, 1984, Goetz and Horri, 1989, Burwick, 1993), possibly due to maturation (Schleuter and Schleuter, 1985). If research proves this to be true, modifications in music instruction may be needed in order to optimize the learning experiences for the boys.

Faced with the threat of the elimination of music classes such as band and orchestra during regular class time, music teachers are often forced to justify their music programs to the administration. Previous research has shown that the children who participate in these programs are higher academic achievers that those who do not (Birdsong, 1992). More research is needed to reinforce the evidence that music programs are not only valuable as a regular part of education curriculum, but that they also enhance academic achievement.

Statement of the Null Hypothese

The following null hypotheses will be tested :

1. There will be no significant difference in the sight reading achievement of third grade students who are taught to use the Tonic Sol – Fa method and those who are taught Numbers.
2. There will be no significant difference in the sight reading achievement of the girls as opposed to the boys.
3. There will be no significant relationship between their sight reading achievement as determined by their Missouri Mastery Achievement Test (MMAT) scores.

Definition of Terms

1. Moveable Do or Tonic Sol – Fa: The notes of the scale are labeled Do, Re, Mi, Fa, Sol, La, and Ti. The first note of the scale is always Do no matter what key it is in.
2. Moveable Numbers: In the Moveable numbers system the notes of the scale are numbered from one to seven. The first note of the scale is always 'one' no matter what key it is in.

3. Sight singing: The ability to read and sing music at first sight (Harvard Dictionary of Music, 1992)
4. Solfege, solfeggio, or solmization: The practice of identifying music scale by syllables instead of numbers (Harvard Dictionary of Music, 1972)
5. MMAT: Missouri Mastery and achievement test was designed by the Missouri Department of Elementary and Secondary Education in order to measure the reading, language arts, mathematics, science, social studies, and civics for students in grades 2 trough 10.
6. RRT: Rhythm Response Test. Schueter and Schlueter constructed the Rhythm Response Test for measuring certain rhythmic response of primary grade children.
7. ANOVA: Analysis of Variance is used to determine if there is any difference between three or more means at a selected probability level (Gay 1987)

Assumptions

It will be assumed that all students will perform to the best of their ability.

Limitations to the Study

1. This study will be limited to two third grade vocal music classes in an elementary school located in the Midwest.
2. Only the students enrolled in the third grade during the 1993-1994 school will be involved.
3. The time spent in instruction will be limited to two fifteen-minute sessions per week.
4. The length of the study will be limited to twelve weeks.

Review of Related Literature

The review of related literatures will be divided into three sections. The first section will review literature related to the sight reading methods of Tonic Sol – Fa and Numbers. Section Two will cover literature which examines the difference in the music achievement of girl and boys, and

the third section will review research which examines music achievement as it relates to academic achievement.

Sight Reading

Hodges (1991) wrote that the body of applied research about teaching music reading is scattered and inclusive. In a review of 40 selected studies he concluded that there were " no replications and few that use similar strategies. " He further states that " even where several studies grouped together , there is rarely enough consensus to lead to a broader conclusion." A review that there are no published abstract relevant to this research. However there are books, journal articles and research published in journals that explore the music reading systems of tonic Sol - Fa and Moveable Numbers that have been exemplified by this review.

In an experiment designed to find the best way for children to learn to sight-read rhythms. Shehan (1387) discovered that the use of aural syllables along with visual stimuli could enhance learning. During the procedure, a group of second and sixth graders were required to read four rhythms. A different procedure was used to teach each rhythm in an attempt to find what methods can help children to learn the most quickly and accurately. Two measure rhythm patterns consisting of quarter and eighth notes were presented in four modes: rhythm 1 was sounded on a woodblock; rhythm 2 was presented using verbal mnemonic syllables (the quarters notes were verbalized as ten and the eight notes were verbalized as te-ka); rhythm 3 was illustrated on a 11" x 14" card and played on a wood block, and rhythm 4 was illustrated on a 11" x 14" card an a recording of the verbal syllables was played.

Statistical significance was only evident in comparing both the aural with both of aural-visual modes combined. In order to find the difference of the means of the presented modes, a Neuman-Keuls multiple was used. It the reveled that an average of 3.68 attempts were necessary for the accurate presentation of the rhythm presented in the visual modes, and average of 5.93 attempts were needed to learn the rhythms presented aurally. However the addition of syllables was noted to decrease the number of attempts in both of the modes.

In a historical study, Goodman (1982) reported Thaddeus Philander Giddings' theory of teaching music:

> Mr. Giddings always believed that vocal music is the foundation of music and the heart of the school music curriculum. He also believed the Sol-Fa system was one of the best ways to teach the reading of music and that this system should precede the students beginning of instrument instruction. Instrumental music often times has been too much set apart from the vocal music programs. He often invited instrumental students to bring their instruments and play with the singing class. He often expressed that those who cannot read words were in the same classification.

The research of both MacKnight (1975) and Grutzmacher (1987) support Giddings are more proficient players if they are able to sight sing the music that they will play.

MacKnight found that beginning band students attain a significantly higher level of music achievement when instructed by a method that requires them to sing tonal patterns. The objective was to develop materials that would treat music reading as a process and emphasize the structure of the melodic line. Ninety fourth grade students were used in the experiment. Both the control group and the experimental group covered the same curriculum. The treatment varied only in the method of introduction dictated by a standard method book. The experimental group was introduced to each of its new pitches through tonal pattern instruction. The Tonic Sol-Fa system was used in instruction because of the researcher's belief that it is transferable to different tonal settings. Each pattern was taught as an individual unit in three stages: (1) presented aurally, (2) an auditory – visual presentation and (3) an auditory – visual presentation of the pattern within a musical phrase. An instruction book was prepared with melodies containing the tonal patterns in the order of presentation.

The Watkins-Farnum performance scale was used to determine the results of the experiment. The mean difference between the two groups consistently favors the experimental treatment. A least-squares design with unequal cells was performed on the post test scores to determine an analysis of variance. The test of significant difference between the criterion means revealed a significant treatment.

In a similar study Grutzmacher (1992) also found that first year instrumental students who receive tonal pattern instruction sight-read significantly better than students who are taught by more traditional methods. A one-factor design was used for the experiment with one independent and three dependent variables. The independent variable was teaching content ion conjunction with specific teaching techniques. The treatment group content consisted of an organized, specific set of tonal patterns that were taught through techniques of vocalization and harmonization and harmonization utilizing the Tonic Sol-Fa method. The control group received instruction emphasizing technical skill development using a single note identification approach consisting of a set of musical symbols and a range of pitches taught from notation.

The results indicate that the total mean vector of the experimental group was significantly higher ($p < .0001$) than that of the control group. There were significant differences in the sight reading achievement and aural identification of major and minor tonalities, with the experimental group scoring significantly higher. No others significant differences were apparent.

Frakas (1972), in a report that investigated the use of the Kodaly method, wrote: "since any two syllables always define the same interval, relative solemization strengthens our intonation." The syllable of any given tone is definitive of its position and function in the scale. Frakas continues "As this syllable/function relation remains constant in any key, relative solmization become a most useful means of teaching harmony."

Scott (1989) found that elementary general music students taught by the Kodaly method exhibited significantly greater achievement than students taught by use of visual traditional music methods. The Kodaly makes great use of visual aids and includes comprehensive instruction in Tonic Sol-Fa.

Four intact first grade classes were used in the experiment. Group A, the treatment group, consisted of two classes that received instruction from the Kodaly method for thirty minutes two time a week. Group B, consisted of two classes that received musical instruction based upon the music series Holt Music, for thirty minutes two times a week. The students received instruction for seven weeks then were individually tasted. A

teacher made instrument that measured achievement in the areas of music literacy, pitch matching and tonal memory was administered after the treatment. The result s of the experiment, determined by a T-Test for independent samples, showed a significant difference in favor of the treatment group. Scoott concludes that integration of the Kodaly method into the existing traditional music program would result in greater achievement in the areas of music literacy, pitch matching and tonal memory.

In a related study, Martin (1991), investigated in effects of instruction using Tonic Sol-Fa, on the development of aural performance and sight reading skills of first grade students. The procedure was in two parts: In part 1, aural perception skills were assessed. In part 2, verbal and sight singing skills were assessed.

Three first grade classes were tested, each utilizing a different procedure. In group 1, the students were required to echo tonal patterns with the syllables of solmization. Group 2, echoed tonal patterns with the syllables of solmization and used hand sighs that represent each syllable. Group 3, echoed tonal patterns, used hand sighs and saw letter representations such as L for La and R for Re. The higher the pitch, the higher the letter was on the card in relation to the other letter.

The groups were given three tests to determine progression. In test 1of the experiment the students translated patterns that the teacher sang on the neutral syllable "bum" to the syllables of solmization. Students were tasted as a group and individually. Test 2 allowed the groups to view the patterns that they were learning on the staff as they echo sang. In test 3, each group viewed the tonal patterns on the staff; were given the first pitch, and were required to sight sing the pattern on the their own using the syllables of solmization.

Analysis of data revealed that the methods used with Group 2 and 3, who gained slightly, were more effective that the method used with Group 1, which incurred a loss. The results were obtained by comparing the scores from Test 1 and 3, and the means of the scores were analyzed. Apparently the instructional method did effect performance however the results were not some of the tasks required for the analysis were apparently too difficult for the first grade students. When faced with the

task of sight singing the children struggled with the solmization to the point that pitch accuracy was hindered.

Birge (1966) wrote about the history of the movement towards the use of the Tonic Sol-Fa method in the United States. Its popularity has been attributed to Luther Whiting Mason who wrote:

> "The proper view to take of a child learning to read is that he is learning to recognize in printed or written forms, the words with which he is already familiar in speech. We only surround him with difficulties if we regard his reading book at this period as a means of extending his vocabulary."

He believed that teaching music reading should be treated the same as learning to read language. Mason began teaching music reading with a method called the Gallin-Paris-Cheve notational method which was similar to Tonic Sol-Fa, but numbers were used instead of syllables. This method was used temporarily in the beginning of sight reading instruction and later transferred to the Tonic Sol-Fa method.

Klemish (1970) found that number names of tones are important as a means of communicating the steps of the scale children. In an experiment to find the effectiveness of two methods of teaching music reading to first grade students. Klemish discovered that young children are able to attain a degree of proficiency in music reading.

Four groups of first grade students were used in the experiment, which tested two methods of sight reading instruction. Two of the classes were taught by a method that allowed them to use step bells and hand and body movement to assist learning. The other two classes were allowed the use of step bells, but instead of body movement the children used staves and conventional note heads. In both groups the notes were identified by the numbers 1-5 and supplementary materials and activities were used to provide a well rounded music program.

The results showed that both methods were effective for different types of achievement. Children who were instructed using method one appeared to attain higher achievement in the development of aural skills: identifying melodic direction, aural matching, aural/visual matching and singing patterns. Method two was stronger in the development of recognition, dictation, dictation with numbers and visual matching. However, the difference between the two methods was not significant.

Klemish noted that the children were particularly comfortable with the use of numbers to identify the scale steps. He wrote that the children were more successful at writing tonal patterns from dictation of the former were patterns unfamiliar to them.

In a debate about whether the Tonic Sol-Fa system or the numbers system is more appropriate for teaching beginning sight reading, Brown (1974), wrote that advocates of the numbers system believe that children are already familiar with the number sequence, but the use of solmization is associated with no such preestablished concept. In more advanced studies in music theory, numbers are more commonly applied and are recognized as having more practicality. Brown also points cut that on the other hand, too may numerical associations can also be confusing when we consider that numbers are associated with note value as well.

Music achievement and Gender

There is large body of research that analyzes the relationship between music achievement and gender. Most generally the results show that girls are higher achievers in music than boys. Researchers seem to be in agreement in the conclusion that the higher achievement of girls may be the result of maturation, which is faster in girls. The boys on the other hand, mature more slowly and this may greatly affect their motor skills inhibiting certain music performance abilities.

In an attempt to find the relationship of grade level and gender differences to certain rhythmic responses of primary grade children, Schleuter and Schleuter (1984) investigated 99 parochial school children from kindergarten through grade three utilizing a Rhythm Response Test (RRT), which was constructed by the investigators. The RRT consisted of 12 tape-recorded items, six of duple and six of triple patterns. The items were recorded in three versions that were randomly ordered. The subjects were requested to clap, chant on the syllable "loo", or step the pre-recorded rhythm that they heard. Each response was given two points if repeated correctly, but only one point was given if the response was correct but faster or slower than the tempo of the test item.

The analysis of data was obtained by an Analysis of Variance (ANOVA) with one variable for response and two grouping variables for

grade and gender. The results showed significances in the F-values for main effects of grades and gender ($F=6.30$, $df=3$, $p < .001$: $F=4.41$, $df=2$, and $p < .05$).

In kindergarten the mean score of the boys was higher than the girls. However this result is misleading due to the number of girls (n=5) in the sample as opposed to boys (n=14), in grades 1, 2 and 3 the girls consistently out performed the boys, and the overall analysis of data is in favor of the girls on all three rhythm responses.

Schleuter and Schleuter (1989) conducted parallel research in which children from two parochial schools were tested. One of the schools provided general music classes for 60 minutes per week, but the other school provided no formal music training other than weekly group singing as a part of religious training.

The data was acquired in the same manner as the 1985 experiment, but different results ensued. Test responses from Schooll One showed that the girls outperformed the boys as in the 1985 experiment: the results from School Two however showed the opposite to be true. In the school where no formal music education was offered the boys outperformed the girls. Schleuter and Schleuter offered this possible explanation for their discovery:

> School One girls responded to music training more than boys with clapping and stepping and stepping responses, and girls in School Two, without of training, did not surpass the boys RRT scores. The effects of maturation for kindergarten through grade three children are evidenced in both boys and girls, especially in the first two years. Effects of early regular music training may be more apparent in the accurate motor responses of girls that of boys.

Graham F. Welch (1977) wrote a review of literature concerning the problem of poor pitch singing. Within his review he cited both Anderson (1937) and Bentley (1968) who reported differences in pitch discrimination in relationship to gender. Anderson studies the pitch accuracy of thirty children in speaking and singing. He reported that in general the boys had more difficulty at pitch discrimination than the girls.

Bentley who conducted a survey of a group of school children from 7 to 14 years of age to find what percentage of the students were monotones (unable to sing or discriminates between pitches), and whether or not the percentage changes as the students get older. He found that at the age of seven, 27 percent of the boys were monotone, ant that only 11 per cent of the girls were. By the age of 14 the percentage decreases significantly for both genders (boys 7-8 percent. And the girls at 2 percent).

Goetz and Horii (1989) tested the pitch accuracy of individuals singing independently against the pitch accuracy of individuals singing in a group. They also sought to find whether or not these effects would differ by grade level or gender. Their sample included one hundred children in kindergarten, first and third grade classrooms from three different elementary schools. The subjects were tested in groups of six. Three subjects from each group wore a microphone that recorded his/her voice individually. The three microphone subjects were individually asked to echo sing a warm-up phrase. Afterward they were joined by the other three subjects for the test of group singing in which all of the subjects in question sang a song together. The recorded responses were played into a "Visi-Pitch" machine that displayed a visual image and gave a numeral value in Hertz for each pitch sung.

A significant interaction between gender and individual and group singing ($p<.01$) occurred. Goetz and Horii reported a pronounced difference in the boy's ability to sing accurately individually and in a group. A comparison of the male and female mean scores revealed that the mean deviations for boys pitch accuracy ere greater in both individual and group singing that those scores for the girls in both categories. The boys were apparently more affected negatively by the presence of other voices than the girls who sang more accurately in both categories.

Burwick (1993) also found that girls sing more accurately than boys. Her research was designed to find if there is any correlation between singing accuracy gender and the musical environment in the home. In order to test the singing accuracy of the subjects, the researcher allowed them to choose a favorite song that they had learned from a music textbook used in class instruction. Burwick accompanied each subject on the piano as they sang; listened to their performance and gave them an evaluation. The performances by the subjects were evaluated as accurate, semi-accurate, or inaccurate according to the subject's ability to sing accurately.

The results revealed a 68 percent accuracy rate of 31 percent among the boys.

DeCarbo (1982) conducted an experiment to find the effect of same/different discrimination techniques on Kindergarten children and their relationship to gender, readiness training and tonal patterns taught with songs or without songs. She wanted to find if the techniques of educational psychologists in the development of visual discrimination ability could be adapted to an aural model.

DeCarbo's sample consisted of kindergarten subjects from three intact classes at three different schools. All of the subjects were randomly assigned to one of two groups. She taught both groups a set of eight tonal patterns. As in the techniques of the psychologists, Group One was instructed using a same/different procedure. The instructor sang one of the tonal patterns twice. The subjects were then required to identify whether the pattern was the same of different. Group Two learned the same eight patterns through activities of imitation and repetition. After the treatment period the Primary Measures of Music Audiation (PMMA) test was administered. The PMMA was designed to evaluate the development aptitude of the tonal and rhythmic aural perception children in grades K-3. In addition, two investigator-constructed Criterion Singing Tests (CST 1 and CST 2) were given. CST 1 consisted of ten-three note patterns and CST 2 consisted of a familiar song.

The data was analyzed using a three-way Multivariate Analysis of Covariance (MANCOVA). The dependent variables were gender, readiness and technique. DeCarbo's research addressed several questions; one of which was "does the sex of kindergarten children interact with aural ability as measured by aural discrimination and singing?" (p. 238). The results of the MANCOVA indicated a significant gender effect $F(3, 76) = 3.85$, $p < .01$; with the girls scoring higher than the boys. DeCarbo concluded that the results may be attributed to maturation, commenting that 'the stage of development for perceiving and performing tonal patterns may be more advanced for kindergarten girls than for boys of the same chronological age" (p. 244).

Music Achievement and Intelligence

Many researchers have discussed a possible link between music achievement and certain kinds of intellectual achievement. In a review of research by Hanshumaker (1980) these findings have been cited in regard to this relationship exists between music achievement and verbal reading achievement (Maze 1967, and Jones 19968). Hurwitz and Wolf (1975) found that first grade students who receive instruction in the Kodaly method scored significantly higher on the Metropolitan Achievement Test than those who did not. No significant effect was found on the reading achievement of first grade students who received "special approaches to reading involving music instruction" (Lauder 1976), and there was no significant difference found in the academic achievement of children who are excused from regular classes to attend instrumental classes and those who are not (Friedman 1959).

A similar study to that of Friedman was conducted by Kvet (1982) who sought to find whether or not there is a difference in the reading, language and mathematical achievement of students who are excused from classroom academic instruction to attend instrumental classes and those who are not. His sample included 2.167 sixth grade students from four different school districts. The subjects were matched in pairs; one of the pair was an instrumentalist and the other was not. In order to assure a proper match, Kvet obtained information pertaining to the subject's gender, race, IQ previous to grade six, accumulative achievement scores previous to grade six , school attended and classroom teacher. He also considered factors such as the number of days absent, socioeconomic status, student behavior and whether the student was taking private music lessons outside of school. The results of Kvets's research showed that there was no significant difference in the reading, language and mathematics achievement of sixth grade students who are excused from regular classroom studies to attend instrumental music classes and those who are not.

Birdsong (1992) also contributed research that was designed to find if there is a difference in the academic achievement of those students who are excused from classroom activities in order to participate in band or orchestra and those who are not. Her sample included a group of 73

students from intact elementary classrooms which were divided into two groups; (a) instrumentalists and (b) non-instrumentalists. The subjects Missouri Mastery Achievement Test (MMAT) scores were used for the measure of academic achievement. The MMAT is designed to determine academic achievement in reading, language arts, math, science, and social studies/civics. Analysis of the data revealed that, although the instrumentalists attained higher scores than the non-instrumentalists in all areas of the MMAT, only the scores for reading were significantly higher at the 05 level.

At the music academy at Stockholm, Sweden, Holmstrom (1969) conducted a study to find if an intelligence test can be used to predict the results of a college entrance exam and the ultimate achievement of the student, which was determined by a grade on a music teacher examination at the completion of his/her degree. The sample included two groups of 40 subjects. The intelligence test given was the Harnquist F-test version A. Group one was tested in November and Group two was tested the following January. The different types of test included within the Harnquist F-test measure were: (a) verbal understanding, (b) numerical ability, (c) inductive ability, and (d) special ability. The results of the F-test were measured in relationship to the entrance exam results. The 28 correlation coefficients observes revealed no significant relationship on the 01 level. However on the 05 level of significance, four relationships were evident: Ear training and inductive ability, music history and verbal understanding and music history and inductive ability. The result of the test to find if there are relationships between the intelligence test and the final teacher exam revealed significance between music theory and verbal understanding on the .01 level. At the .05 level, significance was found in both music history and teaching ability in relationship to the intelligence test of verbal understanding.

The research of Ernst (1970) showed that scores obtained from pre-college tests such as the American College Test (ACT). Minnesota Scholastic Aptitude Test (MSAT) Triggs Reading Survey (TRS), and high school rank are significant indicators in the prediction of music achievement in college. The data showed correlation coefficients that were significant at the .01 level high school rank was determined to be the single best predictor overall of college cumulative honor point and honor point in music course ($r = 0.43$, $r = .44$). Ernst suggests that this research is valuable for identifying the "more able" music student.

Helwig and Thomas (1973) used intelligence test scores and the results of a test to determine musicality, in attempt to predict success in high school choir. The intelligence quotient was derived from the California Test of Mental Maturity and the measure of musicality was obtained from Gaston's Test of Musicality. Success in choir was determined by grades assigned by the researcher at the end of four six-week sessions. A Spearman-Brown prophecy formula was used to analyze the multiple correlations. The results showed that intelligence and musicality were significant in the prediction of success in high school choir at the .05 level.

Hedden (1982) sought to find the degree at which a set of predictor variables are related to music achievement. The variable chosen for the research were academic achievement, attitude toward music, self-concept in music, music background and gender. The tests used in the measurement of these variables were the Music Achievement Test (MAT), which was the criterion measure; the Iowa Test of Basic Skills (ITBS), and investigator designed Attitude Toward Music Scale, the Self Concept in Music Scale and the Music Background Scale. The subjects tested in the experiment were fifth and sixth grade elementary students. Their test results showed that the self Concept in Music Scale and the Attitude Toward Music Scale were significant in the prediction of music achievement, but the most significant predictor was the test of academic achievement; the Iowa Test of Basic Skills.

Method and Procedure

Sample

Two intact third grade classes from Midwestern inner-city elementary school were selected for this study. Fourty-four subjects in a range from high to low intelligence participated in this research. The division of the sample was pre-existing and was not formulated for this research.

Procedure

The intact groups were labeled Group A and Group B, and each group was further divided by gender. Group A received sight reading instruction in the Moveable Numbers method for fifteen minutes twice

weekly. Group B received sight reading instruction in the Tonic Sol-Fa method for fifteen minutes twice weekly. All of the other procedures used in instruction were identical for both groups.

Instrument of Measurement

A teacher made test was administered at the completion of the twelve week treatment period (Appendix A). The test was designed to measure achievement in music reading, ear training and sight singing. The test was administered in three parts. Part One (SR 1) measured only visual music reading. Part Two (SR 2) measured ear training, or the ability to aurally identify a melody and Part Three (SR 3) was designed to measure the subjects ability to sight sing.

The measure of academic achievement was determined by the subjects current MMAT test scores which were attained from his/her school file in the spring of 1994. Five subjects areas are covered within the MMAT including reading, language arts, mathematics, science and social studies/civics. The MMAT was administered during the last semester of the school year.

Design

The research design requires three types of measurement. Restatement of the null-hypotheses are needed for further explanation.

1. There will be no significant difference in the sight reading achievement of third grade students who are taught the tonic Sol-Fa method and those who are taught to use Numbers.
2. There will be no significant difference in the sight reading achievement of the girls as opposed to the boys.
3. There will be no significant relationship between their sight reading achievement scores and their academic achievement as determined by the MMAT.

The first hypothesis is testing the difference between two treatment variables. Tonic Sol-Fa and Numbers, which require an experimental design. Hypothesis 2 is a casual comparative. The dependent variable is the difference between the achievement of the boys and the girls. Hypothesis 3 is correlational. The purpose is to find whether or not there is relationship between sight reading achievement and academic achievement.

Data Analysis

The data consisted of sight reading scores: SR 1, SR 2, and SR 3, which were divided according to gender, and the reading, language arts, mathematics, science, and social studies/civics scores from the subjects MMAT collected in the spring of 1994. The data files were divided into the methods of tonic Sol-Fa and numbers. A two way analysis of variance (ANOVA) was used to analysis the data. The 05 level of significance was selected to accept or reject the null-hypotheses.

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