THE RELATIONSHIP BETWEEN YOUNG CHILDREN'S ABILITY TO RECOGNIZE THEIR OWN VOICES AND TO SING TONAL PATTERNS AND TO CHANT RHYTHM PATTERNS

Submitted to the Temple University Graduate Board

in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

by

Thomas Clark Saunders

December 1984

FORM IV

TEMPLE UNIVERSITY GRADUATE BOARD

Title of Dissertation:

The Relationship Between Young Children's Ability to Recognize Their Own Voices and to Sing Tonal Patterns and to Chant Rhythm Patterns

Author:

Thomas Clark Saunders

Read and Approved by: [signatures]

Date submitted to Graduate Board: January 8, 1985

Accepted by the Graduate Board of Temple University in partial fulfillment of the requirements for the degree of **Doctor of Philosophy**

Date 1/9/85 [signature] (Dean of Graduate School)

ACKNOWLEDGMENTS

There were many persons who helped me move forward and guided me toward the completion of this study:

Mrs. Joann Moyer masterfully taught young children for me.
Art and Lili Levinowitz expertly judged young voices with me.
Dr. John Holahan cheerfully exchanged and focused ideas with me.
My dissertation committee members wisely instructed me.*
Dr. Edwin E. Gordon has forever changed me,
and my wife, Luann, constantly supported me.

*Dr. Stimson Carrow
Dr. Roger Dean
Dr. Edwin E. Gordon
Dr. John Holahan
Dr. Eve Meyer
Dr. Glen Snelbecker

TABLE OF CONTENTS

APPENDIX

LIST OF TABLES

PURPOSE OF THE STUDY

Introduction

Music educators surmise that there is much to be gained by engaging young children in participatory music activities. They reason that a child's active participation in music activities gives him insight into the elements of music which, therefore, result in a greater understanding of music.[1] It has been stated: "What is heard must be performed or else what is heard is not really understood and, in time, it is forgotten."[2] A child best learns to sing a new song by imitating a teacher's performance.

Music educators widely accept the idea that children learn most efficiently not by echoing individual notes of a song but rather, by repeating short groups of notes or music patterns. "Tonal patterns and rhythm patterns, not individual notes, are the basic units of music . . . " in the same way words, not individual letters, are the basic units of language.[3]

It would seem that for a child to be able to reproduce accurately tonal patterns or rhythm patterns, he should possess the ability to 1) perceive the model pattern, 2) briefly remember

---

[1] Thomas A. Regelski, Teaching General Music (New York: Schirmer Books., 1981), p. 354.

[2] Edwin E. Gordon, Learning Sequences in Music: Skill, Content, and Patterns (Chicago: G.I.A., 1981), p. 38.

[3] Gordon, p. 38.

the pattern, 3) activate the larynx, and 4) monitor and correct the sounds he/produces. While all four processes are necessary to echo-sing patterns accurately, the ability to retain briefly music information in memory is fundamental. The vocal chord muscles use the stored information to make a set of primary adjustments for accurate pattern reproduction. In addition, it is from the stored model that the brain compares and contrasts the vocalized sound to make mid-course corrections during the process of performing tonal and/or rhythm patterns.

While music educators in the past have recognized man's ability to "inner hear," only recently have there been investigations into its exact nature.[4] Gordon, in defining "the ability to hear music without it being physically present," coined the word "audiation."[5] Audiation can be described generally as musical thinking. Gordon suggests that audiation includes more than one thought process, and as a result of concurrently engaging those thought processes, one gives organization and meaning to aural events. Meaning is derived by comparing the types and orderly arrangements of tonal patterns or rhythm patterns being perceived to the types and arrangements which are retained in long and short term memory.[6]

---

[4] Robert W. Lundin, An Objective Psychology of Music (New York: The Ronald Press Company., 1953), pp. 114-115.

[5] Edwin E. Gordon, Learning Sequences in Music: Skill Content Patterns (Chicago: G.I.A., 1984), p. 2.

[6] Edwin E. Gordon, "The Interaction of Audiation and

Because one is able to give meaning to music almost immediately after it is heard, one must be efficient in accessing previously heard tonal patterns and rhythm patterns to make meaningful comparisons. Seemingly, it would take a considerable amount of time to compare each pattern perceived to an "unabridged mental dictionary" of previously perceived tonal patterns and rhythm patterns. It is therefore reasonable to suspect that the human mind assigns a categorical classification to patterns aurally perceived, and then enters them into memory for subsequent recall.

Keeping in mind the widely held assumption that children learn most about music when they actively engage their voices, it may also be reasonable to suspect that the use of the voice is a factor in how tonal patterns or rhythm patterns are organized. Perhaps through vocalizing, and not just listening, the characteristic features of tonal patterns and rhythm patterns are most firmly grasped, and therefore are more accurately compared and categorized in audiation.

An accurate vocal reproduction, however, may be dependent upon one's ability to recognize his voice. It would seem that only with accurate voice recognition would one be able to compare his voice to an audiated model to make the necessary vocal chord adjustments during a reproductive vocal performance. Those who

---

Perception as a Primary Function of Learning Theory in Music," Speech, M.E.N.C. Convention, Chicago, 22 March 1984.

cannot recognize their own voices would reasonably have difficulty in accurately controlling their voices, and as a result, they would be unable to reproduce short tonal patterns or rhythm patterns in an effective manner. The question then arises: Does an inaccurate participatory use of the voice, which may be due to one's inability to recognize his own voice, result in a "loose grasp" of the tonal pattern or rhythm pattern and, therefore, result in an inaccurate categorical classification in audiation?

The purpose of this study is to investigate the relative abilities of young children to recognize their own singing voices. The investigation will serve to illuminate the role of the voice within the categorical classification process of tonal and rhythmic music information, a seemingly essential step in the process of audiation.

PROBLEMS

The following questions are the problems of the study:

1) To what extent does the ability of a young child to recognize his own voice relate to his ability to sing tonal patterns accurately?

2) To what extent does the ability of a young child to recognize his own voice relate to his ability to chant rhythm patterns accurately?

3) How does a child's chronological age and tonal aptitude affect his ability to recognize his own voice in the performance of tonal patterns?

4) How does a child's chronological age and rhythm aptitude affect his ability to recognize his own voice in the performance of rhythm patterns?

CHAPTER TWO

RELATED STUDIES

Introduction

Music researchers with interests in the psychology of music learning have undertaken studies in an attempt to understand the various components of the music performance-learning process. They have attempted to identify specific behavioral attributes which they suspect enable a child to bring meaning to music and allow him to perform in a musical manner.

Music Perception

The ability to perceive a series of aural events has been identified as an essential skill which allows a person to perform musically. Much of the research in the perception of aural events has been done in the laboratory by those within the discipline of psychoacoustics.

Psychoacousticians primarily have sought to "explain how we respond subjectively to musical sound signals."[1] Pyschoacousticians have attempted to understand the interactive-subjective properties of pitch, dynamics, timbre, and duration, and the effects on human perception that occur when more than one pitch is presented to a person concurrently or consecutively. Experiments have been designed in which human subjects respond

---

[1] R.A. Rasch and R. Plomb, "The Perception of Musical Tones," in The Psychology of Music, ed. Diana Deutsch (New York: Academic Press, 1982), p.1.

by performing specific behavioral tasks in correspondence to sets of specific sound stimuli. Those procedures have been used in the attempt to determine the consistency of response between presented stimuli and observed behaviors. The assumption is that a lack of resultant behavior to aural stimuli is due to a lack of or an alteration in a person's perception of the presented stimuli. Efforts have been made by psychoacousticians to manipulate specific sets of physical properties of sound within stimulus-response experimental procedures in an attempt to identify the effects of altered aural events on a person's subjective perception.

Psychoacousticians, however, have not attempted to understand how subjective perceptions of an isolated aural event affect a person's ability to give intrinsic music meaning to a sequential series of aural events. A person cannot give music meaning to an independent aural event which he has perceived. Aural events have music meaning for a listener when they are compared to familiar aural events previously perceived.

Audiation

To give music meaning to a perceived aural event, it must be retained in the mind and compared and contrasted to previously perceived aural events also retained in the mind through audiation. Gordon speculates that meaning is brought to a particular set of aural events by comparing the most recently perceived and immediately audiated perceptions to other audiated aural events which were perceived in the recent or distant

past.[2] As one engages in the multidimensional audiation comparison process, one attempts to supply music syntax and to give music meaning to perceived aural events. In addition, as a result of being able to supply meaning to a series of aural events, one soon audiates specific aural events that might occur in the future. Moreover, aural events that a person predicts will occur in the future are also compared and contrasted to the set of aural events that have been perceived and audiated in the recent past and in the distant past in an attempt to give complete music meaning to that aural event.

In experimental exercises, such as those used by psychoacousticians, in which a person is asked to behave in accordance with how he subjectively perceives an aural event in contrast to another aural event, a person must be engaged in the audiation comparison process. At the very least, a person must be audiating the immediately perceived aural event and comparing it to audiated aural events perceived in the recent past.

Psychoacousticians, however, have made no attempt to know how music meaning is altered in specific sets of aural events. Rather, they have been interested primarily in describing what a person is able to perceive. Their concern has not been to understand how music meaning of aural events is derived, but to identify which combinations of sonic components alter subjective immediate impressions of individual aural events.

---

[2] Edwin E. Gordon, Learning Sequences in Music: Skill Content and Patterns (Chicago: G.I.A., 1984), pp. 11-20.

To the author's knowledge, there have not been any studies in the psychology of music learning which have examined the relationship between the changes in one's immediate perceived impressions and their effect on one's ability to give music meaning to a set of aural events. Also, within the study of human language development, the author has not found investigations which examine the relationship between the ability to recognize one's own voice and the ability to learn language. Investigations which examine voice recognition have centered on the process of language production.[3] The primary intent of those investigations has been to discover the relationship between voice recognition and one's ability to produce accurate speech utterances, and not the relationship between voice recognition and the ability to give meaning to words in language. The focus of those studies is not within the domain of the present study.

The effect of the participatory use of the voice in tonal and rhythm pattern training on developmental music aptitude has been investigated in two studies. Three hundred and sixty-five first grade students participated in an experimental study by Gordon which examined the effect of tonal pattern and rhythm pattern training on developmental music aptitude.[4]

Before instruction began, an experimental group and a

---

[3]Gloria J. Bordon, "An Interpretation of Research on Feedback Interruption in Speech" a paper presented at the American Speech and Hearing Association Convention, Chicago, Nov. 2-5, 1977.

[4]Edwin E. Gordon, The Manifestation of Developmental Music Aptitude in the Audiation of "Same" and "Different" as Sound in Music (Chicago: G.I.A., 1981), pp. 35-36.

control group were administered both the Tonal and Rhythm subtests of the Primary Measures of Music Audiation.[5] For a period of approximately thirty weeks, the experimental group received tonal and rhythm pattern instruction. Pattern instruction included the students being asked to give immediate reproductive vocal performances to a series of individual rhythm patterns and tonal patterns performed by the teacher. At the beginning of the thirty-week instruction period, the students were asked to echo-perform both the tonal patterns and rhythm patterns using a neutral syllable. During the latter part of the instruction period, the students were asked to echo-perform the tonal and rhythm patterns using corresponding movable "do" solfege syllables. The students received approximately five minutes of tonal or rhythm pattern instruction in each of their regularly scheduled general music classes. The control group did not receive any tonal or rhythm pattern instruction.

At the end of the instruction period, the Tonal and Rhythm subtests of the Primary Measures of Music Audiation were readministered to the students in both groups. The effects of tonal and rhythm pattern training were assessed with a pre-test and post-test design. For the Tonal, Rhythm, and composite test scores, the experimental group mean gain scores were significantly higher than the mean gain scores for the control group. The results of the study suggest that

---

[5] Edwin E. Gordon, Primary Measures of Music Audiation (Chicago: G.I.A., 1979).

developmental tonal and rhythm music aptitudes change as a result of participatory tonal and rhythm pattern instruction.

Two hundred and sixty children in second and third grade participated in another experimental study by Moore which examined the effects of participatory rhythm and movement activities on developmental rhythm music aptitude.[6] All of the children were administered the Rhythm subtest of the Primary Measures of Music Audiation before a ten-week instruction period. Twice each week, four experimental groups received half-hour lessons of rhythm instruction which included participatory movement exercises, rhythm pattern chanting, and Orff percussion instrument performance activities. Four control groups received an equal amount of classroom music instruction which included conventional classroom music activities without any emphasis on rhythm pattern training. Four additional control groups received ho classroom music instruction.

At the end of the instruction period, the Rhythm subtest of the Primary Measures of Music Audiation was readministered to all of the students who participated in the study. Mean gain scores among the pre-test and post-test of the Primary Measures of Music Audiation Rhythm subtest were analyzed with the use of univariate analysis of covariance techniques. After instruction, the Rhythm subtest mean scores for the experimental groups were significantly higher than those for any

---

[6] Janet L.S. Moore, "Rhythm and Movement: An Objective Analysis of Their Association with Music Aptitude" (Ed.D. dissertation, University of North Carolina, 1984).

of the control groups. The Rhythm subtest mean scores for the two types of control groups did not differ significantly. Those results suggest that developmental rhythm music aptitude is influenced by participatory rhythm and movement activities.

Need for Present Study

Although evidence has been gathered from some investigations which suggest that the participatory use of the young child's voice does influence his audiation abilities, there have been no investigations to suggest the precise role of the voice in the vocal response music learning process. Thus it is of interest to determine if a child who reproduces tonal or rhythm patterns accurately benefits more from pattern training than a child who repeats tonal or rhythm patterns without vocal precision.

The inability to reproduce tonal or rhythm patterns accurately may be due to 1) a lack of developmental music aptitude and audiation achievement, or 2) a lack of ability to recognize one's own voice, or 3) the interaction of the two. A child who has minimal audiation ability seemingly would not be able to reproduce a model pattern. He would have an inadequate stored mental performance model with which to compare his on-going vocal performance and, therefore, he might have difficulty comparing an audiated model performance to his own on-going vocalized performance. As a result, he would not be able to supply sufficient music meaning to the model performance or to his own vocalized performance. Similarly, a child who cannot

recognize his own voice would be unable to compare adequately an on-going performance of his voice to an audiated model. Again, that person would have difficulty in engaging in the audiation comparison process and, therefore, he might be unable to supply sufficient music syntax and music meaning to a series of aural events. A young child's immediate perceived impression of his own voice, during the participatory use of his voice in music learning, may have a profound effect upon his ability to give meaning to music and to perform in a musical manner.

CHAPTER THREE

DESIGN OF THE STUDY

Population

Forty male and female children in kindergarten and first grade enrolled in a public elementary school participated in the study. Twenty of the students were in kindergarten and twenty of the students were in the first grade. The children were predominantly white and of a middle-class socio-economic background. The elementary school, a component of a centralized rural school district, is located in northeastern Pennsylvania.

Procedures

Prior to instruction, the Primary Measures of Music Audiation was administered to the kindergarten and first grade children. It is a standardized test designed to measure developmental music aptitude.[1] The Primary Measures of Music Audiation consists of two subtests. The Tonal subtest is a recorded series of forty paired tonal patterns and the Rhythm subtest is a recorded series of forty paired rhythm patterns. For each subtest the children are asked to listen to the individual paired patterns and to indicate whether the second pattern of the pair is the same as or different from the first. To indicate that the two patterns are the same, the children are asked to circle a pair of matching happy faces on an answer

---

[1] Edwin E. Gordon, Primary Measures of Music Audiation (Chicago: G.I.A. Publications, 1979) p. 3.

sheet. To indicate that the two patterns are different, the children are asked to circle a contrasting pair of happy-sad faces.

The Primary Measures of Music Audiation test results provide an indication of the ability of young children to derive an immediate impression, through audiation, of sameness of and difference between music patterns. For a child to answer the Primary Measures of Music Audiation items correctly, he must audiate the first pattern while perceiving the second pattern.

Each subtest, Tonal and Rhythm, requires a twenty-minute administration period. As recommended in the test manual, the Tonal subtest and the Rhythm subtest were administered to classes on two different days no more than one week apart.

For a period of five weeks following the administration of the standardized music aptitude test, all students were required to echo-sing selected groups of tonal patterns and to echo-chant selected groups of rhythm patterns. The tonal and rhythm pattern instruction was done during the regularly scheduled general music classes. Twenty major and minor tonic and dominant tonal patterns and twenty usual duple and usual triple macro and micro beat and division and elongation rhythm patterns were taught to the children.[2] In addition, patterns

---

[2] The terms usual duple and usual triple meter and macro and micro beat are used to give a more functional definition to rhythm. The temporal division of macro beats into two or three equal micro beats determines usual duple or usual triple meter. For a more complete explanation, see: Edwin E. Gordon, Learning Sequences in Music: Skill, Content, and Patterns (Chicago: G.I.A., 1984), p. 101.