



The relationship between music and language achievement in early childhood
by Judy Ann Hove Harding

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education
Montana State University

© Copyright by Judy Ann Hove Harding (1989)

Abstract:

In the fall of 1988, this study was conducted in the public schools of Helena, Montana, to see if a statistically significant relationship existed between the amount of musical experiences children had in early childhood and their language achievement as measured following the children's second year in elementary school. Parents of randomly selected third grade children completed the HOMES questionnaire to determine the musical experience of their children. Language achievement was determined by the CTBS scores in mechanical language, expressive language, reading, and spelling.

Gender was also of interest in this study; therefore a two-way analysis of variance test was used with gender and musical experience being the two independent variables and one of the four language scores being the dependent variable. The test was run four times, once for each dependent variable. A chi-square test was also run to determine if either gender was given significantly more musical experience.

Three hypotheses were tested for each language skill. No interaction of independent variables existed for any of the dependent variables, so main effects were tested for each. The high group for musical experience also was found to be significantly higher in language achievement for the skills of expressive language, reading, and spelling. Only mechanical language showed no such relationship. It was also the only skill area that did show a significant relationship to gender, with girls being higher. The chi-square test showed that girls received significantly more musical experience than boys.

Because a strong relationship was found to exist between music and three areas of language development, it was recommended that parents, teachers, and other caretakers of young children provide environments rich in musical experience. Additionally, further research should be performed to determine which particular types of musical experience have the strongest relationship to language development.

THE RELATIONSHIP BETWEEN MUSIC
AND LANGUAGE ACHIEVEMENT
IN EARLY CHILDHOOD

by

Judy Ann Hove Harding

A thesis submitted in partial fulfillment
of the requirements for the degree

of

Doctor of Education

MONTANA STATE UNIVERSITY
Bozeman, Montana

April 1989

D378
H2195

APPROVAL

of a thesis submitted by

Judy Ann Hove Harding

This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

Apr. 21, 1989
Date

David D. Sullivan
Chairperson, Graduate Committee

Approved for the Major Department

4-21-89
Date

Donald L. Pearson
Head, Major Department

Approved for the College of Graduate Studies

May 11, 1989
Date

Henry L. Parsons
Graduate Dean

STATEMENT OF PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a doctoral degree at Montana State University, I agree that the Library shall make it available to borrowers under rules of the Library. I further agree that copying of this thesis is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U.S. Copyright Law. Requests for extensive copying or reproduction of this thesis should be referred to University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106, to whom I have granted "the exclusive right to reproduce and distribute copies of the dissertation in and from microfilm and the right to reproduce and distribute by abstract in any format."

Signature

Judy Ann Hove Harding

Date

April 21, 1989

ACKNOWLEDGEMENTS

To the chairman of my graduate committee and long-time friend, Dr. Gerald Sullivan, goes my great appreciation for his own infectious love of language and his interest, encouragement, and assistance throughout this study.

Other people whose help was needed and appreciated include Dr. Donald Robson who provided expert advice in the designing of research and the analysis of data; Dr. Douglas Bartholomew who offered inspiration and the judgment of experience in the musical research, along with Susan Hove-Prebil of Black Hills State College; Manny Brand, Chairman of the Department of Music, Southwest Texas State University, who granted permission to use the instrument he developed to measure musical experience in early childhood; and Dr. Robert Thibeault, Dr. John Kohl, and Dr. William Neff who contributed their knowledge, time, and effort serving on my committee.

I also wish to thank the Helena School District for granting me the sabbatical leave to begin this study and for their complete cooperation in gathering data for the investigation.

Finally I wish to express to Jay, Jill, and John my heartfelt gratitude for the numerous sabbatical leaves of various duration from the duties of wife and mother with no reduction in their payments of love and support.

TABLE OF CONTENTS

CHAPTER	Page
1. INTRODUCTION AND REVIEW OF LITERATURE.....	1
Introduction.....	1
Statement of the Problem.....	3
Need for the Study.....	3
Definition of Terms.....	6
Questions to Be Answered.....	7
Review of Relevant Research or Theory.....	8
Introduction.....	8
Indirect Effects of Musical Experience on Learning.....	8
Movement.....	8
Listening and speaking.....	10
Reading and writing skills.....	13
Intelligence and self-concept.....	15
Direct Teaching of Language Skills Using Music.....	18
Listening.....	18
Speaking.....	21
Reading.....	22
Writing.....	25
2. METHODOLOGY.....	30
Population Description and Sampling Procedure.....	30
Sources of Evidence and Authority.....	33
Investigative Categories.....	33
Methods of Data Collection.....	34
Statistical Hypotheses.....	39
Null Hypothesis 1.....	39
Null Hypothesis 2.....	39
Null Hypothesis 3.....	40
Null Hypothesis 4.....	40
Null Hypothesis 5.....	40
Null Hypothesis 6.....	40
Null Hypothesis 7.....	40
Null Hypothesis 8.....	40
Null Hypothesis 9.....	41

TABLE OF CONTENTS--Continued

	Page
Null Hypothesis 10.....	41
Null Hypothesis 11.....	41
Null Hypothesis 12.....	41
Null Hypothesis 13.....	41
Analytical Techniques and Research Design.....	41
Limitations and Delimitations of the Study.....	45
3. ANALYSIS OF DATA.....	46
Grouping for Musical Experience.....	46
Mechanical Language Skill.....	47
Statistical Hypotheses.....	47
Null Hypothesis 1.....	47
Null Hypothesis 2.....	47
Null Hypothesis 3.....	47
Test.....	47
Results.....	48
Expressive Language Skill.....	49
Statistical Hypotheses.....	49
Null Hypothesis 4.....	49
Null Hypothesis 5.....	49
Null Hypothesis 6.....	49
Test.....	50
Results.....	51
Total Reading Skill.....	51
Statistical Hypotheses.....	51
Null Hypothesis 7.....	51
Null Hypothesis 8.....	51
Null Hypothesis 9.....	51
Test.....	52
Results.....	53
Spelling Skill.....	53
Statistical Hypotheses.....	53
Null Hypothesis 10.....	53
Null Hypothesis 11.....	53
Null Hypothesis 12.....	53
Test.....	55
Results.....	55
Summary of Test Results Across the Four Language Skill Areas.....	55

TABLE OF CONTENTS--Continued

	Page
Difference in Musical Experience	
Between Boys and Girls.....	56
Null Hypothesis 13.....	56
Test.....	57
Results.....	57
4. CONCLUSIONS AND RECOMMENDATIONS.....	58
Conclusions.....	58
Recommendations for Learning.....	60
Recommendations for Further Research....	61
REFERENCES CITED.....	66
APPENDICES:	
A. Cover Letter Accompanying Questionnaire	
Sent to Parents.....	72
B. Home Musical Environmental Scale	
(HOMES) Questionnaire Sent to	
Parents.....	74

LIST OF TABLES

Table		Page
1.	Group and cell means: Mechanical language achievement by gender and by level of musical experience.....	48
2.	ANOVA table for achievement in mechanical language skill.....	48
3.	Group and cell means: Expressive language achievement by gender and by level of musical experience.....	50
4.	ANOVA table for achievement in expressive language skill.....	50
5.	Group and cell means: Total reading achievement by gender and by level of musical experience.....	52
6.	ANOVA table for achievement in total reading skill.....	52
7.	Group and cell means: Spelling achievement by gender and by level of musical experience.....	54
8.	ANOVA table for achievement in spelling skill.....	54
9.	Statistical significance of interaction and main effects across the four divisions of language skill.....	56
10.	Chi-Square test for boys and for girls in the high and low groups of musical experience.....	57

ABSTRACT

In the fall of 1988, this study was conducted in the public schools of Helena, Montana, to see if a statistically significant relationship existed between the amount of musical experiences children had in early childhood and their language achievement as measured following the children's second year in elementary school. Parents of randomly selected third grade children completed the HOMES' questionnaire to determine the musical experience of their children. Language achievement was determined by the CTBS scores in mechanical language, expressive language, reading, and spelling.

Gender was also of interest in this study; therefore a two-way analysis of variance test was used with gender and musical experience being the two independent variables and one of the four language scores being the dependent variable. The test was run four times, once for each dependent variable. A chi-square test was also run to determine if either gender was given significantly more musical experience.

Three hypotheses were tested for each language skill. No interaction of independent variables existed for any of the dependent variables, so main effects were tested for each. The high group for musical experience also was found to be significantly higher in language achievement for the skills of expressive language, reading, and spelling. Only mechanical language showed no such relationship. It was also the only skill area that did show a significant relationship to gender, with girls being higher. The chi-square test showed that girls received significantly more musical experience than boys.

Because a strong relationship was found to exist between music and three areas of language development, it was recommended that parents, teachers, and other caretakers of young children provide environments rich in musical experience. Additionally, further research should be performed to determine which particular types of musical experience have the strongest relationship to language development.

CHAPTER 1

INTRODUCTION AND REVIEW
OF LITERATUREIntroduction

Language arts in elementary schools consists of the four basic components of language: listening, speaking, reading, and writing. In addition to these four basic areas are the many subdivisions of skills within each one, some of which are normally taught as subjects in themselves, such as spelling and handwriting. Other communication skills are most often categorized within the general class called language, i.e., grammar, vocabulary, and syntax. Whether taught as individual subjects or as part of the language class, all the different skills may be combined and taught in an integrated manner. In fact, research has shown that the skills of language are most effectively taught in combination (Anderson and Lapp, 1988).

Because these language arts skills are the skills of communication, they are applicable to any learning task. Through our communication skills, we receive information in all subject areas. Through them we also express questions to obtain more information or to clarify messages we receive.

Through language we are able to create our own responses and communicate our unique interpretations of messages received. It would be hard to argue against the fact that language arts is the basic part of the school curriculum. McDonald (1975) quoted Julius Leveine, an elementary principal, who said:

In the early years of school, learning to listen to language, to use language, and to recognize the symbols which represent language are vitally important skills. If a child does not develop these skills, this failure may have a significant effect on ability to use language as a communicative tool throughout school years. If [children] fail at reading, . . . they may fail at everything.
(p. 874)

Yet, children do fail at reading and at the other skills of language, and so educators keep exploring the causes for those failures and seeking better methods of teaching to prevent them. One field of research that has recently received emphasis is the use of music to promote the development of language skills.

McDonald (1975) discussed many reasons why children, even before starting school, should have daily experiences in music. Both affective and cognitive benefits were explored. Musical experiences were acknowledged as being particularly relevant to the development of language and reading readiness skills: auditory discrimination, oral expression, visual skills, and listening.

In the school setting, Aronoff (1974) suggested that music is an invaluable tool across the curriculum. Many

educators have been aware of the use of music and movement activities for self-expression, for developing social skills, and for physical release. Aronoff presented some of the direct ways to use music in such activities as introducing social studies concepts and increasing vocabulary for language. She also referred to the idea that an individual learns best when the whole being is involved, as is the case with these types of activities. She found that even intelligence itself could be modified by these experiences.

In times of the "back to basics" philosophy, some questions existed as to whether arts are indeed basic. For this reason, exploring the arts' relationship to the most basic skill of all, that of language, would be informative.

Statement of the Problem

The problem addressed by this study was to determine if a relationship exists between language skill achievement and the extent of certain musical experiences in early childhood. The study was conducted in the elementary schools in the Helena, Montana Public Schools. Children who had finished the second grade were used as the subjects for this study.

Need for the Study

Kiester (1985) found that early childhood is the critical time for developing creative thinking.

By the age of eight, most children have developed nearly 80 percent of their mental manipulative processes. This means that adult

intelligence depends to a large extent upon creative experiences early in life. (p. 24)

Research done in Hungary by Friss and cited by McDonald (1975) showed that:

The achievement of Hungarian children receiving daily music instruction [using the Kodaly Method] were statistically superior to control groups in all other subject areas, as well as music. (p. 872)

The Kodaly Method is one that begins at an early age and emphasizes auditory discrimination skills.

These research findings raised important questions about the creative experiences that are provided to our children in the United States. Are the kinds of musical experiences cited by the literature to aid children in their development showing similar correlations to learning achievement in our country? In particular, does it show a correlation to their language skills achievement?

The literature discussed many methods for using music to enhance language skills, and offered explanations as to why these methods should be successful. Some (Hahn, 1987; Jalongo and Collins, 1985; Martin, 1983; Ridley, 1986; and Teitel, 1985) presented descriptive conclusions relative to how the music affected the learning. None of the studies conducted in the United States seemed to offer analytical research to show if there really was a statistical difference in the learning achieved through the use of music.

One study by J.S. Shelton investigated the influence of home environment on musical development and showed a positive correlation for musical background and musical skills. Shelton's study, however, did not extend to any other part of the curriculum (Greenberg, 1967).

McDonald (1975) pointed to Nicholson's work with American children in which it was found that a purposeful curriculum integrating music and reading readiness activities resulted in a significant increase in the scores for readiness and for reading achievement on standardized tests. Nicholson's results certainly contributed to this field of investigation, but his research differed from this investigator's study in two ways: his population consisted only of slow learners, ages six to eight (this study worked with all third grade students in regular classrooms), and he worked with a curriculum where music was purposefully integrated (this study investigated if musical experiences, whether or not directly integrated to teach language, would affect the learning of language skills).

Mathison (1977) attempted to determine the effect of language arts instruction that emphasized aesthetics for kindergarten, first grade, and second grade students. She tested for change in attitude, IQ, and self-concept. Her results showed no significant change until second grade. At that level the enriched program did affect the attitude and IQ of the students. This study used many different types of

aesthetic instruction, only part of which were in the field of music. Additionally, it did not attempt to measure aesthetic experiences beyond the six-month period of the study.

The literature describing instructional methods utilizing music showed strong possibilities of a connection between experiences children have with music and learning achievement. No study was found, however, where a statistical relationship was established between language skills achievement in this country and musical experiences taking place in early childhood.

The findings from this present study could provide very helpful implications for the utilization of music in our primary curriculum as well as in preschools and in the home environment.

Definition of Terms

For the purpose of this research project, the following definitions will be employed:

- (1) Early childhood: The period extending from prenatal to the end of second grade.
- (2) Holistic learning: A method of learning that begins with the whole and works toward the individual parts.
- (3) Kernel sentence: Any sentence used to teach a basic form of sentence structure by manipulating it with activities that add to it, subtract from it, or make changes within it.

- (4) Musical experience: Activities involving rhythm, pitch, or movement that the literature showed to be helpful in some way to learning language.
- (5) Language skill achievement: Competency in language skills as measured by the Comprehensive Test of Basic Skills (CTBS) in the subtotals of language (both mechanical and expressive categories), reading, and spelling.
- (6) Mechanical language skills: This term refers to those language skills such as punctuation and capitalization which are written and visual.

Questions to Be Answered

This study will answer the following questions:

- (1) Is there any interaction between gender and the levels of musical experience for mean achievement score on the CTBS in any of these language skills: mechanical language, expressive language, reading, and spelling?
- (2) Is there any statistically significant difference between the mean achievement scores of boys and those of girls on the CTBS for any of the four language skills mentioned above?
- (3) Based on the CTBS, is there any statistically significant difference between the mean achievement scores of the group of students with low levels of musical experience and those with high levels of musical experience for any of the four language skills?

- (4) Is there any statistically significant difference between the amount of musical experience that boys had and the amount of musical experience that girls had according to the questionnaire completed by the parents?

Review of Relevant Research or Theory

Introduction

The body of knowledge existing relative to musical experiences and their effect on learning of language arts skills will be categorized in the following manner for this review: (1) theories on the indirect effects that music has on general development and learning, and (2) instructional theories utilizing music to more directly teach the skills of language.

Indirect Effects of Musical Experience on Learning

Movement. Movement is a very important part of musical experiences. The beginning of a child's expressing him/herself, his/her first access to creativity, may actually be movement (Cohen, 1974). Shehan (1987) described it this way:

However we view it, music is inseparable from movement. Music elicits internal human responses such as rate of heartbeat, breathing, galvanic skin response and muscle contraction or relaxing. (p. 25)

In discussing Piaget's sensorimotor stage, 18-24 months, Zimmerman (1985) presented this period as a time for learning

through perceptions and actions. The infant's movements, organized into patterns of action, were early forms of communication.

Later on, in singing games and creative movement activities, the older child continues to communicate with the body, showing melodic contour and rhythm with his/her movements. Feelings also are expressed through these body movements, and self-awareness is enhanced, according to Cohen (1974), who said, "The body is a child's very self, psychologically and kinesthetically" (p. 60).

Between the ages of two and five, children enter what Piaget termed the "preoperational stage," where the child begins to grasp a symbolic realism of language. Zimmerman (1985) felt that singing games, nursery rhymes, and chants helped the child to move from the sensorimotor manner of learning into the symbolic. Some of the same lessons were learned, but this time with symbolism attached. Zimmerman observed that music and movement seemed to be synonymous for children of this stage. Children were able to chant the rhythms of speech or keep the beat of music with sticks or hand claps, responding naturally to what they heard.

Shehan (1987) found that with young children, the chanting activities were performed with more accuracy than the marching ones. She attributed this to the fact that small muscles used in clapping and chanting were more easily

coordinated to move than the larger muscles needed for skipping or marching.

For most effective learning, the importance of total involvement of the child was emphasized by Aronoff (1974) who felt that music-movement activities accomplished this very successfully. Ashton-Warner (1963) concurred and described how naturally her primary students in New Zealand moved into movement:

Dancing I place in the morning output time, considering it as good a medium as any other, since Plato said it was the one complete expression involving the faculties on all levels, spiritual, intellectual and physical. That's what I think too. Not that I deliberately teach it for that reason. It just happened one bright spring morning when I was playing some Schubert to please no one but myself that a child stood up from his work and began composing a dance, then another, then another, and there it all was. And here it all still is. (p. 90)

Listening and speaking. In addition to movement, a baby very early in life communicates vocally. In referring to the findings of Papousek on preverbal communications between parent and infant, Andress (1985) pointed to baby talk as the prime musical experience in an infant's daily life. Musical qualities such as rhythms, pitch changes, and accents are all present in baby talk. The minor third (the "cuckoo" sound) is often repeated in baby talk. The pitch is usually elevated, more in the range of the baby's voice, and invites imitation and answering from the infant. Baby talk remains

the main source of music for the first year of life; then adults tend to go into regular talking and singing of melodies.

This early vocalizing was also noted by Zimmerman (1985). She called the period of two to six months a time of learning to listen and pointed to sound as the first sense by which the infant organizes its perceptions. By the second half of its first year, she says the infant can repeat its own vocalizations and imitate those of adults. This ability to imitate is a very important skill for language readiness. During this period of lolling and trilling conversations with adults, the child can imitate rhythm, pitch and accent. He can do this for short segments from about the ages of twelve to fifteen months. By approximately nineteen months of age, he can imitate whole sentences.

Two-year-olds and early threes are ready to listen to songs from our culture. Even though they are imitating at this stage, it is not really a singing experience, but more of an auditory assimilation. They process the understanding that it is a song and they feel the pleasure of the singing. Primary reactions are still listening and movement.

Teitel (1985) used nursery rhymes as her musical learning tool. This is another musical activity that can involve actions as well as clapping the rhythm. Because nursery rhymes often have a book source, they are excellent for introducing print concepts such as:

- (1) Print tells a story.
- (2) Pictures help tell a story.
- (3) Progression of print is from left to right. The top line is read first, and then down to the bottom. (Teitel, 1985, p. 14)

Parents who are uncomfortable singing because they feel they don't have good voices would probably put aside their inadequate feelings and sing much more if they understood what a powerful force it is in the development of their child, according to McChesney (1985). He credited singing with "helping children develop language, perceptual skills, psychomotor coordination, and sensory and self-awareness" (p. 98). He also said it teaches the syntax of the language and pointed to the fact that we adults can still sing to this day the singing games we learned in early childhood.

Bennett (1987) noted that Kodaly placed a similar emphasis on the importance of singing when he gave this advice to American teachers:

You must base all your teaching of music to your children on your own folk songs! Folk songs carry the language well. The children must sing every day. If children were allowed to speak only once or twice a week, they never would learn to speak, or read, or write. (p. 38)

The importance of music as a daily experience was also stressed by McDonald (1975) when she spoke of the preschool and primary school student. She first talked of the affective area and how singing a favorite song or listening to one from a recording sets the atmosphere for pleasure. In so

doing, it sets the tone for learning, too. She then detailed the readiness skills that are learned while listening to music: auditory discrimination, letter sounds, syllabication and pronunciation of words, using context meaning, and grammar. She especially saw benefits to the skill of listening; because the child was listening willingly, he was attentive. Good listening habits were being reinforced and attention spans were being increased.

Another area of readiness McDonald felt was extremely important to preschoolers was that of vocabulary expansion. Both actions to the songs and context clues help to internalize the meaning of the vocabulary. By substituting words for a blank in the song, children can further develop vocabulary and grammar with their own creativity.

This kind of oral experience, where a kernel sentence is first repeated in song and perhaps acted out, and then is used for a substitution game where the children put in their own words for a certain part, is an excellent way to learn grammar. According to Goldstein (1983), it is the only way to learn grammar. He does not believe we attain correct grammar usage by learning the rule, but rather that we learn the rule by using the grammar correctly. We internalize the structure we use and "own it," whether it be the correct or incorrect structure.

Reading and writing skills. Just as the oral manipulation of language can prepare children for speaking correctly,

so does the preparation apply to reading and writing. The imitation capability that was important in the infant stage is also very important for beginning reading. Ashton-Warner (1963), in her theory of organic reading, had beginning readers read only familiar material, words that were a part of them. Many reading teachers agree with that concept today because it keeps reading so natural and so easy.

Emans (1978) studied children who came to school knowing how to read. He discovered that these children were the best and most natural readers. Looking into their backgrounds, he found that no adult had made a conscious effort to teach them to read early, but that they had been exposed to much reading with much repetition. The children seemed to have taken the natural step of imitating what they heard over and over and associated it with the symbols. Emans advocated the use of nursery rhymes for beginning readers, making sure that they had them well implanted in their oral language and understood the meaning before being given the written symbols to read.

Song picture books were the tool used by Bromley and Jalongo (1984) in their elementary classroom to teach reading in this holistic way. The children can learn to sing the song and can internalize its meaning through actions and other oral activities before reading it in the picture book. When they do read it, the reading is a natural, fluent kind of reading and a successful, joyful experience. An

elementary reading specialist summarized the idea in the following way:

Young children need maximum opportunity to develop auditory and visual skills in ways that are not directly related to language reading and in ways that are both pleasurable and easy. Music is the ideal medium for encouraging this development. (Lloyd, 1978, p. 327)

Early childhood is a fruitful time to develop this kind of holistic thinking, reported Kiester (1985), who further stated, "It is the prime time for right-hemisphere brain development" (p. 24). Music is considered to be an experience of the right brain for most of us (Harvey, 1986), so this is a time when humans are open to musical experiences of a holistic quality.

Intelligence and self-concept. Early childhood is also the time when creative experiences can actually modify that entity we call intelligence; our adult capabilities are largely dependent on the creative experiences taking place before the age of eight (Kiester, 1985). Corroborating evidence is supplied by Zoltan (1985), who also felt that music education "can have a positive and wide transfer effect on intelligence" (p. 116). Another challenge to the idea of intelligence being predetermined at birth comes from Hunt and is cited by Aronoff (1974), who felt that experience could indeed affect intelligence, especially during early childhood.

An important aspect to the holistic learning situations cited above as creative experiences is the involvement of the senses. The more of one's being that is involved, intellectual, emotional, and motor, the better one learns (Aronoff, 1974). The earlier this kind of learning is introduced to the child, the more capable he will be of responding with his whole being. Improving learning through involvement of more senses was also supported by Livo (1975). Because singing involves hearing, feeling, and moving, he theorized that one better remembers what is learned. An example offered by Livo was that he can still sing "Jingle Bells" in Latin after studying it twenty-eight years ago, but he does not remember any other Latin.

The final indirect area of learning to be discussed is both a bridge to future achievement and a learning goal in itself; it is the development of self-concept. When movement was discussed at the beginning of this section, self-awareness was pointed out as one of the consequences of this early reaction to music (Cohen, 1974). Self-awareness is the beginning of self-concept, how we feel about ourselves and our learning. McDonald (1975) simply called it "happiness" when she spoke of this affective area. She stated that the happiness that a child feels in singing a familiar song or listening to a favorite recording was enough in itself, but went on to tell how it also sets the stage for learning, particularly in reading and language readiness.

In the well-known school of Summerhill in England, A.S. Neill (1960) described the goal as simply "happiness." He felt if that goal were attained, learning would follow naturally and easily. Keister (1985) had a similar goal, but expressed in reverse order: "A final goal of education, self-realization, follows naturally from the other goals, particularly with an arts-enriched curriculum" (p. 27).

The sequential goals for the "Education Through Music" (ETM) program were illustrated by Bennett (1987). The five goals rested on the firm base of the goal of "comfort for the individual" (p. 40). In this program, as in the philosophy of many educators, a child must first be comfortable in order to be able to learn. The second goal to set the stage for maximum learning is that of cooperation within the group. Both of the affective goals of ETM were also evident in Aronoff's (1974) views that classroom teachers of young children use music activities to provide for social interaction as well as self-expression.

Maslow (1973) cited music, rhythm, and dancing as experiences that lead to the discovery of self. In speaking of his "intrinsic education," he visualized a core curriculum of art, music, and dance. His favorite for the very young children was dancing because it was so easy for them to react to the rhythm. "The function of education . . . is ultimately the self-actualization of a person" (p. 168). Maslow also expressed this goal in a less technical way: "It is

helping the person to become the best that he is able to become" (p. 169).

Direct Teaching of Language
Skills Using Music

Listening. Music is used in a direct application to enhance development even before birth. Shetler (1985) investigated reports by mothers that their unborn infants moved to music that they were listening to or were playing. He found that:

Infants who received systematic prenatal musical stimulation exhibit remarkable attention behaviors, imitate accurately sounds made by adults (including nonfamily members), and appear to structure vocalization much earlier than infants who did not have prenatal musical stimulation. (p. 27)

Shetler had done work in the 1960's with Shinichi Suzuki, who recommended that mothers play music, of the level that the child might play at three years of age, to the unborn child. Other parents chose to play classical music or other types of music to their unborn children. Shetler's work with children after birth includes documentation of the echo sounds they make, original sounds they make, and activities with "sound toys."

Brand (1985) stated that babies hear language before and after birth. Although they cannot understand this language, listening to the uncomprehended forms is important to the later development of language skills. This kind of

unconscious listening he felt was as important for music as it was for language. Of all the periods of life, Brand felt that music might have its most important influence during early childhood, especially infancy.

The singing of lullabies is particularly recommended for babies:

Evidently, during lullabies the combination of singing, rocking, cuddling, looking, and smiling provides the kind of sensory stimulation that enhances mental development and produces such powerful effects on the infant. . . . What is important is not that parents sing well, but that they sing at all. . . . Frequently, lullabies even produce primitive musical response by the baby in the form of cooing or gurgling. This cooing of the infant and singing of the mother establishes a special kind of early music making and communication that can be differentiated from other parent-infant sounds as early as four days after birth. (Brand, 1985, p. 30)

Because the first year of life is so critical for developing receptive language, and because infants are so predisposed to sound and music, it is important to provide listening experiences. Adult records of diverse styles of music are recommended, emphasizing music with frequent changes in tempo and volume. Singing to babies at any time of the day provides very good listening instruction, which is made even better if the baby's own name is used in the song or if movement of his body parts are involved (Brand, 1985).

Teaching listening to young children through music was also advocated by Sims (1986). She recommended several strategies to increase listening attentiveness. One is to have the children listen for a specific aspect of the music; another is to involve the children in movement to the music. Sims felt it was important to use good recordings and equipment and to choose music of variety and quality. She emphasized that the development of attentive listening skills needs to be taught, not just for music, but for all learning.

Callihan and Cummings (1985) also stressed the importance of variety and quality in the choice of music to which young children are exposed. They found that children at ages three and four have distinct preferences for the music that they choose and that these preferences reflect directly what the caretakers in their lives choose. In these authors' experimental work, the children who were exposed to classical music chose that music type. Callihan and Cummings also recommended that children be actively involved in the listening to gain the most from it.

Learning a new song focuses the child's listening on specifics while providing high motivation. The natural rhythm and flow makes the repetition fun (McDonald, 1975). Bromley and Jalongo (1984) stressed the importance of this repetition for moderate disorders in listening. When there are problems in the reception of sounds -- decoding and understanding -- the listener needs repetition to gain

competency. In primers, this is provided, but artificially; thus interest and motivation may wane. In songs, the repetition is natural and enjoyable. Argiro (1974) also stressed the importance of repeatedly hearing correct language patterns; he related this to children learning English as a second language who needed repeated work with patterns different from what they heard at home.

Speaking. Speaking and listening, the two oral skills, are so closely related that most of the instructional methods for developing good listening habits can also promote good speaking. Argiro (1974) discussed this in his work with children who had deficiencies in oral language because of speaking a different language or vernacular at home. Not only was the listening of correct language in repetition important, but also the verbalization of that language. Singing provides a natural source for verbalization, as stated by McDonald (1975), while providing the rhythm that makes syllabication and pronunciation come naturally. Livo (1975) stated that "there is no safer place to practice difficult feats of diction than that provided each individual while singing along with a group" (p. 542).

Oral vocabularies are expanded as lyrics are memorized and the meaning made clear by the context and actions of songs, according to McDonald (1975), who also suggested then using the familiar songs to substitute similar words to

capitalize on the familiar oral expression to further expand vocabulary.

Wendt and Nash (1976) suggested a similar technique of instruction by using a familiar song to provide motivating exercises in listening and speaking by musical cloze. They played part of a line and then stopped the song to let children finish that line. The children obviously had to listen attentively to the first part to know what ending could fit; then they had to use the patterns they had learned to create an ending of their own and verbalize it.

Reading. Emans (1978) found that there are children who learn to read by themselves, naturally, without direct instruction from adults. These children are often the best readers, and from them we have learned methods of instructing reading based on this natural way. Like the learning of oral language, this kind of reading develops from repeated listening and observing. The child formulates rules for himself and then tries them out; when they work, he keeps them and continues to use them.

Emans (1978) emphasized the importance of children's rhymes for this method of teaching reading. "The child's world is filled with nursery rhymes, chants and songs. Some have found their way into print; many have not" (p. 938). He recommended that a teacher use the rhymes that the children already have in their repertoire when they come to

school. There are also many good sources in rhyme books and song books.

The important part of this strategy is that the children should know the rhymes orally before the reading instruction begins.

In this way the children would have the rhymes in their oral language and have a sense of their meanings before encountering them in written language. Thus, children could make the connection between oral and written language. Techniques familiar to first grade teachers could be used: they can be written on large wall charts; individual booklets can be mimeographed; they may be tape recorded for use in listening centers; teachers can move their hands from left to right under the print as it is read; rhymes that repeat specific words can be selected; charts can be cut up into flash cards to be used in developing a sight vocabulary; words can be grouped to be used in developing word attack skills; children may then read in unison and to each other. Any technique used, however, should take advantage of the natural qualities of the rhymes and care should be taken to keep the lessons interesting and enjoyable. (Emans, 1978, p. 939)

Lois Hahn (1987) agreed with Emans' premise that learning reading is most efficient when it begins with a whole piece of reading and then is broken into parts (skills and words) that make up that whole. In her work she demonstrated the parallel between learning to read music and learning to read language. Her control group learned music reading by isolated knowledge of pitch and note value. Her experimental group learned the whole melody first and then learned how to notate it. Hahn's experimental group

progressed better than the control group with a statistically significant difference. Her conclusion was that both reading music and language benefit by a whole-to-part approach and that songs and rhymes facilitate this kind of instruction in reading.

Bromley and Jalongo (1984) used this same whole-to-part theory when they instructed reading using song picture books. Again, the material was first learned thoroughly in the oral language skills. The rhythm facilitates the fluency so that children can imitate the song to read the song book. Imitation is often above their ability to comprehend or reproduce.

The idea that reading instruction is best initiated by reading experiences rather than rules was reaffirmed by Willert and Kamii (1985) in their recommendations for the very first reading instruction in the school curriculum. They discussed how many kindergartens now teach phonics skills to prepare children for reading and preschools give worksheets to prepare them for kindergarten. According to these two early childhood experts, children are not like empty vessels to be filled with knowledge in bits and pieces; rather, they "learn language, both in spoken and written forms, by making rules and relationships from within, rather than by absorbing them from the environment" (Willert and Kamii, 1985, p. 3).

Teitel (1985) decided to use nursery rhymes in her kindergarten classroom for reading instruction instead of the pre-primer. The children learned each rhyme first, "as they would a song." She felt that "the use of nursery rhymes in the curriculum conforms to the principles consistent with natural acquisition of reading" (p. 14). These principles included allowing participation to be voluntary, giving the learners an active part, and using interesting materials that emphasized meaning.

Teitel continued to outline her whole method of proceeding from this whole rhyme through various individual skills contained in it: comprehension, speech/print relationship, visual matching/sequencing, sight words, phonics, and story construction. She explained how different levels of learning maturity could be accommodated throughout the plan.

Folk songs comprised the materials used by Jalongo and Collins (1985) in their teaching of reading. They emphasized that "young children are interested in the words, the singing, the motions -- they want to participate rather than be entertained" (p. 17). The important qualities for the teacher, then, are enjoyment and enthusiasm which generate response from the children, rather than ability or training in music.

Writing. "Form is the framework that organizes and gives meaning to the elements of music. The form for both musical lyrics in a song and words in a poem or story are

similar" (McCarthy, 1985, p. 238). This form learned in song lyrics can provide a framework for writing lyrics or poems with that same form. Dynamics and rhythm of a song also carry over into language. Writing from a well-learned song thus helps the writer to include these important elements which music and language have in common (McCarthy, 1985).

Writing by imitating the form of song lyrics can be used to teach poetry. Shaffer (1982) taught the musical concepts of tone color, dynamics, register, tempo, form, and enunciation with music, and then explored with the class how each of these qualities of music could also be found in spoken language. As an intermediate step between singing and speaking, she used choral reading. From this step the lesson continued to the composition of the children's original poems.

Musical cloze was a tool used by Mateja (1982) to teach vocabulary development and grammatical structure from song lyrics. This can be done orally or written to teach speaking or writing. He recommended selecting a song that fits the learner's interests and possibly a unit of study. The song is well-learned first, preferably orally and graphically. The leader then sings the song, deleting a certain part. The deleted section is carefully chosen to teach some particular expressive outcome. This outcome could be rhyming words, action verbs, categorizing, or other language elements. The completions supplied by the students are then written on the

board. This provides a class activity for writing which can build experience and confidence for individual writing efforts. The rhythm and form are easily maintained from the original lyrics that have not been deleted.

Lichtmann and Lewis (1985) used ballads as their base for a writing method for older children, combining history as well as music with writing. They first studied various ballads that depicted historical events. Then one was chosen to be learned well enough to incorporate its form in rhythm and rhyme scheme. These aspects may be analyzed musically as well as learned rotely. The students then researched an event in history that interested them and wrote a ballad pertaining to that time period. The results were very rewarding to the writers and the instructors.

Spelling, another tool of writing, can also be taught more effectively with music, according to Martin (1983). She worked with remedial students, mostly boys, who had particular problems with spelling. She decided to try a new approach based on Lozanov's theory of suggestology and Prichard and Taylor's theory of accelerated learning. Martin's students recorded the spelling words, with their meanings and spellings, on a tape while Haydn's "Water Music" was played as loud or louder than their voices. They then listened to the recording the last thing before going to bed and the first thing in the morning. Martin not only found great improvement in the students' spelling skills, but also

in their ability to express their thoughts, the sequential memory skill and their self-esteem. According to Martin (1983):

The success of working and speaking with music lies in globally engaging the right and left brain by decreasing resistance barriers and the influence of the flinch factor (a mental negative set about learning at school), resulting in more effective learning internalization, comprehension, and memorization. (p. 507)

This last use of music to teach spelling skills is actually a combination of direct and indirect instruction. It is used with the express purpose of improving instruction, yet the music is actually a background that works indirectly on that learning by its effect on the function of the brain. Further documentation of this kind of application of music to improve learning was given by Sequin (1984) in her work with adults entering vocational programs. She, too, experienced success in improving both academic and affective areas.

A final example of the use of music to induce accelerated learning took place in an elementary school where Frances Ridley (1986) was principal. She worked with three teachers in her school to apply Lozanov's theory to a second grade, a third-fourth grade combination, and a fourth grade. The dependent variables used to report their results were directly related to language achievement. According to Ridley (1986), "If you look closely at the test scores,

you'll see that we more than doubled our SAT growth rate in spelling and vocabulary" (p. 76).

Although there is not one simple technique that Lozanov promotes, one of the main ones was described by Ridley (1986) as follows:

Lozanov's most original technique is what he calls concert reading. Against a background of music -- usually classical and frequently baroque -- the teacher reads the material to be learned while the students follow along on their copy and are encouraged to make mental images. This particular teaching technique stimulates both the right and left brain, a practice we encouraged throughout the program. (p. 76)

Music is certainly not the only element of Lozanov's theory of learning and instruction, but it is a main ingredient.

The procedures used to conduct this study are outlined in Chapter 2.

CHAPTER 2

METHODOLOGY

The review of literature pointed to a variety of sources which found that musical experiences are related to language development. This study is intended to add to the theoretical framework by investigating if a statistically significant relationship exists between the amount of musical experiences provided to a child by the end of second grade and the achievement in language skills attained at that point.

Population Description and
Sampling Procedure

The population for this study included all third grade students in the Helena (Montana) public schools. According to the Chamber of Commerce (Helena Chamber of Commerce, 1988), this capital city has an estimated population of 24,800. It is the county seat of Lewis and Clark County which has an estimated population of 50,000, and it serves a trade area of 61,500 people.

The State of Montana has by far the most employees in the county, followed by the United States Government, Helena Schools, Mountain Bell, St. Peter's Community Hospital, City/County Government, and Blue Cross/Blue Shield, in that order.

The only industrial employer listed in the top ten is American Smelting and Refining (number eight). Both the city and county have experienced a steady growth since the population figures of 1970.

An estimate by the University of Montana Bureau of Business and Economic Research in January of 1983 showed the average income of a husband-wife family to be \$22,000 (Helena Chamber of Commerce, 1988, p. 6). There are eleven elementary schools (K-6) with a total enrollment of 3,857 (Helena Chamber of Commerce, 1983, p. 3).

The beginning third grade students utilized in this study were randomly selected from the population of all third graders. Analysis of data collected on the subjects was inferred to the population of all the third graders in the system. Wiersma (1969), in speaking of ex post facto investigations, stated, "If the researcher plans to generalize to a larger population, the Ss observed would comprise a random sample from the population" (p. 263). Ferguson (1966) described the word "random" in sampling theory as based on "the idea of the equiprobability of each population member being included in the sample" (p. 133).

The list of children beginning third grade in the fall of 1988 was obtained from the Helena School District. The required sample size was selected from a table of numbers calculated by Krejcie and Morgan (1970, p. 608). This table is based on a formula for determining sample size established

by the research division of the National Education Association. Since the total population was 550, a sample size of 217 was necessary. This provided a 95 percent confidence interval, as recommended by Cooper and Weekes (1983).

A method of random selection suggested by Ferguson (1966) requires an ordered list of all possible members of the population. Every n th name is then selected as a subject. This is the method that was used for the random selection in this study. A list of all eligible third graders was numbered. This list was then divided into 110 segments of five numbers each from the total list of 550. The numbers 1 through 5 were put into a container, and two numbers were drawn, number 2 and number 5. The second and fifth students from each segment were thus selected as subjects for the study. This method yielded a total of 220 subjects, just three more than the necessary number for the desired 95 percent confidence interval. If any student whose name was the second or fifth in a segment had incomplete data, the next name on the list replaced them.

In reference to improving response rate, Fink and Kosecoff (1985) recommended planning in advance to replace respondents who did not answer the questionnaire or were ineligible in some way. They suggested oversampling to begin with to provide these replacements when needed. For this study, the procedure followed was to replace any respondent who did not qualify for any reason with the next number on

the list. All third graders were issued questionnaires, not only to provide for the oversampling recommended, but also to fit into the school situation. Primary children who were not randomly selected for a study might feel left out and could cause disruption and problems for the classroom teacher.

Sources of Evidence and Authority

Investigative Categories

There were two investigative categories within the study: those with high levels of musical experiences and those with low levels of musical experiences. The musical experiences calculated were those on the Home Musical Environmental Scale developed by Manny Brand (1986) for his study of second grade children. The items on his questionnaire were rated by direct observation responses made by parents.

As to the reliability of parental observation, Wiersma (1969) said,

Direct observation can be effectively used in situations where other data gathering procedures are not applicable, for example, with young children for whom written communication is impossible and verbal communication difficult. (p. 202)

Wiersma also stated that direct observation of behavior provides information that is usually bias-free.

The attribute of gender was also used as an investigative category. The gender variable examined if boys and girls have different levels of achievement in language skills. The categories of gender were also investigated to see if boys and girls in the study were given different levels of musical experience in early childhood.

Methods of Data Collection

The Comprehensive Tests of Basic Skills (CTBS) was the instrument used to measure achievement in language. Scores on this test included two language scores: expressive language and mechanical language, total reading score and a spelling score. This is the third edition of this test produced by McGraw-Hill. This test was reviewed by Robert L. Linn (1985) in the Ninth Mental Measurements Yearbook. He stated that some of the advantages of these tests are that they have been carefully edited, the test booklets are easily read, and the administrator's manuals provide clear directions.

The objectives of the tests were developed, as is usual, by reviewing textbooks and curriculum guides from large school districts and state departments of education. Vocabulary and readability were carefully controlled for the level of the test. Teachers were included in examining the item tryouts, and provided input through their comments (Mitchell, 1985).

As to the test's validity, a description of each test and its system of development was given.

The statistical data related to validity consist of a list of the number of items and the percentage of students in the norming sample who demonstrated mastery of each objective at a given grade and level. (Linn in Mitchell, 1985, p. 383)

In general, the validity was judged to be comparable to that of similar batteries of tests.

Referring to reliability, the same reviewer reported that CTBS results are "more comprehensive and potentially useful than those provided by most of the publishers of achievement test batteries" (Linn in Mitchell, 1985, p. 384). Estimates of alternate form reliabilities are not available, but comparisons of the standard error for the two forms indicate that they are quite comparable.

These CTBS tests were administered district-wide to the students in the spring of the year in Helena. Classroom teachers administered the tests within the classroom, taking care to follow the instruction manuals explicitly. Scoring was done by the the publisher of the test from the mark-sense forms of the students. Individual scores and class scores were returned to the teacher on computer printouts. Individual scores were then filed in the permanent folders of the students.

The purpose of the study led to using the CTBS because it incorporates the four language achievement scores most

applicable to the focus of the study. Raw scores were used for each of these four dependent variables.

The instrument chosen to measure the independent variable of musical experience was the Home Musical Environmental Scale (HOMES) (see Appendix B). This parent questionnaire was developed by Manny Brand of the University of Houston in 1986 to measure the musical environment of children in nearly the same age groups as in this study (i.e., second grade children). The dependent variable in his study, however, was musical attributes, not language achievement (Brand, 1986).

Jack Taylor, editor of the Journal of Research in Musical Education, reviewed Brand's study. In speaking of how the study deals with the musical environment of the home, Taylor described the HOMES as "an instrument proven valid and reliable" (Taylor, 1986, p. 60).

Brand described development and validation of the HOMES in Psychology of Music. According to the author of the instrument,

Concurrent validity was determined by comparing the music teacher's ratings of the subject's home musical environment with the parents' evaluation of the home musical environment as assessed by the HOMES." (Brand, 1985, p. 44)

Content validity was established by a "panel of four music educators with extensive experience in general music at the elementary and early childhood levels" (Brand, 1985, p. 42).

In this article the reliability index of the HOMES was .86. Conclusions drawn were that the "HOMES appears to be both reliable and valid as an instrument for assessing home musical environment" and that this instrument would be recommended as a tool to further research in this area (Brand, 1985, p. 46).

Parents were asked to complete the HOMES questionnaire describing the musical experiences of their children from birth. Results of the questionnaire were used to group the children according to high (one standard deviation or more above the mean) or low (one standard deviation or more below the mean) amounts of musical experience. These groups were then compared on the Comprehensive Tests of Basic Skills (CTBS) for language achievement (Mitchell, 1985). Statistical analysis of this comparison will add quantitative data to determine whether these two areas are related.

A non-experimental type of research, ex post facto, was utilized. Wiersma (1969) used the following definition by Kerlinger for this method:

. . . research in which the independent variable or variables have already occurred and in which the researcher starts with the observation of a dependent variable or variables. He then studies the independent variables in retrospect for their possible relations to, and effects on, the dependent variable or variables. (p. 258)

Wiersma stated that large portions of educational research are ex post facto in nature and make valuable contributions

to the body of knowledge, even if cause and effect relationships are not definitely established.

Some of the suggestions for using self-administered questionnaires were:

- (1) Send respondents a letter telling them the purpose of your survey questionnaire. This should explain why the respondents should answer the questions, and tell them about who is being surveyed. . . .
- (2) Keep the questionnaire procedures simple. . . .
- (3) Consider incentives. This may encourage people to respond. (Fink & Kosecoff, 1985, p. 46)

The parent questionnaires were sent home by all of the third grade teachers in the system after the Director of Curriculum for the Helena District arranged for the researcher to meet with all building principals. At this meeting the purpose of the study was outlined, copies of the cover letter to the parents (see Appendix A) and the HOMES were distributed for viewing, and complete directions to the teachers were described to show how the simplicity of the design required minimal use of either teaching time or teacher time.

The cover letter to the parents also explained the purpose of the research and assured the confidentiality of their responses. These were prestapled to the questionnaires to be all ready to send home with the children (who received a pencil sticker for their part in taking the

information home). Also included were additional stickers for the children when they returned the forms from home.

The researcher scored by hand the questionnaires returned by parents of the subjects. All of this hand work was checked by an assistant who was hired for that purpose. The scores were then entered into the computer in the Department of Education of Montana State University and double checked for accuracy. From these scores the mean and the standard deviation were figured and printed by the computer along with each score entered.

Statistical Hypotheses

The following hypotheses were tested to resolve the questions to be answered. Four different scores showing language achievement in mechanical language skills, expressive language skills, reading, and spelling were used as dependent variables. Therefore, each of the first three null hypotheses were tested four times, once for each dependent variable.

Null Hypothesis 1: There is no statistically significant interaction between the independent variable of musical experience and the independent variable of gender on the dependent variable of mechanical language skill as measured by the CTBS.

Null Hypothesis 2: There is no statistically significant difference in the mean achievement between boys and

girls on the dependent variable of mechanical language skill as measured by the CTBS.

Null Hypothesis 3: There is no statistically significant difference in the mean achievement between the high and low musical experience groups on the dependent variable of mechanical language skill as measured by the CTBS.

Null Hypothesis 4: There is no statistically significant interaction between the independent variable of musical experience and the independent variable of gender on the dependent variable of expressive language skill as measured by the CTBS.

Null Hypothesis 5: There is no statistically significant difference in the mean achievement between boys and girls on the dependent variable of expressive language skill as measured by the CTBS.

Null Hypothesis 6: There is no statistically significant difference in the mean achievement between the high and low musical experience groups on the dependent variable of expressive language skill as measured by the CTBS.

Null Hypothesis 7: There is no statistically significant interaction between the independent variable of musical experience and the independent variable of gender on the dependent variable of total reading skill as measured by the CTBS.

Null Hypothesis 8: There is no statistically significant difference in the mean achievement between boys and

girls on the dependent variable of total reading skill as measured by the CTBS.

Null Hypothesis 9: There is no statistically significant difference in the mean achievement between the high and low musical experience groups on the dependent variable of total reading skill as measured by the CTBS.

Null Hypothesis 10: There is no statistically significant interaction between the independent variable of musical experience and the independent variable of gender on the dependent variable of spelling skill as measured by the CTBS.

Null Hypothesis 11: There is no statistically significant difference in the mean achievement between boys and girls on the dependent variable of spelling skill.

Null Hypothesis 12: There is no statistically significant difference in the mean achievement between the high and low musical experience groups on the dependent variable of spelling skill as measured by the CTBS.

Null Hypothesis 13: There is no statistically significant difference between the amount of musical experience that boys had and the amount of musical experience that girls had.

Analytical Techniques and Research Design

A mean was calculated for the raw scores in mechanical language achievement for all the boys in each of the

categories for musical experience and for all girls in each of these categories. These means were then entered in the appropriate cells of a table for two-way analysis of variance as follows:

		Means for <-----Musical Experience----->		
		Low	High	Total
Boys				
Girls				
Total				

Figure 1. Cells for two-way analysis of variance.

Charts of all the names for each of the four subcategories with their musical experience scores and their four raw scores from the CTBS were kept in confidential files. They were available to check the work entered on the table above and to provide the needed information to make similar tables for the other three dependent variables of achievement in expressive language, reading, and spelling.

Three F-ratio tests of significance were run: one on the interaction of gender and musical experience on language achievement, and one on each of the main effects of musical experience on language achievement and gender on language

