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PREDICTION OF MUSICAL CREATIVITY IN COMPOSITION
AMONG SELECTED VARIABLES
FOR UPPER ELEMENTARY STUDENTS

by
MYUNG-SOOK AUH

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy

Dissertation Advisor: Dr. John Kratus

Department of Music
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May, 1995
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GRADUATE STUDIES

We hereby approve the thesis of

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candidate for the Ph.D. in Music Education
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(signed)  John Kratos
(chair)

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PREDICTION OF MUSICAL CREATIVITY IN COMPOSITION AMONG SELECTED VARIABLES FOR UPPER ELEMENTARY STUDENTS

Abstract
by
MYUNG-SOOK AUH

The primary purpose of the study was to examine the best predictors of musical creativity in composition among selected variables for upper elementary students. The selected variables were formal and informal musical experiences, musical self-esteem, musical aptitude, musical achievement, academic grades, IQ, and gender. Relationships between musical creativity in composition and the selected variables were also examined.

Subjects were 67 fifth- and sixth-grade students enrolled in a public elementary school. Musical creativity of students was measured by a composition task. The individual students were asked to make up a song on an Orff alto-xylophone within 10 minutes. When they finished making up a song, they were asked to play the song and repeat it exactly the same. Three judges rated the compositions for five dimensions using 7-point rating scales. The composition dimensions were Craftsmanship, Musical Syntax, Musical Originality, Musical Sensitivity, and Repetition of Song. Students also completed the following measures: the Musical Experiences Questionnaire devised by the investigator, the Self-Esteem of Musical Ability by Schmitt (1979), the Musical Aptitude Profile by Gordon (1988), and the Music Achievement Test by Colwell (1968).
The results were as follows:

1. Compositional creativity was significantly related to informal musical experience, musical aptitude-tonal, musical achievement-pitch, and academic grades.

2. The best predictors of compositional creativity were informal musical experience, musical achievement-pitch, and academic grades, which together accounted for 25% of the variance in total composition ratings. In addition, musical aptitude-tonal was one of the best predictors when the individual composition dimensions were considered.

3. The strongest predictor of compositional creativity was informal musical experience, which alone accounted for 11% of the variance in total composition ratings.

The findings on informal musical experience support Sherman’s (1991a) notion that students’ musical experience outside school is the main source of their creative involvement in music. Implications for teaching were that music teachers should (a) encourage students to enjoy creating music at home or outside school with friends and family members; and (b) emphasize the joy of music-making in class.
ACKNOWLEDGEMENTS

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CHAPTER I
STATEMENT OF THE PROBLEM

The Importance of Creativity

Psychologists and educators have long noted the importance of creativity in human development. Torrance (1963) describes four reasons why creativity is important in education. First, through creativity children can express their own ideas and emotions, which improves mental health. When children's need to express their thinking and feeling is strangled, their psychological being becomes crippled. Combs (1962) emphasizes how important it is for public education to help children develop a positive view of themselves: "Indeed, the production of such people [those with a positive view of themselves] must be the primary goal of education" (p. 62). Therefore, public education, with an emphasis on creativity, may give children an opportunity to express their feelings and emotions and experience emotional well-being. Russ (1993) reviewed empirical research on creativity and affect and concludes that creativity is related to positive affect.

Second, children become fully functioning persons as they develop all of their mental abilities, including the ability to learn and think creatively. When children learn only by recognizing and memorizing, they learn passively. However, when children learn and think creatively, they "question, inquire, experiment, manipulate, or play with ideas and materials" (Torrance, 1963, p. 46). As Torrance (1963) mentions, we cannot say that children are becoming fully functioning persons when they do not develop their creative
ability. Kelley (1963) states that students become fully functioning persons as they learn to solve daily problems by using creative solutions. Maslow (1976) writes that self-actualizing creative persons are found among fully functioning persons, who utilize their creative potential for self-actualization.

Pfeil (1972) conducted a study to compare creative thinking in music between creativity-centered and traditional music classes for college students. He writes:

> College-level introductory courses in the fine arts usually emphasize appreciation of finished art products, and do not engage the student in creative activity. Music appreciation courses, for example, usually limit the students' way of experiencing music to those associated with listening.

> The exercise and celebration of creative potential is widely considered necessary to human fulfillment [italics added]. Music is among the available means for experiencing creative potential. (Pfeil, 1972, p. 2415A)

The creativity-centered music appreciation class was designed to encourage students to freely express their own ideas and feelings, to create original musical ideas, and to trust their own decisions and be independent musically. Students' creative thinking in music was measured by a test devised by the researcher. The results showed that students in the creativity-centered class were more creative in music than students in the traditional music appreciation class. Therefore, the results support the notion that music instruction may facilitate students' creative thinking in music.

Third, although teachers may be concerned that creative learning is time-consuming, Torrance (1963) found that many things can be taught more economically by creative learning than by passive learning. He also found that some children can learn much more when learning creatively, while they
learn very little when learning passively. Sherman (1991b) states that creating music is the surest means of getting to know music.

Finally, children are more likely to succeed in their vocations when they develop the creative ability to solve problems that they would face in their daily lives. Also, children's creativity can enable them to work out solutions for problems in our democratic society, where intelligent and imaginative solutions are in great need. Maslow (1976) describes self-actualizing creativity as the potential that every person has to be creative in any area that he/she is interested in: e.g., cooking, teaching, social relationships, and leadership. Therefore, he states that self-actualizing creativity is a defining characteristic of essential humanness.

Musical Creativity Projects in Schools

There have been several organized efforts to develop and improve the musical creativity of children. Among them were two national projects in the 1960's: the Contemporary Music Project (CMP) (Music Educators National Conference, 1966) and the Manhattenville Music Curriculum Program (MMCP) (Biasini, Thomas, & Pogonowski, 1970). These reform movements were triggered by (a) the concerns about the effects a depersonalized, subject-oriented curriculum would have on the student and (b) the influence of humanistic psychology emphasizing development of a self-actualizing person as the goal of education. The aim of the Contemporary Music Project was to increase emphasis on creative musical activities in schools, using contemporary music. The project employed improvisation and composition activities with contemporary composition techniques. The Manhattenville
Music Curriculum Program encouraged children to improvise and compose music. The MMCP project implemented a curriculum based on discovery learning through creative exploration.

Arts Propel (Gardner, 1991), an educational project initiated by Project Zero, also had an emphasis on creating music. Project Zero was established over 20 years ago at Harvard University’s Graduate School of Education to improve the quality of arts education. Currently, Howard Gardner is one of the leaders of Project Zero, and his theory of multiple intelligences (1983) has provided the basis for several projects by Project Zero. Arts Propel was also based on applications of the multiple intelligences theory.

According to Gardner’s multiple intelligences theory, there are seven kinds of intelligence: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal intelligence. Gardner (1983) insists that musical intelligence is discrete from other kinds of intelligence; students’ musical intelligence should not be assessed by an IQ test, which is a measure of linguistic and logical-mathematical intelligence. Many music educators embraced Gardner’s theory partly because it gave music a unique identity in the school curriculum.

Arts Propel is a collaborative music assessment project with high school students. The project employed three principal components for arts education: production, reflection, and perception (Davidson, 1991). Production is essential as the starting point of all musical activities in the projects. Reflection encompasses thinking processes such as planning, designing strategies, making choices, and evaluating results. Perception is the discriminating ability on which production and reflection depend. In Arts
Propel the three components are present in a flexible and fluid relationship to one another. Gardner (1991) states that production, i.e., creating such as composing and improvising, must remain central in arts education. “Such [arts education] processes can improve only if artistic creation remains to be the cornerstone of all pedagogical efforts” (p. 281).

The emphasis on artistic creation is shown in two composition projects conducted in Pittsburgh school districts: Songsmith and First Melody. In the Songsmith project students wrote limericks and set them to music using computers. In the First Melody project students learned how to compose and perform antecedent and consequent phrases playing their compositions on bell sets.

Davidson (1991), who was involved in the composition projects, gives the following suggestions for fostering musical creativity of students. First, a computer can be an effective tool for students’ composing, helping them in notation and play-back of their songs. Second, a classroom environment fostering students’ creative music making is essential for their creative learning. The fostering environment should be designed to (a) allow long-term engagement on significant problems, (b) allow self-paced work, (c) provide open-ended learning situations, (d) allow students to define and frame problems for themselves, (e) develop judgement and creative abilities, not merely accuracy, and (f) allow empowerment of students in real-life tasks.

Special attention should be given to open-ended learning situations in the fostering environmental conditions. As Davidson (1991) states, his interviews with students revealed that many students are involved in composing and arranging as well as performing outside of school; they listen
to music during most of their waking hours and go to sleep listening to their favorite tape or radio station; and the repertory provides models for their melodic composition.

Sherman (1991a) mentions that music class in school has not been the place where students are encouraged to be creative. He writes:

Most, if not all, genuinely creative activity—which leads to knowing in music—takes place outside the aegis of institutionalized learning. The obvious example of this is the secondary school student who prefers to know music on the level of rock through creative involvement outside school rather than to know about music on whatever level it is presented in school. One might opine that had music and music education developed along more creative lines, students would look to the schools as the prime source of musical excitement and imagination. (Sherman, 1991a, p. 8)

Therefore, it seems that the students’ musical experience outside of school is an important part of their music learning.

Music Curriculum and Musical Creativity

Fowler (1991) describes the current state of music education in educational and music educational contexts. The back-to-basics movement during the past three decades has eroded the status of music education in schools. The National Commission on Excellence in Education (1983) stresses the importance of basic courses in education in their report, A Nation at Risk: The Imperative for Educational Reform. President Bush addressed the renewed emphasis on science and mathematics in 1990. As the five basics—English, mathematics, science, social studies, and computer science—were given more focus in schools, music and other arts programs were threatened with elimination from the school curriculum. A report on arts education by the
National Endowment for the Arts, issued in 1988, states plainly: "... basic arts education does not exist in the United States today" (National Endowment for the Arts, 1988, p. 33). In the report, basic arts education was defined as a curriculum that provides all students with general understanding in the arts.

Fowler (1991) also states that music education overly emphasized performance for the musically talented and paid little attention to educating all students. He mentions that an effective way to develop general musical understanding for all students is to include creating music, such as composing, in the music curriculum. He writes:

If we have been negligent, it is in ignoring the model of artist as composer. Being creative is another vibrant way for students to acquire musical understanding. Creating music will be accorded even greater emphasis in the years ahead. (Fowler, 1991, p. 14)

Fowler insists that music educators should recognize that musical creativity is an essential tool to develop musical thought and understanding for every child.

Sherman (1991a) states that creating music is an essential condition for knowing music. He distinguishes between knowing music and knowing about music. Knowing music is that one understands musical elements and their functions, and the musical understanding is expressed through composing and performing, i.e., nonverbally. Knowing about music is that one is knowledgeable about music theory and history, and the musical knowledge is expressed through verbalization, i.e., nonmusically. He affirms that a goal of music education should be to develop students into knowing musicians, and thus students should be involved in creating music. According
to this view, creating music is an important and necessary aspect of the general music curriculum.

National standards for arts education, which were developed recently by National Arts Education Associations (1994), show an awareness of the importance of creating music in the general music curriculum. National standards in music emphasize composing and improvising by including them as major aspects of music that students should achieve. Objectives for composition are, for example, as follows (National Arts Education Associations, 1994):

**Grades K-4:** Students should be able to (a) create and arrange music to accompany readings and dramatizations; (b) create and arrange short songs and instrumental pieces within specified pieces; and (c) use a variety of sound sources when composing.

**Grades 5-8:** Students should be able to compose short pieces within specified guidelines, demonstrating how the elements of music are used to achieve unity and variety, tension and release, and balance.

**Grades 9-12 (Proficient):** Students should be able to compose music in several distinct styles, demonstrating creativity in using the elements of music for expressive effect.

**Grades 9-12 (Advanced):** Students should be able to compose music, demonstrating imagination and technical skill in applying the principles of composition.

While the objectives for composition are set in national standards in music, how best to achieve the objectives is left to music teachers. Kratus (1991) offers suggestions to improve compositional skills of students. He suggests that music teachers show students how to develop and test musical ideas in group composition; the teachers ask questions such as “What sounds should come next?” or “What ending do you prefer?” in order to stimulate
their ideas. Information such as this would be useful for instruction on composition.

However, still more teaching strategies and suggestions for musical creativity are needed to help music teachers implement the national standards on composition. Especially lacking are pedagogies based on systematic research on musical creativity. This study is an effort to provide information on which will help instruction on musical creativity. Below is a brief review of the research related to this study, which led into selecting the dependent and independent variables of this study.

**Research Review for Selecting Variables**

This study chose to use a composition task to measure musical creativity. Kratus (1989) states that creating music is an intentional act. Process of composition allows children to be intentional and reflective because of the opportunities to refine their musical ideas.

Several researchers have examined relationships between musical creativity and musical and nonmusical variables. Many researchers employed improvisation tasks to measure musical creativity (Baltzer, 1988, 1990; Gorder, 1980; Schmidt & Sinor, 1986; Swanner, 1986; Vaughan, 1977; Vaughan & Myers, 1971; Vold, 1986; Webster, 1977, 1979, 1987b, 1988; Wig, 1981). Other researchers used composition tasks to measure musical creativity (Hassler & Feil, 1986; Kratus, 1994; Laycock, 1992; Moore, 1986; Morgan, 1985; Swanwick, 1991; Webster, 1977, 1979). Results on the relationships between musical creativity and selected musical and nonmusical variables are briefly described below.
Laycock (1992) found that musical experiences were the second significant factor related to compositional ability of high school students among five variables: musical experiences, musical self-esteem, musical aptitude, academic grades, and age. (The most significant factor was musical self-esteem.) Significant differences in musical creativity were found between students with musical training and students without musical training (Webster, 1988). However, no significant relationships between musical experiences and musical creativity were found by Gorder (1980).

Only a few researchers have studied relationships between musical self-esteem and musical creativity. It was found that musical self-esteem was the most significant factor related to compositional ability among the five variables examined in Laycock's (1992) study.

Researchers found no significant relationships between musical aptitude and musical creativity measured by improvisation tasks (Baltzer, 1990 [practically no significant relationships]; Gorder, 1980; Schmidt & Sinor, 1986; Swanner, 1986; Vaughan & Myers, 1971; Webster, 1987b). However, it should be noted that Baltzer (1990) found significant negative relationships between tonal and rhythm aptitude and Musical Extensiveness of MCTM-II, and Schmidt and Sinor (1986) found significant negative relationships between rhythm aptitude and Musical Flexibility and Musical Syntax of MCTM-II. Other researchers found significant positive relationships between musical aptitude and musical creativity measured by a composition task (Kratus, 1994; Laycock, 1992).

Several researchers found that musical achievement was significantly related to musical creativity (Baltzer, 1990; Morgan, 1985; Webster, 1977,
1979). Musical creativity was measured by improvisation tasks in Baltzer (1990), by musical problem-solving tasks in Morgan (1985), and by composition, improvisation, and analysis tasks in Webster (1977, 1979). Moreover, Webster (1977, 1979) and Baltzer (1990) showed that musical achievement was the best predictor of musical creativity measured by improvisation tasks. Gorder (1980), however, found no such relationships between the two constructs.

Several researchers found no significant relationships between academic achievement and musical creativity (Baltzer, 1988; Laycock, 1992; Wig, 1981). However, Baltzer (1990) showed that relationships between academic achievement and musical creativity varied according to grade level and musical creativity measures. For example, when using Webster's (1987b) Measure of Creative Thinking in Music-II (MCTM-II), significant relationships were found for third graders; however, no significant relationships were found for first and second graders. Different results were found using Wang's (1985) Measure of Creativity in Sound and Music (MCSM) and the Song Completion Measure (SCM) devised by Baltzer.

Swanner (1986) found no significant relationships between IQ and musical creativity in improvisation. However, Webster (1977, 1979) found significant relationships between IQ and musical creativity in improvisation, while he found no significant relationships between IQ and musical creativity in composition.

Researchers found different results on relationships between gender and musical creativity, using Webster's MCTM-II. Swanner (1986) and Webster (1987b) found no significant relationships between gender and
musical creativity. However, Schmidt and Sinor (1986) and Baltzer (1990) found that boys scored significantly higher on MCTM-II than did girls. As Schmidt and Sinor (1986) state, MCTM-II has test items that favor boys, such as the "space story." No significant relationships between gender and musical creativity were found by Baltzer (1988, 1990) when employing Wang's MCSM and/or his SCM. Webster (1977, 1979) found no significant differences in musical creativity due to gender using composition tasks, while he found significant differences using improvisation tasks (males scored significantly higher than females).

The other musical variables investigated were performance media (voice and instruments) (Webster, 1977, 1979) and performance ability (Wig, 1981). The other nonmusical variables examined were age and/or grade level (Baltzer, 1988, 1990; Kratus, 1986; Laycock, 1992; Morgan, 1985; Swanwick, 1991; Webster, 1977, 1979, 1987b), general creativity (Vaughan, 1977; Vold, 1986; Webster, 1977, 1979), personality traits (Swanner, 1986), reflection/impulsivity (Schmidt & Sinor, 1986), learning styles (concrete/abstract and sequential/random) (Moore, 1986), field dependence/independence (Morgan, 1985), and psychological androgyny (Hassler & Feil, 1986).

As shown above, the results are mostly conflicting, and more research remains to be done. Contradictory results were found on relationships between musical creativity and such variables as musical experiences, musical aptitude, musical achievement, academic achievement, IQ, and gender. Relationships between musical self-esteem and musical creativity of elementary students have not been examined. Few studies have investigated relationships between academic achievement and musical creativity in
composition for elementary students. The contradictory results regarding the relationship of IQ and gender to musical creativity suggest that the means of measuring musical creativity might have affected the results. IQ and gender should be re-examined for their relationships with musical creativity as measured by additional means. Therefore, seven variables were chosen for this study among the musical and nonmusical variables: musical experiences, musical self-esteem, musical aptitude, musical achievement, academic grades, IQ, and gender.

**Upper Elementary Students at Risk**

Upper elementary students were chosen as subjects for this study because they have been in need of new approaches to music learning. There is ample evidence that fifth- and sixth-grade students are at risk in music learning. Asmus (1986) found that students in sixth and seventh grades attributed success and failure in music to ability. That is, they blamed lack of musical ability for their minimal improvement in music which resulted in their not making an effort to achieve in music. Vander Ark, Nolin, and Newman (1980) found that musical attitudes became more negative as the grade level increased from third to sixth grade. Svengalis (1978) questioned why musical attitudes of preadolescent males declined as grade level increased. She found that grade level was significantly negatively related to musical attitude and musical self-concept, which was consistent with previous findings. However, an important finding of her study was that the best predictor of musical attitude was musical self-concept. Therefore, the decline in musical attitudes of preadolescent males is related to their low musical self-esteem. Austin
(1990) found, similarly, that musical self-esteem was significantly related to musical activity participation of fifth- and sixth-grade students. That is, fifth- and sixth-grade students with low musical self-esteem showed low participation in musical activities. The results indicated that fifth- and sixth-grade students appeared to be in great need of effective music instruction.

There have been few studies investigating relationships between musical self-esteem and compositional creativity for upper elementary students. Laycock’s (1992) study examined the relationships with high school students, not with upper elementary students.

**Importance of the Study**

This study is important in four aspects. First, this study reexamined inconsistent findings of previous research, such as follows: (a) relationships between musical creativity and independent variables of musical experiences, musical aptitude, musical achievement, academic achievement, IQ, and, gender; and (b) whether musical aptitude is one of the best predictors of musical creativity or not. Baltzer (1990) found that musical aptitude was one of the best predictors of musical creativity, while Webster (1977) did not find such a result.

Second, there are few studies examining the best predictors of compositional creativity of upper elementary students. Webster (1977, 1979) investigated the best predictors of compositional creativity; however, the subjects were high school students. Kratus (1985) found that the age of the subjects affects their compositional ability. Thus, it may be that results different from Webster’s would be found in this study regarding the best
predictors of musical creativity among upper elementary students. Baltzer (1990) examined the best predictors of improvisational creativity for children in first through third grades. His results showed that the best predictors of improvisational creativity varied depending on which measure was used to assess musical creativity. Therefore, it is interesting to see whether Baltzer's (1990) results are replicated when musical creativity is measured by a composition task.

Third, few researchers examined the role of informal musical experience in musical creativity. Neither Webster (1977, 1979) nor Baltzer (1990), in their studies on the best predictors of musical creativity, included informal musical experience among independent variables. Sherman (1991a) states that students are involved in creative musical activity more often outside school than in school. If the results of this study find that students' musical experience outside school was a good predictor of musical creativity, Sherman's (1991a) notion would be supported by this experimental research and should be suggested as an implication for music instruction.

Finally, the results of this study would be able to suggest implications for teaching and research. For example, suppose the results showed that musical experience and musical achievement were the best predictors of musical creativity in composition. Then, implications for teaching would be that music teachers should encourage students (a) to participate in music performance groups in school and also enjoy making music at home or outside school and (b) to learn musical elements and structure and understand them. Further research would remain to be done on the effects of musical experience
and musical achievement on musical creativity in composition for upper elementary students.

**Purpose of the Study**

The primary purpose of the study was to determine the best predictors of compositional creativity among the selected variables of musical experiences, musical self-esteem, musical aptitude, musical achievement, academic grades, IQ, and gender. This study also examined relationships between compositional creativity and the selected variables.

**Research Questions**

This study sought to answer the following research questions:

1. Are there significant relationships between compositional creativity and selected variables of musical experiences, musical self-esteem, musical aptitude, musical achievement, academic grades, IQ, and gender for upper elementary students?

2. What are the best predictors of compositional creativity among the selected variables for upper elementary students?

3. What is the strongest predictor of compositional creativity among the selected variables for upper elementary students?

**Delimitations**

It was decided that students would be tested individually on the composition task which was designed to measure their musical creativity. Group testing may have hindered students from exploring freely during the
composition testing, and individual students may have been influenced by their peers in music making. Therefore, some adjustment should be made when the findings of this study are applied to classroom music instruction. That is, other variables, such as social skills and classroom environment, may affect creative behavior during music classes.

It should be noted that there may be limitations in generalizing the results of this study due to the particular way in which musical creativity was measured. Baltzer (1990) used three different measures of musical creativity in improvisation and found different results. Webster (1977, 1979) also found different results when he assessed musical creativity with composition, improvisation, and analysis tasks. Other different findings which might have occurred due to different measurements of musical creativity are as shown in Chapter II.

Definition of Musical Creativity

Torrance (1988), a noted creativity researcher, states, “Creativity defies precise definition. . . . However, if we are to study it, we must have some approximate definition” (p. 43). It has been noted that there is no one definition upon which all researchers agree. This disagreement among researchers is partially due to the elusive nature of creativity and also researchers’ different orientations toward creativity. Some researchers see creativity as a process, while others see it as a product. Torrance chooses a process definition of creativity for research purposes. He describes creative thinking as the process of sensing problems, making guesses and hypotheses for the problems, evaluating and testing these guesses and hypotheses.
possibly revising and retesting them, and finally communicating the results (Torrance, 1988).

The definition by Torrance reflects Wallas’ (1926) four stages of creative processes: Preparation, Incubation, Illumination, and Verification. In Preparation the creator first becomes aware of the problems at hand. In Incubation the creator may get involved in subconscious imagery or part-time thinking of the problems at hand. Divergent thinking plays a crucial role in the Incubation stage. Illumination is so-called “Eureka!”; solutions to problems may come suddenly and provide the creator with a flood of energy that drives thinking ahead to the first stages of completion. Convergent thinking becomes important in this stage. In Verification the creator refines the creative product.

A product-oriented definition is suggested by Amabile (1982). She states that since any identification of a creative thought process must finally depend on the final product of the process, an operational definition of creativity is better made on the basis of the creative product. Amabile’s definition of creativity is: “A product or response is creative to the extent that appropriate observers independently agree it is creative” (Amabile, 1982, p. 1001). The appropriate observers are experts in the area of the created product. Amabile’s definition is called “consensus definition,” because whether a product is creative or not is judged by the consensus of experts.

Music education researchers define musical creativity on the basis of the definitions of general creativity. Like Torrance, Webster sees musical creativity as a process. Webster (1989) defines creative thinking in music as
... a dynamic process of alternation between convergent and divergent musical thinking, moving stages [of creative processes] over time, enabled by certain skills (both innate and learned) and by certain conditions, and resulting in a final product (p. 66).

This definition is based on his research (Webster, 1977) in developing a measure of musical creativity. Webster incorporated the ideas of Guilford and Torrance on creative thinking as convergent and divergent thinking processes. He also identified the enabling skills and enabling conditions by reviewing a great number of studies on creativity and musical creativity. His research on identification of musical creativity was extended to developing “a conceptual model of creative thinking in music” (see Webster, 1987a, p. 162 for the model).

Weisberg (1988) views creativity as problem-solving ability. As he states, until recently, researchers held the “genius” view of creativity, i.e., only great works were labelled as creative. However, all solutions to problems are creative so long as they are novel and meet the standards of the problem. Therefore, as Weisberg writes, the capacity to think creatively is not the exotic trait or skill envisioned by the genius view, but a basic human capacity. Russ (1993) states that although researchers suggest a variety of definitions of creativity, the definitions have two common criteria for a product to be judged as creative: “(a) unique, original, novel; (b) good, that is, adaptive, useful, aesthetically pleasing, according to the standards of the particular discipline” (p. 1). She adds that novelty is not sufficient; the product should be good and appropriate for the domain being considered (e.g., aesthetically pleasing for an artistic work).
Some music education researchers define musical creativity as a problem solving ability in music (e.g., Laycock, 1992; Vold, 1986). They analyzed solutions to a given musical problem, i.e., the created product such as composition and improvisation. Webster (1992) notes that the creative product is a clue to mental process of creative thinking.

In this study, musical creativity was defined on the basis of the ideas of product-orientation and problem-solving ability. Musical creativity and other related terms were defined in this study as follows:

**Musical creativity:** the ability to solve musical problems in original and coherent ways.

**Improvisation:** spontaneously-made music which is original and coherent, but may not be repeatable by the music maker.

**Improvisational creativity:** the ability to create music spontaneously which is original and coherent, but may not be repeatable by the music maker.

**Composition:** reflectively-made music which is original, coherent, and repeatable by the music maker.

**Compositional creativity:** the ability to create music reflectively which is original, coherent, and repeatable by the music maker.

It should be noted that the defined aspects of compositional creativity are reflected in the composition dimensions used to assess students’ compositional creativity in this study, which are described in Chapter III. Finally, certain terms are interchangeably used in this dissertation: musical creativity in composition and compositional creativity, and musical creativity in improvisation and improvisational creativity.
CHAPTER II

REVIEW OF THE LITERATURE

Creativity research has been conducted focusing on creative product, creative process, creative person, and creative environment. This study examines the best predictors of composition as a creative product. Therefore, the review of the literature focuses on creative product only.

This chapter consists of two sections. The first section is a review of selected research on musical creativity in general. The second section, relationships between musical creativity and selected variables, presents a review of research directly related to this study. It has been suggested that students may show different levels of musical creativity according to the means of measuring musical creativity, such as improvisation, composition, and analysis (Hassler & Feil, 1986; Webster, 1977). Webster (1992) states that the difference between composition and improvisation is that while composing one has more time to revise the created product, while improvisation is a spontaneous product with no time for revision. It is likely that the aspects, abilities, and skills of musical creativity may differ between composition and improvisation. Therefore, the review is in two parts: compositional creativity and improvisational creativity. In each of the parts, studies with elementary students are presented first, and then those with high school students are described.
Musical Creativity

Compositional Creativity

Compositional creativity has been assessed by judges' ratings for musical characteristics of compositions. Researchers analyzed musical characteristics of children's compositions to examine children's musical thinking (Doig, 1941, 1942a, 1942b; Kratus, 1985, 1986) and to identify sequences of children's musical development (Swanwick & Tillman, 1986). Doig's (1941, 1942a, 1942b) studies have historical importance in musical creativity research, since Doig was a pioneer in reporting the results in such a systematic way. Her three studies investigated musical characteristics of children's group compositions set on a given text and on a given subject and their solutions to given musical problems. Doig found that younger children (6 years old) showed more freedom and flexibility in the use of melody, rhythm, intervals, non-harmonic tones, and meter than did older children (10 years old). The results of her three studies indicated that children showed age differences in the development of musical concepts.

Swanwick and Tillman (1986) analyzed compositions of over 700 children to identify sequences of their musical development. They analyzed musical characteristics of the compositions and categorized these characteristics by applying Piaget's concepts of assimilation and accommodation. They found eight stages of children's musical development, i.e., Sensory, Manipulative, Personal Expressiveness, Vernacular, Speculative, Idiomatic, Symbolic, and Systematic. The stages were illustrated in a spiral form, implying flexibility of the stages (see Swanwick & Tillman, 1986, p. 331 for the spiral model). Children 10 to 12 years of age are in Speculative stage.
The children engage in deliberate repetition of patterns for imaginative deviation and attempt to introduce a deviation that does not quite work. Children 13 and 14 years of age belong to the “Idiomatic” stage, in which they seek to enter recognizable musical communities, and thus they show strong preference for popular music such as rock and roll, rap, and reggae style music. Swanwick and Tillman suggested that their findings regarding children’s musical development have implications for music curriculum planning.

To find out why some children are successful in composition and others are not, Kratus (1990) examined compositional strategies used by high-success and low-success children in their compositions. High-success children were defined as those who had high ratings on composition, which were rated for Craftsmanship and Replication. Low-success children were those who had low ratings on composition. The compositional strategies investigated were stepping and skipping movement; changing pitch or rhythm of pattern; transposing pattern; extending pattern; repeating pitch, rhythm, or whole song; speaking; and silence. It was found that low-success students continued exploring new musical ideas with stepping and skipping movement through to the end of the composition time. (Ten minutes were given for composing.) In contrast, high-success students rarely explored after the first four minutes. Rather, for the remainder of the time, they developed their musical ideas with changing pitch/rhythm and extending patterns and repeated their songs in part or as a whole. Kratus stated that the success of the compositional product appears to depend on the nature of the compositional process. Therefore, as he suggested, music instruction on
composition should focus on teaching how to compose rather than what to compose.

The effect of compositional experiences on composition was examined by Reinhardt (1990). She focused on the effect of repeated compositional opportunities on tonal structure of fifth-grade students' compositions. The individual students attended the composition sessions once a week for five consecutive weeks. They were given a maximum of 10 minutes for the composition task with an electronic keyboard. Compositions resulting from the first, third, and fifth sessions were analyzed for components of tonal structure (i.e., pitch range, degree of tonality, establishment of tonal patterns, and tonal pattern development) and replication of song. Three independent judges and the investigator rated the compositions. The results showed that there were no significant changes in the tonal structure of compositions during the five sessions. However, a significant difference was found in the ability of students to replicate their compositions between the first and fifth sessions. Therefore, the results indicated that the effect of repeated compositional opportunities was on their ability to better conserve their musical ideas and come up with a more complete composition.

**Improvisational Creativity**

Other researchers have developed measures of musical creativity using improvisation tasks, six of which appear in the music education literature. They are Vaughan's Music Creativity Test (1977), Gorder's Measure of Musical Divergent Production (1980), Vold's Measure of Musical Problem Solving (1986), Webster's Measure of Creative Thinking in Music-Version I
Webster's (1987b) Measure of Creative Thinking in Music-Version II (MCTM-II) is a well-established measure of improvisational creativity. In MCTM-II, children's improvisation is rated for four dimensions: Musical Fluency, Musical Flexibility, Musical Originality, and Musical Syntax. These dimensions are so-called global dimensions, distinguished from the dimensions of musical characteristics examined in composition tasks. Hickey and Webster's (1994) comparison of the rating scales showed that both dimensions of global and musical characteristics produced high interjudge reliabilities. Global dimensions were, for example, craftsmanship, creativity, and overall aesthetic value. Musical characteristics dimensions were such as tonal cohesiveness and metric cohesiveness. The two kinds of dimensions were paired with implicit and explicit definitions: Implicit-Global, Implicit-Musical characteristics, Explicit-Global, and Explicit-Musical characteristics. It was found that higher interjudge reliabilities were found for Implicit-Global and Implicit-Musical characteristics.

Reinhardt (1990), on the other hand, studied children's improvisations for their musical characteristics. The purpose of her study was to determine whether there were significant differences in the use of rhythmic elements among 3-, 4-, and 5-year old children. The results showed that (a) virtually all children were able to maintain a steady beat and steady meter; and (b) the use
of different durations and rhythm patterns increased with age. Therefore, Reinhardt suggested that children’s rhythmic sense in improvisation is developmental.

Azzara (1993) investigated (a) the effects of instruction in improvisation on instrumental music achievement and (b) the effects of music aptitude levels on instrumental music achievement. Subjects were fifth-grade instrumental (wind and percussion) students. Students’ instrumental music achievement was measured by their performance of three études: student-prepared étude, teacher-assisted étude, and sight-read étude. Students’ musical aptitude was measured by Gordon’s Musical Aptitude Profile. It was found that (a) students receiving instruction in improvisation were significantly higher in instrumental music achievement than students receiving no such instruction; and (b) students with high music aptitude were significantly higher in instrumental music achievement than students with low and moderate music aptitude.

Relationships Between Musical Creativity and Selected Variables

This section presents detailed reviews of studies on relationships between musical creativity and the selected variables, i.e., musical experiences, musical self-esteem, musical aptitude, musical achievement, academic achievement, IQ and gender. The review focuses first on compositional creativity and then on improvisational creativity, which enables comparison of the research findings on relationships of compositional creativity with those on relationships of improvisational creativity. While Webster’s (1987) results indicated that there is no developmental pattern in children’s musical
creativity, Swanwick’s (1991) and Kratus’ (1989) results showed correlation between age and compositional ability. Therefore, the results of this study will be also compared with those of previous studies on high school students’ compositional creativity in terms of similarities and differences in their relationships.

**Compositional Creativity and Selected Variables**

**Elementary Students**

Several researchers examined relationships between children’s compositional creativity and other variables such as musical aptitude and age (Hassler & Feil, 1986; Kratus, 1994; Swanwick, 1991). Kratus (1994) investigated relationships among musical aptitude, compositional process, and compositional product. In his study, he hypothesized that in contrast to the previous finding that musical aptitude is not significantly related to musical creativity in improvisation, musical aptitude might be significantly related to musical creativity in composition. Subjects were 40 nine-year old children. Gordon’s (1982) Intermediate Measures of Music Audiation was administered to measure their musical aptitude. The children were tested individually with a composition task. Each child was asked to make up a song on a synthesizer within 10 minutes. Two judges rated the composed songs on three major dimensions: (a) Cohesiveness—Tonal cohesiveness and metric cohesiveness; (b) Pattern use—developed melodic pattern, repeated melodic pattern, developed rhythmic pattern, and repeated rhythmic pattern; and (c) Extensiveness—pitch range and length of song.
The following results were found: (a) Audiation was significantly positively related to tonal and metric cohesiveness and significantly negatively related to pitch range. Audiation tended to be negatively related to length of song, although not significant. (b) Audiation was not significantly related to any melodic and rhythmic patterns, except for developed rhythmic pattern. (c) The compositional process was significantly related to the compositional product in terms of cohesiveness, pattern use, and extensiveness.

There is a trend that some researchers view compositional creativity of children as developmental; i.e., children's ability to compose develops to higher levels as they get older. Swanwick, a leading figure of this theory, identified the sequences of children's musical development (Swanwick & Tillman, 1986). Swanwick (1991) compared the sequences of children's musical development and the four dimensions of musical criticism, which, he hypothesized, are parallel. He randomly selected compositions by children aged 4 to 15 from the pool of over 600 compositions collected for his previous study. Two judges rated the compositions on the four dimensions of musical criticism, i.e., control of sonorities, expressive characterization, structural relationships, and personal evaluation. The results showed that there was a correlation between age and composition scores on the four criterion dimensions.

Kratus (1985, 1986) examined how children use melodic and rhythmic motives by analyzing songs by children. Eighty children aged 5, 7, 9, 11, and 13 were studied with 16 children in each age group. Children were tested individually on a composition task using a hand-held keyboard instrument.
The child was asked to make up a song that "sounds good to him/her." Two rules were given for the composition task: (a) start with the pitches $C-D-E$, labeled 1–2–3 on the instrument; and (b) use only the white keys of the keyboard. Five types of motives were examined: melodic repetition, melodic development in the same direction, melodic development in a different direction, rhythmic repetition, and rhythmic development. Two judges analyzed the songs independently. Interjudge reliabilities for the motives ranged from .55 to .88.

The following results were found. In terms of use of melodic motives, melodic repetition was quite common in songs from all age groups; there were no significant differences in the use of melodic repetition among the age groups. However, there were significant differences in the use of melodic development in both the same and different directions between 5- and 11-year-olds; 11-year-olds used significantly more melodic development than 5-year-olds. In terms of use of rhythmic motives, unlike melodic repetition, rhythmic repetition was not a common feature of younger children's songs; 11-year-olds used significantly more rhythmic repetition than 5-year-olds. Rhythmic development was very rare for all age groups. In terms of use of both melodic and rhythmic motives, children's use of both melodic and rhythmic motives (their repetition and development combined) increased consistently between the ages of 5 and 11. The results indicated that children's use of melodic and rhythmic motives showed a developmental pattern of musical understanding; i.e., children developed melodic concepts faster than rhythmic concepts.
Kratus pointed out an interesting finding that 13-year-olds used fewer melodic and rhythmic motives than did 11-year-olds. He hypothesized that the decline in 13-year-olds' use of motives might be due to the content of their general music program, which focused on music theory, while music classes of 11-year-olds' focused on musical performance. Interestingly, however, music educators and researchers have noticed that sixth- and seventh-grade students are at risk in music learning (e.g., Asmus, 1986) and their musical attitudes become negative (e.g., Nolin & Vander Ark, 1977; Svengalis, 1978).

Hassler and Feil (1986) employed both composition and improvisation tasks to examine their relationships with other variables. The variables examined included psychological androgyne (showing how much a person has both male and female characteristics) and hemispheric dominance. Subjects were 30 five-year old children. The results showed the following: (a) Boys' psychological androgyne was significantly related to their compositional ability, but not to improvisational ability; however, girls' psychological androgyne was not significantly related to their compositional ability nor to their improvisational ability. (b) There were significant differences between children's compositional ability and improvisational ability.

**High School Students**

Several researchers examined relationships between high school students' compositional creativity and other variables (Laycock, 1992; Moore, 1986; Morgan, 1985; Webster, 1977, 1979). Webster (1977, 1979)
investigated relationships between musical creativity in composition, improvisation, and analysis and several variables, using his Measure of Creative Thinking in Music-Version I (MCTM-I). MCTM-I assessed musical creativity on four dimensions: Musical Extensiveness, Musical Flexibility, Musical Originality, and Musical Elaboration. The variables examined were musical achievement, musical aptitude, general creativity, IQ, gender, age, performance medium, and piano lesson background. Musical achievement was measured by Colwell's (1968) Music Achievement Test (MAT), Levels 3 and 4; music aptitude by Gordon's (1988) Musical Aptitude Profile (MAP), Tonal Imagery; and general creativity by Torrance Tests of Creative Thinking (TTCT), Figural and Verbal forms (1974). The details on compositional creativity are presented here, and those on improvisational creativity are described later.

Subjects, who were high school instrumental and vocal students, were given a set of take-home composition tasks. The composition task had a musical frame, i.e., an outline of a short musical phrase for triangle and some other instrument or vocal part. The students were asked to compose music using the musical frame. Their compositional creativity was assessed by judges' ratings for four dimensions: Fluency, Flexibility, Elaboration, and Originality. The following results were found: (a) Musical achievement was significantly related to compositional creativity and was the best single predictor of compositional creativity. (b) Musical aptitude, IQ, and gender were not significantly related to compositional creativity. (c) Age, grade level, performance medium, and piano lesson background were not significantly
related to compositional creativity. (d) Compositional creativity had little relationship to improvisational creativity.

Relationships between high school students' compositional ability and their musical experience, musical self-esteem, musical aptitude, academic grades, and age were investigated by Laycock (1992). Compositional ability represented musical problem-solving ability. Subjects were 56 high school students aged 15 to 18. Students' compositional ability was measured through a composition task, which was rated for tonality, meter, motives, phrases, cohesiveness, originality, complexity, replication, pitch range, and length of song. Their musical self-esteem was measured by Schmitt's (1979) Self-Esteem of Musical Ability (SEMA); musical aptitude by Gordon's MAP; and musical experience by an investigator-devised Musical Experience Questionnaire. The students were tested individually on the composition task. Each student was asked to compose a song on acoustic piano within a maximum of 20 minutes.

The results showed that musical self-esteem and musical experiences were most strongly related to compositional ability; next most strongly related to compositional creativity was musical aptitude; and academic grades and age were least related to compositional ability. Details of significant relationships are as follows: (a) Musical self-esteem was significantly related to most of the 14 musical characteristics examined. (b) Musical experience was significantly related to tonality, motives, phrasing, cohesiveness, originality, complexity, and replication. (c) Tonal aptitude was significantly related to tonality, meter, phrasing, originality, complexity, and replication.
Unexpectedly, rhythm aptitude was not significantly related to the use of rhythmic motives.

Moore (1986) conducted research on relationships between compositional ability and learning styles. Moore viewed compositional ability as involving intuitive and rational musical abilities. He identified four learning styles: Concrete-Sequential, Concrete-Random, Abstract-Sequential, and Abstract-Random. The learning styles were examined with four perceptual modalities: visualization, written words, listening, and activity. Subjects were 64 high school instrumental students in the eleventh and twelfth grades. They were administered a test for musical composition devised by the investigator and also two learning style inventories, i.e., the Gregorc Style Delineator (Gregorc, 1982) and Edmonds Learning Style Identification Exercise (Reinert, 1976). The results were as follows: (a) Intuitive musical ability was negatively related to Abstract-Random. (b) Rational musical ability tended to be negatively related to Abstract-Random and positively related to Concrete-Sequential, although the relationships were not significant. (c) Abstract-Random learning style was negatively related to perceptual modes of written words and activity.

Morgan (1985) investigated relationships between musical problem-solving ability and musical and non-musical variables of high school instrumental students. Musical problem-solving ability was measured by a researcher-devised Musical Problems Test (MPT). The MPT consisted of three tasks: (a) learning an unfamiliar piece, (b) transposing, and (c) creating an ending. Since Morgan’s MPT had a composition task, i.e., “creating an ending,” Morgan’s study is reviewed here for its findings on relationships of
compositional creativity. The musical variables examined were musical achievement and performance ability, which were measured by Colwell's MAT and Watkins-Farnum Performance Scale (Watkins & Farnum, 1954), respectively. The non-musical variables were field dependence/independence and creative personality traits, which were measured by the Hidden Figures Test (Morgan, 1985) and Group Inventory for Finding Interests (Davis & Rimm, 1979), respectively. The results were as follows: (a) Musical problem-solving ability was significantly related to musical achievement and performance ability, but not to field dependence/independence and creative personality traits. Furthermore, the same result was found for the composition task of MTP. (b) Eleventh graders did significantly better on the musical problem-solving task than ninety graders did.

Summary

The findings on relationships between compositional creativity and the selected variables are summarized as follows:

1. Compositional creativity was significantly related to musical achievement and musical self-esteem.
2. Compositional creativity was not significantly related to academic achievement, IQ, and gender.
3. Inconsistent results were found on relationships of compositional creativity with musical experiences and musical aptitude.
Improvisational Creativity and Selected Variables

Elementary Students

Several researchers have examined relationships between elementary children's improvisational creativity and other variables (Baltzer, 1988, 1990; Schmidt & Sinor, 1986; Swanner, 1986; Vaughan, 1977; Vold, 1986; Webster, 1987b, 1988).

In order to show that his Measure of Creative Thinking in Music-Version II (MCTM-II) is a reliable and valid measure of musical creativity designed for children, Webster (1987b) investigated relationships between musical creativity and selected variables using his test. Webster's MCTM-II had been revised from his earlier MCTM-I. MCTM-II consists of three sections: exploration, application, and synthesis. The exploration section helps children become familiar with the instruments used in MCTM-II, i.e., piano, nerf ball, and temple blocks. For example, children are asked to improvise the sound of rain falling into a bucket using temple blocks. In the application section, children engage in more challenging tasks by creating music using each of the instruments singly. One of the application tasks is improvising "frog music" on the piano with a nerf ball. The synthesis section is for free composition. That is, children are asked to compose their own piece with a beginning, middle, and end using all the instruments.

MCTM-II measures children's musical creativity through judges' ratings for four dimensions: Musical Extensiveness, Musical Flexibility, Musical Originality, and Musical Syntax. (Musical Elaboration in MCTM-I was replaced with Musical Syntax in MCTM-II.) The selected variables examined were musical aptitude, teacher ratings of student variables, grade
level, and gender. Subjects were first-, second-, and third-grade children. Webster (1987b) measured musical aptitude with Gordon’s Primary Measures of Music Audiation (PMMA) (1979). Teacher ratings of student behaviors were recorded on an investigator-designed Teacher Rating Sheet.

The results of Webster’s (1987b) study were as follows: (a) Musical aptitude had little relationship with musical creativity; the correlation coefficients between the two ranged from .00 to .24. (b) There were no significant differences in musical creativity among grade levels and genders. (c) Teacher ratings of student behaviors were generally not significantly related to musical creativity. Therefore, Webster stated that musical creativity is a discrete ability from musical aptitude as measured by PMMA, and that musical creativity of children is not likely to be developmental, since there were no significant differences in musical creativity by grade level. The finding of no significant relationship between teacher ratings of student behaviors and musical creativity was suggested as evidence for inverse validity of MCTM-II.

Webster (1988) was interested in determining whether there are significant differences in musical creativity between students with musical training and students with no musical training. In the study, students with musical training were those who had at least two years of Dalcroze and/or Suzuki training. Musical creativity was measured by Webster’s MCTM-II. Webster found the following: (a) students with musical training scored significantly higher in Musical Syntax than did those with no musical training; and (b) students with no musical training scored significantly higher in Musical Originality than did those with musical training.
Relationships among musical creativity, musical aptitude, and the cognitive style of reflection/impulsivity were examined by Schmidt and Sinor (1986). Subjects were second-grade children. At the beginning of the study, the Matching Familiar Figures (Kagan, 1964) test was administered to identify reflective and impulsive children. Reflective children were those who spent a long time in solving problems and produced only a few errors in the MFF test. Impulsive children were those who spent a little time in solving problems and produced a lot of errors in the MFF test. Only those children identified as reflective and impulsive were selected for this study. Musical creativity was measured by Webster’s MCTM-II, and musical aptitude by Gordon’s PMMA. Musical creativity was rated for the four dimensions of MCTM-II.

The following results were found: (a) Musical aptitude was not significantly related to musical creativity, except that rhythm aptitude was significantly related to Musical Flexibility and Musical Syntax. (b) Reflection/impulsivity was not significantly related to musical creativity. (c) Reflection/impulsivity was significantly related to tonal aptitude, but not to rhythm aptitude. (d) Significant differences in musical creativity between males and females were found. (e) High intercorrelations were found among the four dimensions of MCTM-II. As Schmidt and Sinor mentioned, the finding of high intercorrelations might be either because Webster’s MCTM-II measures a single aspect of musical creativity in general or because children’s abilities in the four dimensions of musical creativity develop in similar ways.

Swanner’s (1986) study investigated relationships between children’s musical creativity and their personality traits as well as other variables. Other variables examined were musical aptitude, motivation, IQ, and gender.
Subjects were 69 third-grade children. Musical creativity was measured by Webster's MCTM-II, personality traits by Cattell's (1966) Early School Personality Questionnaire, and musical aptitude by Gordon's PMMA. IQ scores were obtained from school records. The results showed the following: (a) Such personality traits as excitability, aggression, independence, anxiety, self-confidence, curiosity, and imagination were significantly related to musical creativity. (b) Imagination, curiosity, and anxiety were the best predictors of musical creativity among several personality traits, accounting for 29% of the variance in MCTM-II score. (c) Musical aptitude, motivation, IQ, and gender were not significantly related to musical creativity.

Baltzer (1988) investigated relationships between children's musical creativity and several other variables as a part of his study on validation of Wang's musical creativity test. Wang (1985) developed the Measures of Creativity in Sound and Music (MCSM) on the basis of Torrance's creativity test. MCSM measures children's musical creativity with judges' ratings on Fluency and Imagination. The several variables investigated were academic achievement, gender, age, and teacher ratings of general and musical creativity. Subjects were 32 second-grade children, with 16 boys and 16 girls. Their musical creativity was measured by Wang's MCSM. The classroom teachers and music specialist rated on children's general creativity and musical creativity, respectively, using investigator-devised teacher rating forms. The following results were found: (a) The interjudge reliabilities of MCSM were .99 for Fluency and .90 for Imagination. (b) Academic achievement was not significantly related to musical creativity. (c) There were no significant
differences in musical creativity due to gender and age in months (within the second-grade sample).

Relationships between musical creativity and several variables were examined by Baltzer (1990), using three measures of musical creativity. The three measures were Webster's MCTM-II, Wang's MCSM, and a researcher-devised Song Completion Measure (SCM). The several variables investigated were musical aptitude, musical achievement, academic achievement, grade level, age, and gender. Subjects were 90 first-, second-, and third-grade children. They were administered the three measures of musical creativity, i.e., MCTM-II, MCSM, and SCM. Their musical aptitude was measured by Gordon's Intermediate Measures of Music Audiation (IMMA); and musical achievement by a researcher-devised Music Achievement Measure.

Baltzer found the following: (a) Musical achievement was more strongly related to musical creativity than was music aptitude; the correlation coefficient ranged from .32 to .40. (b) Musical achievement was the best predictor of musical creativity. (c) Relationships between musical aptitude and musical creativity were moderately low, although significant. (d) Relationships between academic achievement and musical creativity varied by grade level and measure of musical creativity. (e) Relationships between age/grade level and musical creativity were moderately low, although significant. (f) There were no gender differences for MCSM and SCM; however, males scored significantly higher than did females on three of the four MCTM-II subscores (i.e., Musical Extensiveness, Musical Flexibility, and Musical Originality) and MCTM-II Composite.
Vaughan (1977) conducted five studies to validate her measure of musical creativity, the Musical Creativity Test (MCT), and examined relationships between musical creativity measured by MCT and other variables. A summary of the five studies conducted in 1970, 1971, 1972, 1974, and 1976 were reported in Vaughan (1977). The Musical Creativity Test, which was designed for children, assessed musical creativity on four dimensions: Fluency, Rhythmic Security, Ideation, and Synthesis. The variables examined were musical aptitude and general creativity, which were measured by Bentley's Measures of Musical Abilities and Torrance Tests of Creative Thinking (TTCT), respectively. The results of the studies were not consistent. No significant relationships between musical aptitude and musical creativity were found in the 1970, 1974, and 1976 studies, while significant relationships between the two were found in the 1972 study. In the 1971 study, musical aptitude was significantly related only to Fluency and Rhythmic Security subscores of MCT. Findings relating to general creativity were also conflicting. No significant relationships between general creativity and musical creativity were found in the 1970, 1972, 1974, and 1976 studies, while significant relationships between the two were found in the 1971 study.

Vold (1986) examined relationships among musical creativity, general creativity, and teacher ratings of creativity as a part of her development of a measure of musical creativity. The measure developed by Vold was the Measure of Musical Problem Solving (MMPS), which was designed for kindergarten children. MMPS assessed musical creativity on three dimensions: Divergent thinking (fluency and flexibility), Sensitivity (to the expressive import of sound), and Convergent thinking. Subjects were 30
kindergarten children. MMPS and TTCT were administered to measure children’s musical creativity and general creativity, respectively. The results showed the following: (a) significant relationships were found between musical creativity and general creativity; and (b) weaker positive relationships were found between musical creativity and teacher ratings of creativity and between general creativity and teacher ratings of creativity.

**High School Students**

Relationships between high school students’ improvisational creativity and other variables were examined by Webster (1977, 1979) and Gorder (1980). Webster’s (1977, 1979) study was described in detail earlier. Therefore, only the results on improvisational creativity are presented here: (a) Musical achievement was significantly related to improvisational creativity and was the best single predictor of improvisational creativity (as well as of compositional creativity). (b) Musical aptitude was significantly related to improvisational creativity. (c) TTCT-Figural creativity was significantly related to improvisational creativity, while TTCT-Verbal creativity was not. (d) Age, performance medium, and piano lesson background were not significantly related to improvisational creativity. (e) An interesting result was that significant relationships were found between improvisation and analysis and between composition and analysis; however, no significant relationships were found between improvisation and composition. This suggests that abilities in improvisation and composition develop independently.

Gorder (1980) investigated relationships between musical creativity and other variables of high school students, as a part of an examination on
constructs of his measure of musical creativity. Gorder viewed musical creativity as divergent production ability in music. Thus, he called his measure Measures of Musical Divergent Production (MMDP). A unique feature of MMDP is that MMDP has a scoring dimension of Musical Quality in addition to Musical Extensiveness, Musical Flexibility, Musical Originality, and Musical Elaboration. Musical aptitude was measured by Seashore Measures of Musical Talent (Seashore, 1919) and Drake Musical Aptitude Tests (Drake, 1954); and musical achievement by Colwell’s Music Achievement Test, Level 2, Feeling for Tonal Center. It was found that (a) musical aptitude, musical achievement, musical experience and training, and age were not significantly related to musical creativity; and (b) IQ was significantly related to only Musical Quality score of MMDP. As Gorder noted, the results should be interpreted with caution because musical divergent production ability is not the totality of musical creativity.

Relationships between high school students’ improvisational ability and their academic grades and performance ability were examined by Wig (1981). In his study, subjects were sixth- and eighth-grade band students. Their improvisational ability was measured by a Measure of Melodic Improvisation Ability (MMIA), which was devised by the investigator. On the MMIA students were asked to improvise a theme and vary it by retrograde, inversion, retrograde-inversion, or embellishment. Their improvisational ability was evaluated on a 5-point rating scale for twelve musical dimensions. Students were pre-tested on improvisation with MMIA and then were given instruction in compositional strategies for 7 weeks. After the 7 weeks of instruction, students were post-tested on improvisation with MMIA. Three
judges rated the improvisations. It was found that (a) improvisation scores improved significantly ($p < .001$) after the instruction in compositional strategies, and (b) neither academic grades nor performance ability were related to improvisational ability. Therefore, the results indicated that the teaching strategies employed in the study were effective in facilitating improvisation ability of high school band students.

Summary

Most of the findings on the relationships between improvisational creativity and other variables were inconsistent. Possible reasons for the inconsistent results are that (a) the studies used different measures of musical creativity, assessing different aspects of musical creativity; and (b) the reliability and/or validity of the measures of musical creativity were not satisfactory enough to produce convincing results. As Baltzer (1990) found, different measures of musical creativity produced varied relationships between musical creativity and other variables (e.g., academic achievement and gender). Therefore, only the findings of the studies conducted with Webster’s MCTM-II, which is a well-established measure of musical creativity for children, are summarized below (Baltzer, 1990; Schmidt & Sinor, 1986; Swanner, 1986; Webster, 1987b, 1988):

1. Improvisational creativity was significantly related to musical achievement.
2. Improvisational creativity was not significantly related to musical aptitude and IQ.
3. Inconsistent results were found on relationships of improvisational creativity with academic achievement and gender.

4. There were significant differences in improvisational creativity (Musical Originality and Musical Syntax) between students with musical training and students with no musical training.

The Best Predictors of Musical Creativity

A few researchers (Baltzer, 1990; Webster, 1977, 1979) examined the best predictors of musical creativity. The study by Baltzer (1990) was described in detail earlier, and thus only information on the best predictors of musical creativity is described here. Baltzer (1990) employed multiple regression analysis to determine the best predictors of musical creativity of children. Musical creativity was assessed by three measures employing improvisation tasks: Webster’s MCTM-II, Wang’s MCSM, and Baltzer’s SCM. MCTM-II assessed musical creativity for four dimensions: Musical Extensiveness, Musical Flexibility, Musical Originality, and Musical Syntax. MCSM had two scoring dimensions: Fluency and Imagination. In SCM, students were asked to improvise original songs and song endings. The independent variables examined were musical aptitude, musical achievement, academic achievement, age, grade level, and gender. Musical aptitude was measured by Gordon’s IMMA, and musical achievement by a researcher-devised Music Achievement Measure. Subjects were first- through third-grade students.

The results regarding MCTM-II showed the following: (a) The best combination of predictors of musical creativity was musical achievement and
gender, which accounted for 16% of the variance in MCTM-II composite scores. (b) The best combination of predictors of Musical Extensiveness (ME) was musical aptitude, musical achievement and gender, which accounted for 18% of the variance in ME scores of MCTM-II. (c) The best combination of predictors of Musical Flexibility (MF) was musical achievement and gender, which accounted for 21% of the variance in MF scores of MCTM-II. (d) The best combination of predictors of Musical Originality (MO) was musical achievement and gender, which accounted for 17% of the variance in MO scores of MCTM-II. (e) The best single predictor of Musical Syntax (MS) was musical achievement, which accounted for 14% of the variance in MS scores of MCTM-II. In Baltzer (1990), boys scored significantly higher on ME, MF, MO, and Composite of MCTM-II than girls.

The results regarding MCSM were as follows: (a) the best combination of predictors of Fluency was musical achievement, age, and academic achievement, which accounted for 31% of the variance in MCSM-Fluency scores; and (b) the best combination of predictors of Imagination was age and academic achievement, which accounted for 19% of the variance in MCSM-Imagination scores.

The best predictor of SCM was musical achievement, which accounted for 13% of the variance in SCM scores.

Webster (1977, 1979) investigated the best predictors of musical creativity of high school students. His study was explained in detail earlier, and thus only information on the best predictors of musical creativity is described here. He used multiple regression analysis to predict three modes of musical creativity: composition, improvisation, and analysis. Compositional
creativity was measured by take-home composition tasks. Improvisational creativity was measured by the earlier version of his musical creativity measure, i.e., MCTM-I. Analytical creativity was measured by three tasks analyzing a short melody, duets, and a complete composition. The independent variables investigated were musical aptitude, musical achievement, general creativity (figural and verbal), piano lesson background, age, grade level, and gender. Musical aptitude was measured by Gordon’s MAP, musical achievement by Colwell’s MAT, and general creativity by TTCT.

The results were as follows: (a) The best single predictor of compositional creativity was musical achievement, which accounted for 7% of the variance in composition scores. (b) The best combination of predictors of improvisational creativity was musical achievement and figural creativity, which accounted for 28% of the variance in MCTM-I composite scores. (c) The best combination of predictors of analytical creativity was musical achievement and figural creativity, which accounted for 30% of the variance in total scores of analytical tasks. Therefore, Webster concluded that musical achievement was the strongest predictor of musical creativity in all three modes.

**Summary**

The findings on the best predictors of musical creativity are summarized in the following:
1. The best single predictor of compositional creativity was musical achievement.

2. The strongest predictor of improvisational creativity was musical achievement.

3. The best predictors of musical creativity found in Baltzer (1990) were musical achievement, musical aptitude, academic achievement, age, and/or gender, while the best predictors found in Webster (1977, 1979) were musical achievement and figural creativity.

4. Inconsistent results were found regarding musical aptitude. Baltzer (1990) found that musical aptitude was one of the best predictors of musical creativity, however Webster (1977, 1979) did not find such a result.

Overall Summary

Most of the previous research found that musical achievement was significantly related to musical creativity; only Gorder (1980) was exceptional. Relationships between musical aptitude and musical creativity are controversial. In general, researchers found significant relationships between musical aptitude and musical creativity using a composition task. However, they found no significant relationships between the two constructs using improvisation tasks. Most of the studies found that IQ was not significantly related to musical creativity, except Webster (1977), who found significant relationships between improvisational creativity and IQ. Formal musical experience, academic grades, and gender yielded inconsistent findings in terms of their relationships with musical creativity and thus should be studied.
further. Only one study (Laycock, 1992) examined relationships between musical self-esteem and musical creativity; therefore, further study is needed in this area. Finally, no research was conducted on the role of informal musical experience in musical creativity.
CHAPTER III
PROCEDURES FOR DATA COLLECTION

This chapter presents descriptions of the data collection procedures and the analysis of the compositions and the data. There are five parts in the chapter, which describe the following: (a) subjects—descriptions of the subjects, the school, and their school music program; (b) instrumentation—the Musical Experiences Questionnaire, the Self-Esteem of Musical Ability questionnaire, the Musical Aptitude Profile-Melody and Meter subtests, and the Musical Achievement Test-Test 1; (c) data collection—musical creativity and independent variables; (d) analysis of the compositions—descriptions of the composition dimensions, definitions of the dimensions, and judge ratings of the compositions; and (e) analysis of the data.

Subjects

An inner city public elementary school located in an urban area of Ohio was chosen for the study. The excellent teaching of the school music teacher and her willingness to cooperate with the research project were the primary reasons for this choice. The teacher has taught music for 20 years in elementary schools and currently is music director of a children’s chorus. She uses Orff-Schulwerk pedagogy in her general music classes. Having been acquainted with the music teacher for more than a year, the investigator was convinced that the music teacher would be willing to cooperate with this research project.
The music teacher introduced the investigator to the principal, vice-principal, and curriculum director at the school. The investigator was identified as a doctoral candidate at a university near the elementary school, working on her dissertation on musical creativity. Seeking authorization for the research, the investigator described what the research was about and what possible implications the research results might have.

The music teacher then introduced the investigator to the school’s fifth- and sixth-grade classroom teachers. The research was described to the classroom teachers. Their cooperation was essential for the research, since students would be tested during general classes. This procedure was suggested by the music teacher. If only music classes were used, time limitations would not allow for timely data collection. All of the classroom teachers agreed to cooperate fully with the research.

A quiet room was reserved for the research until the research was finished. An Orff alto xylophone, the musical instrument to be used for the composition testing, was borrowed from the music classroom.

Fifth- and sixth-grade students participated in this study. The number of subjects proposed for this study was 70. In order to have meaningful results from multiple regression analysis with the 7 independent variables proposed in this study, it was necessary to have approximately 70 subjects; i.e., about 10 subjects for each independent variable for multiple regression analysis (Thorndike, 1978).

The ages of the fifth-grade students ranged from 10 years, 2 months to 12 years, 1 month. The ages of the sixth-grade students ranged from 11 years to 14 years, 3 months.
Description of the School

The public elementary school participating in the research was located in an urban area of Ohio. The school has educated the children of the community for over 100 years. Ninety-nine percent of the students are African-American and were mostly from low socio-economic status. The total enrollment at the school was about 580 students. Students from kindergarten through sixth grade attend the school, and there were three classes for each grade. The number of students in each class was between 25 and 30.

Description of the School Music Program

The music program at the school consisted of general music and choir. The general music class was a requirement for all students in kindergarten through sixth grade. The music teacher saw students once a week for 35 minutes. The music program focused on vocal music and did not provide instrumental programs such as school band and orchestra. The school choir was composed of 40 students who were chosen by audition based on ability. The music director of the choir, who was also the general music teacher, saw the students twice a week. Choir members were from fourth through sixth grades.

The music curriculum of the general music class was based on developing concepts of musical elements such as texture, pitch, rhythm, style, timbre, and dynamics. The teacher employed aspects of the Orff-Schulwerk pedagogy in her instruction. She taught students music through singing, movement, and speech rhythms and used Orff bar-instruments, Orff percussions, and recorders for instrumental ensembles. Her instruction also
included music listening and literacy. However, students were not given the opportunity to compose or improvise in class.

**Instrumentation**

Four instruments were used for this study: (a) Musical Experiences Questionnaire, (b) the Self-Esteem of Musical Ability measure, (c) the Musical Aptitude Profile, Melody and Meter subtests, and (d) the Music Achievement Test, Test 1.

**Musical Experiences Questionnaire**

The Musical Experiences Questionnaire was devised by the researcher (See Appendix A). The questionnaire consists of two parts: formal musical experience and informal musical experience. The first part on formal musical experience was based on the student questionnaire used in Laycock’s (1992) study. The first part asked students two questions. The first question was whether they have ever participated in any musical activities, such as school band, school orchestra, school choir, church choir, private lessons, and/or other musical activities; and, if any, how many years they had participated in the musical activity. Therefore, students were asked about participation in six kinds of musical activity and the minimum score could be 0 [zero] when they did not participate in any of them. The second question was whether they were currently participating in any of the musical activities listed above.

The second part on informal musical experience was generated on the basis of the following assumptions: (a) upper elementary students engage in musical activities outside of school and church; and (b) if these informal
musical activities were not counted as part of their musical experiences. Important information may be lost. This part asked students what musical activities they had done with their family, friends, or on their own. The kinds of informal musical activities listed in the question were as follows: watching MTV, listening to records, CDs, or tapes, listening to the radio, singing, making up a song, playing musical instruments, dancing, and going to concerts. One point was assigned to each kind of the informal musical experience when responded with “Yes.” Therefore, total scores for the informal musical experience could range from 0 to 9.

**Self-Esteem of Musical Ability**

The Self-Esteem of Musical Ability (SEMA) measure was developed by Schmitt (1979) (See Appendix B). SEMA measures self-esteem of musical ability for children aged 10 to 15. The items ask children their opinions on their own self-confidence in music, musical skills and abilities, and the influence of significant others (e.g., parents, friends, teachers) on their musical ability. An example of the items on self-confidence in music is, “I expect a lot of myself in music.” An example of the items on musical skills and abilities is, “I know music well enough to help others learn it.” And an example of the items on influence of significant others is, “I practice more because my teacher thinks I can do well in music.” Schmitt found the three major factors of self-esteem of musical ability through factor analysis. It should be noticed, however, that some of the items reflect more than one factor. SEMA has 4 choices; i.e., strongly disagree, disagree, agree, and strongly agree.
To compute test-retest reliability of SEMA, Schmitt (1979) administered it to 83 seventh-grade students with a time interval of 3 days between the two administrations. The test-retest reliability of SEMA was .91. To assess construct validity of SEMA, she administered SEMA to 173 students ages 10 and 15 and also asked them to describe their subjective opinion on their musical ability. Three independent judges’ ratings of the students’ subjective descriptions on their musical ability and the SEMA scores were correlated. The interjudge reliability of the judges’ ratings ranged from .76 to .86. The Spearman rank correlation between the ratings of the subjective descriptions and the SEMA scores was .73. The Pearson product-moment correlation between the two was .71.

Austin (1990) used SEMA in his study with upper elementary students and found that the reliability of SEMA was .94. Laycock (1992) also employed the SEMA measure in his study with high school students and found the split-halves reliability to be .93. Therefore, the research by Schmitt, Austin, and Laycock suggests that the Self-Esteem of Musical Ability measure is a reliable tool to measure musical self-esteem.

**Musical Aptitude Profile-Melody & Meter**

Gordon (1988) developed the Musical Aptitude Profile (MAP) to measure stabilized music aptitude for students in fourth through twelfth grades in 1965. Gordon (1987) distinguished between developmental music aptitude and stabilized music aptitude. Developmental music aptitude is a level of one’s musical potential which fluctuates from birth to age nine due to the continuous interactions between innate musical ability and musical
environment. However, stabilized music aptitude is a level of one's musical potential that is attained at age nine and not further influenced by musical environment.

The Musical Aptitude Profile consists of three main tests: Tonal Imagery, Rhythm Imagery, and Musical Sensitivity. Tonal Imagery has Melody and Harmony subtests. Rhythm Imagery has Tempo and Meter subtests. Musical Sensitivity has Phrasing, Balance, and Style subtests. Thus, MAP has seven subtests. The number of items in each subtest for Tonal Imagery and Rhythm Imagery is 40 and that for Musical Sensitivity is 30. Each subtest of MAP takes 15 minutes to administer. It is recommended that three 50-minute sessions are set for administering of the three main tests of MAP in order to secure time for distributing and collecting test sheets and giving instructions.

The Musical Aptitude Profile has several notable features. First, the items in the Tonal Imagery and Rhythm Imagery tests are paired, such as 1A and 1B, 2A and 2B, and so on. The paired items have the same first phrase. That phrasing was necessary because when the items were not paired, students got tired by processing too many musical phrases (i.e., 80 phrases) for a short period of time (i.e., 15 minutes) in a subtest. Second, the Tonal Imagery and Rhythm Imagery tests have in-doubt response among the three choices for the items. When they are not sure of a correct answer, students are asked not to guess, but to choose the in-doubt response. Gordon (1987) found that the in-doubt response increased reliability of the Musical Aptitude Profile. Third, the musical instruments used for MAP are string instruments, i.e., violin and cello. Fourth, the Musical Sensitivity test is a music preference test, in
which students are asked to choose the option which makes better musical sense. The inclusion of the music preference test indicates that Gordon embraces both atomistic and Gestalt views on music aptitude. Finally, Gordon states that the Musical Sensitivity test assesses one’s sensitivity to musical expression and interpretation and also indirectly assesses one’s creative and improvisational aptitudes in music.

As he was aware of the school situation in which music teachers and researchers experience difficulties in arranging three testing sessions to administer all subtests of MAP, Gordon (1988) made the following recommendation. When there is not sufficient time to administer all the seven subtests of MAP, a music teacher may administer only the Melody and the Meter subtests instead. Therefore, the researcher decided to use the Melody and Meter subtests of MAP for this research.

In the Melody subtest, two musical phrases are played. Then, students are asked to decide whether the second phrase is the same as the first phrase or different from it. The second phrase always has extra notes added to the first phrase. Thus, students are asked to remove the extra notes while listening, and compare the two phrases in terms of their basic outlines. If students are in doubt whether the answer is L (Like) or D (Different), they are asked not to guess, but to fill in the oval in the question-mark column.

In the Meter subtest, two musical phrases are played. Then, students are asked to decide whether they are played in the same rhythm or in different rhythms. The recorded instruction explains that when the phrases are played in different rhythms, it will be because the second phrase is accented differently from the first phrase. As in the Melody subtest, when students are
not sure whether the answer is S (Same) or D (Different), they are encouraged to fill in the oval in the question-mark column.

Split-halves reliabilities of MAP, corrected by the Spearman-Brown formula, were reported in the MAP manual (Gordon, 1988). The split-halves reliabilities for all grades (i.e., grades 4 through 12) ranged from .80 to .92 for Tonal Imagery, from .82 to .91 for Rhythm Imagery, from .84 to .90 for Musical Sensitivity, and from .90 to .96 for Composite. The split-halves reliabilities for the Melody and Meter subtests were .75 and .70 for fifth grade, respectively, and .76 and .75 for sixth grade, respectively.

The most appropriate kind of validity for a music aptitude test is longitudinal predictive validity. The longitudinal predictive validity can be obtained by correlating students' musical aptitude measured before music instruction and their musical achievement measured after a long period of instruction. Three longitudinal predictive validities of MAP were reported in the MAP manual (Gordon, 1988). The first one was from a three-year study on prediction of musical success after three years of instruction. The second one was from a two-year study on the diagnostic validity of MAP. And the third one was from a five-year study with culturally-disadvantaged students. The three longitudinal predictive studies and their results are described below.

In the three-year study (Gordon, 1967), 241 students were studied. The Musical Aptitude Profile was administered to the students before music instruction was given. Then the students were given instrumental music instruction for three years. At the end of the three-year period, students' musical achievement was measured by their performance of etudes and the
Iowa Tests of Musical Literacy. The results showed that the predictive validity of MAP was .75.

The two-year study (Gordon, 1970) was to examine diagnostic validity of MAP. One of the important purposes of MAP is to diagnose musical strengths and weaknesses of each student so that the teacher can adapt instruction to the individual differences among students. Thus, the research question was to determine whether students achieve significantly higher when the teacher knows the students’ MAP scores and uses the scores in his/her instruction than when he/she does not. Subjects were divided into experimental and control groups. Seven teachers taught students of both groups, but they were informed of the MAP scores of only the experimental group students. It was found that the predictive validity of MAP was .60 for the experimental group and .58 for the control group. Therefore, MAP scores predicted musical success for both the experimental and control group students, regardless of instructional mode.

Finally, the five-year study with culturally-disadvantaged and culturally-heterogeneous students (Gordon, 1975) found that, regardless of their cultural backgrounds, students who score above average or high on MAP will achieve more in music than students who score below average or low on MAP. Therefore, the result indicated that the Musical Aptitude Profile can predict students’ musical success, regardless of their cultural backgrounds.
Music Achievement Test-Test 1

Colwell developed the Music Achievement Test (MAT) for students in third grade through college level (Colwell, 1969). The Music Achievement Test has four tests with varying difficulties and contents: Test 1, Test 2, Test 3, and Test 4. Descriptions of the four tests of MAT are shown below.

MAT, Test 1 consists of three subtests: Pitch Discrimination, Interval Discrimination, and Meter Discrimination. The number of items in each of the three subtests is 25, 28, and 15, respectively. Thus, the total number of items on the MAT, Test 1 is 68. In both Pitch Discrimination and Interval Discrimination each question is worth 1 point, and in Meter Discrimination each question is worth 2 points. Thus, the total number of points for the MAT, Test 1 is 83. The recording time of the MAT, Test 1 is approximately 18 minutes. However, it is suggested in the manual that extra time is necessary to answer procedural questions and distribute and collect the answer sheets. In the Pitch Discrimination subtest students are asked which of two or three tones is higher. In Interval Discrimination students are asked whether the pattern they hear is a step-by-step motion or a skipping motion. And in Meter Discrimination students are asked whether the pattern they hear is duple meter or triple meter.

The MAT, Test 2 consists of three parts: Major-Minor Mode Discrimination, Feeling for Tonal Center, and Auditory-Visual Discrimination. The MAT, Test 3 consists of Tonal Memory, Melody Recognition, Pitch Recognition, and Instrument Recognition. The four parts of MAT, Test 4 are Musical Style, Auditory-Visual Discrimination, Chord Recognition, and Cadence Recognition. The total number of points for the MAT tests is 108 for
Test 2, 75 for Test 3, and 89 for Test 4. The MAT manual presents percentile ranks and standard scores for raw scores. The standard scores have the mean of 500 with a range of scores generally from 200 to 800.

Among the four tests of MAT, Test 1 was chosen for the research. One of the reasons is the content validity of MAT, Test 1 for this research, which was confirmed by the music teacher of the students. After examining the four tests of MAT, the music teacher recommended the MAT, Test 1 for measuring her students’ musical achievement. She stated that the students learned the subject matter covered in the MAT, Test 1 in class.

Reliabilities of the Music Achievement Test were reported in the MAT, Interpretive Manual (Colwell, 1969). Split-halves reliability of the MAT, Test 1 is .94. The reliability of the MAT, Test 1, as computed by Kuder-Richardson 21, is .88. The reliability of the MAT, Test 1 for fifth grade is .84 and that of sixth grade is .87.

In summary, the Music Achievement Test, Test 1 was chosen for the research because of the following reasons: (a) the music teacher verified that the MAT, Test 1 is appropriate for measuring the upper elementary students’ musical achievement; (b) MAT has high reliability; and (c) MAT takes about 30 minutes to administer, which is reasonable for this testing situation.

Data Collection

This section describes the following: (a) preparations for data collection, (b) the composition testing, (c) the four group sessions for the questionnaires and music aptitude and achievement tests, and (d) data collection of academic grades, IQ, and gender. The preparations included
getting approval for the research from the Board of Education for the school district and distributing and collecting the parental permission form. The part on the composition testing describes the testing room setting and procedure of the composition testing, including instruction on the composition task in detail.

**Preparations**

Although the principal, the music teacher, and the classroom teachers of the students approved conducting the research with the students at the public elementary school, an official approval from the Board of Education for the school district had to be obtained before starting the data collection. To get the official approval, the academic advisor of the investigator sent a letter of recommendation for the research to the Director of Curriculum and Instruction at the Board of Education and a copy of the letter to the principal, curriculum specialist, and the music teacher at the school. After receiving the letter of recommendation, the Board of Education gave official approval to conduct the research at the school.

The permission letters were distributed by the fifth- and sixth-grade classroom teachers to their students a week before the data collection. The permission letter consisted of a cover letter and permission slip (see Appendix C). The cover letter described that (a) the purpose of the research is to improve students' musical creativity in composition; (b) the child will be asked to make up a song on a musical instrument, take music tests, and fill out questionnaires; and (c) the test results of the child will be kept entirely confidential. The investigator promised in the letter that the child's test results
would be reported to the parent. The permission slip, which is the bottom portion of the cover letter, asked the parent to circle "Yes" if he/she agreed to the child's participation in the research, or to circle "No" if he/she did not. The parent was also asked to write the child's birthday in the blank provided.

The permission slips were returned to the classroom teacher or the music teacher within a week. In total, 67 students returned the permission slips with 32 being fifth-grade students and 35 being sixth-grade students. The response rate for return of the permission slips was approximately 50%. In some classes nearly 90% of the students returned the permission slip, while in other classes only a few students returned it.

The data collection for the research took one month, beginning January 10, 1994 and ending February 9, 1994. The permission letters were distributed to fifth- and sixth-grade students one week before the data collection period. The permission letters were returned to the music teacher or classroom teachers of the students within a week. The music teacher made a schedule for the composition testing of the students to be conducted on an individual basis. Questionnaires for musical experience and musical self-esteem and tests for musical aptitude and musical achievement were administered to the students in four group sessions. Those students who missed any of the tests finished the test(s) at the end of the testing period.

**Composition Testing**

Musical creativity of the fifth- and sixth-grade students was measured by a composition task. Below are descriptions of the testing room setting.
procedure of the composition task, and rationale for the instructions on the composition task.

**Testing room**

The testing room was located close to the fifth- and sixth-grade classrooms. Thus, its location made it easier for the students to come to the testing room while classes were going on in all classrooms. Also, the location made it easier for the researcher to remind classroom teachers of the schedule for composition testing when they forgot to send a student to the testing room at the scheduled time. The testing room size was 17 by 14 feet. The room was quiet with two doors to the corridor, which were closed during the testing. Thus, it was less likely that the student would be disturbed by noise from the outside. The temperature in the testing room was warm. When the room became uncomfortably warm, the windows were opened to adjust the temperature.

The testing room was set up with an Orff alto xylophone, a video camera, an alarm clock, an instruction sheet (see Figure 1). Two notices requesting no interruption were posted on the doors. Close to the back wall, two desks were moved together, and the Orff alto-xylophone, alarm clock, and instruction sheet were placed on them. An Orff alto-xylophone with good sound quality was borrowed from the music classroom at the school. The pitches of the xylophone ranged from C to a". The alarm clock helped the student keep track of the composition time, which was a maximum of 10 minutes. The instruction sheet reminded the student of the requirements of
Figure 1. The testing room set-up for the composition testing.

the composition task. A SONY Video Hi8 Handycam CCD-TR 200 and Hi8 8mm videotape were used to record the compositions. The Hi8 video camera and videotape ensured high quality of recording. The video camera was set up 12 feet from the student's seat and faced the xylophone in a diagonal direction from the left-hand side of the xylophone.

An Orff alto xylophone was chosen for the composition testing for several reasons. First, the music teacher was an Orff specialist and used Orff instruments in her music instruction; the students played the instruments often
during music class. It was important to choose a musical instrument familiar to the students so that the performance medium used did not inhibit students' ability to create music. Secondly, among the Orff instruments, bar instruments have both tonal and rhythmic elements, but non-pitched percussion instruments do not. Thirdly, metallophones produce long, sustained notes, and, if a song is played with a metallophone, it is difficult to perceive the rhythm of the song clearly. However, xylophones produce short, clear-cut sounds, and it is relatively easy to perceive the melody and rhythm of a song. Finally, an Orff alto xylophone has the range of a singing voice, while an Orff soprano xylophone is an octave higher in range. Children better perceive sounds in the range of the singing voice than sounds in other ranges. Therefore, an Orff alto xylophone was decided to be most appropriate for this study.

**Procedure of the Composition Testing**

The researcher chose to test students individually rather than in a small group. When students compose in a small group, they may not be able to fully concentrate on their composition task. They may be interrupted or influenced by the others in the group while composing. Data collected in that way would not reflect each individual's compositional creativity.

Schedules for the composition testing were arranged class by class in order to minimize interruption of class activities. The schedules were made based on the permission slips that students returned to school. Each composition session was set for 30 minutes. The composition testing started at 9:30 a.m. every day during the data collection period and ended at 2:30
p.m. An average of 8 students per day were scheduled for the testing. The testing schedule was interrupted for 4 days by inclement weather. Testing the subjects for the composition testing took 3 weeks. The relatively short period of time for the composition testing is attributed to the full cooperation of both the music teacher and the classroom teachers for the research.

The classroom teachers were given the schedules for the composition testing one or two days in advance. Every morning during the data collection period, they were reminded which students were scheduled for the testing in order to prevent any delay. The schedules were followed fairly well, as each student came to the testing room on time.

When the student came to the testing room, the researcher asked him/her to have a seat on a chair in front of the Orff xylophone. The researcher sat and recorded student’s name, class, grade level, identification number and gender. Then the researcher introduced herself to make the student feel comfortable with the researcher. The researcher thought that if the student did not feel comfortable in the testing situation, his/her creative ability in music may be inhibited.

The researcher asked a few introductory questions before giving instructions on the composition task. These included: “Have you ever made up a song before? How did you make up the song? The introductory questions were designed to help the student prepare for the composition task.

Then, the researcher gave the following instructions on the composition task:
I am going to ask you to make up a song on this xylophone. You have 10 minutes to practice and make up a song on this xylophone. I am setting this alarm clock to 10 minutes. [While the student was watching her, the researcher set the alarm clock to 10 minutes so that he/she was aware of how much time remained.] After 10 minutes, the alarm clock will ring. Then, you should stop making up your song. However, 10 minutes should be long enough for you to make up a song. When you make up a song, do not make the length of your song very long. You should make the length of the song 3 minutes or less than 3 minutes.

When you finish making up a song, you tell me that you are finished. If you finish before 10 minutes, that’s all right. You simply tell me that you are finished. Then, play your song two times exactly the same. Remember, you will have to play your song two times exactly the same. For example, suppose your song is like this: [the researcher sang the melody shown below, using a hand motion to describe the arch-shape melodic line].

![Melody Example](image)

The first playing of your song will be: [the researcher sang the melody again with the same hand motion]. And the second playing of your song should be exactly the same with the first playing. Thus, the second playing of your song will be: [the researcher sang the melody once again with the same hand motion in order to make clear that the first and second playing should be exactly the same]. While you are playing your song two times, I will videotape your playing.

Lastly, but most importantly, be creative in your composing. That is, make up an original song, a song that is so new that nobody ever heard it before. Any questions?
Rationale for Instructions on the Composition Task

Several decisions had to be made regarding the instructions on the composition task. Those decisions were as follows: (a) a maximum of 10 minutes was given to the students to practice and make up a song; (b) length of the song was limited to 3 minutes or less; (c) the student was told repeatedly that he/she should play the song two times exactly the same; (d) the student was encouraged to be creative in composing; and (e) the composition was videotaped rather than recorded on a cassette-tape recorder. Rationale for the decisions are described below.

First, a maximum of 10 minutes was successfully used in previous studies using a composition task to measure elementary students’ musical creativity. Kratus (1985, 1989, 1990, 1994) gave elementary children 10 minutes to practice and make up a song on a musical instrument. On the other hand, high school students in Laycock’s (1992) study were given 20 minutes to practice and make up a song. It might be appropriate to give high school students more than 10 minutes for making up a song, because they have a longer attention span than do elementary students. The researcher had found in her previous work with fourth-grade students’ compositions (Auh, 1993) that most fourth-grade students had finished making up a song in less than 10 minutes. Therefore, it was decided that a maximum of 10 minutes was appropriate for the upper elementary students to make up a song on a musical instrument.

Second, the student was instructed to limit the length of the song to 3 minutes or less, because the researcher’s previous experience with children’s compositions suggested that a song longer than 3 minutes tends to be
exploratory and cannot be replicated by the student composer. When a student makes up an exploratory song, he/she does not seem to have a clear musical idea, but seems to try a series of incoherent ideas. Moreover, the creative aspects that judges look for in rating the song would be found most often in a song of 3 minutes or less. A longer song does not indicate a higher level of creativity. Therefore, it was not necessary to have the student continue more than 3 minutes.

Third, it was necessary to emphasize repeatedly that the student should play the song two times exactly the same. In a previous research project (Auh, 1993), the researcher had noticed that the students had not been very aware of the given requirement of repeating their song exactly the same. Thus, in this study, she repeated the instruction on playing the song two times exactly the same. As Kratus (1989) states, "... if a composition cannot be repeated by its composer, then it cannot be defined as a [compositional] product" (p. 95).

Fourth, students were encouraged to be creative in composing. If an instruction can make a difference in students' creative product, the instruction should be given to the student. There is no reason that the student should not be encouraged to be creative in the composition testing, which measures their musical creativity. To make an analogy with writing, writers might write better by understanding what they are asked to write; a student may make up a more creative song by understanding that it is important to be creative.

Finally, there were two advantages of videotaping when compared to cassette-tape recording. One advantage was that, when the student moved the sticks fast on the xylophone, judges could more easily distinguish on
videotape whether the movement is a physical error or an intentional act. The other was that judges could more easily recognize students’ mistakes through their facial expression and behavior. When students made a mistake then tried again, often they did it without making any sounds. If judges rated compositions with a cassette-tape recording, they often would have misunderstood the student’s second trial as a part of the original song. Judges would have counted it in their ratings for Repetition of Song, which was one of the five dimensions for the composition ratings. (More on the dimensions for the composition ratings is described in next section: analysis of the compositions.) It should be noted that the student was asked to repeat the song to see whether a clear musical idea could be reproduced later, not to assess performance ability. Therefore, students were allowed to stop and start again without penalty if they were aware of mistakes.

After giving the instructions, the researcher started the alarm clock, which counted down from 10 minutes to 0 seconds. Then she sat down on a chair in a corner of the room and waited quietly until the student finished composing. As expected, most students finished composing before the maximum 10 minutes expired. When those students stated that they were finished, the researcher asked them, “Are you sure that you can play your song two times exactly the same?” The question was to check whether the students had a specific song in mind and were ready to replicate it, or if they were still composing or trying out ideas. Some students answered, “Yes.” Then those students were allowed to go on and play their song two times. But many of them looked unsure and so went back to practicing. The students were asked to stop composing if they were still playing on the
xylophone after 10 minutes. When the students finished making up a song, they were asked to play the song two times exactly the same. While the students were playing the song two times, the researcher videotaped the performance.

**Musical Experiences, Musical Self-Esteem, Musical Aptitude, and Musical Achievement**

When composition testing was completed, four group sessions were arranged to measure students' musical experiences, musical self-esteem, musical aptitude, and musical achievement. The four group sessions were as follows:

- **Session 1:** The Musical Aptitude Profile, Melody subtest
- **Session 2:** The Musical Achievement Test, Test 1
- **Session 3:** The Musical Experiences Questionnaire and the Self-Esteem of Musical Ability questionnaire
- **Session 4:** The Musical Aptitude Profile, Meter subtest

Each session took an average of 3 days to administer the test(s) to all students. That is, the students took the tests with an interval of 3 days between each session. The tests were ordered to minimize student fatigue resulting from taking a series of tests over a few weeks. Each session was 35 minutes. Between sessions the researcher placed answer sheets and pencils on the desks. The room used for the composition testing was also used for group sessions; it could accommodate 13 students.

Schedules for the four group sessions were given to classroom teachers one or two days in advance. Schedules were made class by class to reduce
interruption of classes as much as possible. Testing all students in the four
group sessions took 10 days. Several students missed some of the tests
because (a) they were absent on the day of the test; (b) a few were called to
counselling due to behavioral problems; (c) they became frustrated or bored
with the testing and thus did not finish it; or (d) they forgot to come to the
testing room at the scheduled time. They were rescheduled to finish the test(s)
that they missed.

A Realistic SCR-48 cassette tape player was used to play the
recordings of the Musical Aptitude Profile, Melody and Meter subtests and
the Musical Achievement Test, Test 1. The tests were given in accordance
with the instructions in the manuals (Colwell, 1968; Gordon, 1988). Important
instructions which the student needed to be reminded of while taking the
tests were written on the blackboard. The instructions were: (a) name and
class; (b) the arrangement of the items, i.e., from left to right, or from top to
bottom, in order to prevent misplacing answers; (c) use of the “in-doubt”
response, when students are not sure of the right answer; and (d) meaning of
the choices of the items, e.g., (1) (2) (?), in order to help students to recall the
meanings of the choices.

**Academic Grades, IQ, and Gender**

The nonmusic variables examined in this study were academic grades,
IQ, and gender. Academic grades of the students were obtained from the
classroom teachers. The teachers provided the students’ most recent
academic grades, which were for seven subjects: reading, math, language,
spelling, social studies, science, and health. The grading system used for the
academic grades was A, B, C, D, and E. For analysis of the data of the academic grades, the grades of A, B, C, D, and E were converted to 4, 3, 2, 1, and 0, respectively, and the converted grades for the seven subjects were totalled. Thus, the possible range for the academic grades is 0 to 28.

The students' IQ scores were obtained after getting approval from the school principal for access to personal folders of the students. The personal folders were located in the main office at the school. The test used to measure the students' IQ was the Cognitive Skill Index (CSI), which is an age-normed measure of general academic aptitude (Keyer & Sweetland, 1994). The CSI has a mean of 100 and a standard deviation of 16. Unfortunately, scores for 16 students were missing from their file. Thus, the total number of students whose IQ scores were available was 51. Due to the considerable number of missing IQ scores, IQ scores were not used in stepwise multiple regression analysis. IQ scores were, however, used to compute relationships between musical creativity and the independent variables using Pearson product-moment correlations.

Gender was one of the independent variables in this study. The students' gender was recorded by the researcher during the composition testing.

Analysis of the Compositions

This section explains the five dimensions chosen for the composition ratings, the definitions of the dimensions, and the rating procedure of the
compositions. Previous studies that used one or more of the five dimensions are cited to describe how the five dimensions were chosen.

Composition Dimensions

Rationale for the Dimensions

Five dimensions were chosen for the composition ratings in this study: Craftsmanship, Musical Syntax, Musical Originality, Musical Sensitivity, and Repetition of Song. The dimensions were chosen on the basis of review of the literature on creativity in general and musical creativity.

Russ (1993) states that although there have been disagreements in identifying criteria for judging whether a product is creative or not, two characteristics have been repeatedly cited for the criteria:

For a product to be judged as creative, it must be: (a) unique, original, novel; (b) good, that is, adaptive, useful, aesthetically pleasing, according to the standards of the particular discipline. (p. 1)

Therefore, Russ identifies original ideas and good techniques as two common criteria for judging creativity in a product.

Amabile (1982), in a study to find a reliable method for assessing creativity, used three categories for judging artistic creativity: Creativity Cluster, Technical Cluster, and Aesthetic Judgment. The Creativity Cluster consists of creativity, novel use of materials, novel idea, effort evident, variation in shapes, detail, and complexity. The Technical Cluster is comprised of technical goodness, organization, neatness, planning, representationalism, symmetry, and expression of meaning. The criteria Amabile lists for Aesthetic Judgment are liking, aesthetic appeal, and likelihood of display. Therefore, the
Creativity Cluster and Technical Cluster represent the two common criteria of originality and technical goodness for judging creativity in a product.

On the other hand, Amabile's categories also include Aesthetic Judgment, because the categories evaluate artistic creativity. As a result, it seemed appropriate to include a category of aesthetic sensitivity in music (or musical sensitivity) in the criteria for judging musical creativity in the present study. Therefore, originality, technical goodness, and musical sensitivity were identified as the criteria for judging musical creativity.

The specific dimensions of criteria for judging musical creativity in composition were chosen by reviewing the studies on musical creativity. Webster (1987a) developed a Conceptual Model of Creative Thinking in Music, which showed several aspects involved in creative thinking in music. In this model, Webster identified two aspects which might be related to musical creativity: skills and conditions. Skills consisted of the following factors: (a) musical aptitudes—extensiveness, flexibility, originality, tonal imagery, rhythm imagery, and musical syntax; (b) conceptual understanding; (c) craftsmanship; and (d) aesthetic sensitivity. Conditions consisted of the following factors: (a) motivation, (b) subconscious imagery, (c) environment, and (d) personality. In comparing Webster's categories with Amabile's, the skills factors of originality, craftsmanship and musical syntax, and aesthetic sensitivity are similar to the categories of originality, technical goodness, and aesthetic sensitivity, respectively. Therefore, the four dimensions of Craftsmanship, Musical Syntax, Musical Originality, and Musical Sensitivity (or Aesthetic Sensitivity in Music) were chosen for the composition ratings in this study.
Webster's (1987a) definitions of the four dimensions are shown below [italics added for emphasis]:

Craftsmanship: the ability to apply factual knowledge in the service of a complex task; technical mastery.

Musical Syntax: the ability to shape musical expressions in a logical manner according to patterns of musical repetition, contrast, and sequencing.

Originality: uniqueness of musical expression, not necessarily associated with internal logic (syntax).

Aesthetic Sensitivity: the shaping of sound structures to capture the deepest levels of feelingful response, achieved over the full length of a musical work.

Researchers (Kratus, 1990; Laycock, 1992) studying children’s compositions to assess their musical creativity included Repetition of Song in the dimensions for ratings because they were measuring musical creativity in composition, not in improvisation. When a child improvises, the child makes music spontaneously and does not have to reproduce the music at a later time. Conversely, when a child composes, the child needs to have a clear musical idea and should be able to reproduce it at a later time (Kratus, 1989; Webster, 1987a). It has been known that although some children cannot read or write musical notation, they can compose. Thus, researchers have avoided musical notation either by having the child repeat the song or by using computer and Musical Instrument Digital Interface (MIDI) to record the child's composition and retrieve it at a later time. Therefore, Repetition of Song (or Replication of Song) was included in the dimensions for the composition ratings in this study. Kratus (1990) defines Replication of Song as follows:
Replication of Song: the degree to which the repeated song is the same as the original. \((7 = \text{the repetition of the song is the same as the original, } 1 = \text{none of the repetition of the song is the same as the original})\)

**Descriptions of the Dimensions**

The dimension Craftsmanship was employed in a study on children's compositional strategies (Kratus, 1990). Kratus defines Craftsmanship as follows (p. 4):

Craftsmanship: \([7 = \text{the highest score, } 1 = \text{the lowest score}]\)

- \(7 = \text{the song forms a cohesive whole and makes interesting use of melodic and rhythmic patterns.}\)
- \(1 = \text{the song appears to have no structure, with seemingly random pitches and rhythmic durations.}\)

Kratus (1994) used dimensions called Tonal Cohesiveness and Metric Cohesiveness. Although they have different names from Craftsmanship, they refer to similar aspects as Craftsmanship. Both Craftsmanship and Tonal and Metric Cohesiveness refer to technical mastery in tonal and rhythmic elements: i.e., the cohesiveness of song and use of melodic and rhythmic patterns in Craftsmanship, and tonal center(s) and rhythmic regularity in Tonal and Metric Cohesiveness. Below are definitions of Tonal Cohesiveness and Metric Cohesiveness (Kratus, 1994, p. 17):

**Tonal Cohesiveness:** the degree to which the pitches in a composition are constructed around a tonal center or centers. \((7 = \text{very strong tonal cohesiveness, } 1 = \text{no tonal cohesiveness})\)

**Metric Cohesiveness:** the degree to which the durations in a composition are constructed of regularly occurring accented and unaccented beats. \((7 = \text{very strong metric cohesiveness, } 1 = \text{no metric cohesiveness})\)
The more general category of Craftsmanship was chosen as one of the dimensions for the composition ratings instead of Tonal Cohesiveness and Metric Cohesiveness. In previous studies, judges seemed to have difficulty in separating tonal and rhythmic elements in their ratings. Intercorrelations between Tonal and Metric Cohesiveness tended to be high. For example, in Laycock's (1992) study, the intercorrelation between tonality and meter was .84.

Musical Syntax is one of the four scoring dimensions that Webster (1987b) used to evaluate children's divergent thinking ability with his Measure of Creative Thinking in Music (MCTM). Webster (1987b) describes Musical Syntax with a slight difference from the one described above (Webster, 1987a), as follows:

Musical Syntax: the extent to which the child manipulates musical phenomena in a logical and inherently musical manner, with attention to the shaping of the whole response and not just a single part.

This definition focuses on the structure or big picture of the song rather than on small parts of the song. Therefore, Musical Syntax is different from Craftsmanship in that Craftsmanship deals with small parts of music (such as melodic and rhythmic patterns), while Musical Syntax deals with global aspects of music (such as the formal structure of the song).

Musical Originality is an essential aspect of musical creativity. The key word in definitions of Musical Originality by several researchers is "unique." Webster (1987b) defines Musical Originality as "the extent to which the child manipulates musical phenomena in a unique fashion." Thus, there exists a
common key concept of uniqueness for Musical Originality. However, there are many discrepancies in judges’ ratings for Musical Originality, as shown in its relatively low interjudge reliabilities. As Baltzer (1990) found, interjudge reliability for Musical Originality of Webster’s Measures of Creative Thinking in Music-II was .66, which was relatively weak. Webster (1987b) also found interjudge reliability of .66 for Musical Originality of his MCTM-II. In Laycock’s (1992) study, interjudge reliability for [Musical] Originality was .63, which was moderately low when compared to those for other dimensions.

It should be noted that the originality of a composition is judged by comparing it with compositions of other children in the same age group. For example, Laycock’s (1992) definition of [Musical] Originality considers the norm for the population of the experiment. He defines Originality as follows (p. 73):

Originality: the degree of uniqueness of the composition.
(7 = something entirely new to the norm for the population of the experiment, 1 = no uniqueness; similarities to a known song)

Musical Sensitivity reflects the student’s aesthetic sensitivity in music shown in the composition. Aesthetic sensitivity was identified as one of the enabling skills for musical creativity in Webster’s (1987a) conceptual model of creative thinking in music. He defines aesthetic sensitivity as follows:

Aesthetic Sensitivity: the shaping of sound structures to capture the deepest levels of feelingful response, achieved over the full length of a musical work. [italics mine] (p.163)
Amabile (1982) also includes Aesthetic Judgment as a category evaluating artistic creativity. Therefore, it is appropriate to include Musical Sensitivity in the dimensions as the composition ratings measured musical creativity in composition. In both Musical Originality and Musical Sensitivity, judges’ subjective opinions are present.

Repetition of Song was used in several studies (Kratus, 1990; Laycock, 1992; Reinhardt, 1990). Definitions of Repetition of Song used in those studies are almost identical. That is, Repetition of Song measures the degree of the sameness between the first playing and the second playing of the song.

Definitions of the Composition Dimensions

Definitions of the five dimensions for the composition ratings were as follows:

Craftsmanship: the degree to which the tonal and rhythmic elements in a composition show technical mastery in terms of tonal center and rhythmic regularity. (7 = very high technical mastery, 1 = no technical mastery)

Musical Syntax: the degree to which the tonal and rhythmic patterns in a composition are structured in a logical manner, so that the music makes sense. (7 = highly logical structure, 1 = no logical structure)

Musical Originality: the degree to which the composition is unique, when compared to the existing songs for children, and different from the songs by other children. (7 = very much unique and different, 1 = not unique and different at all)

Musical Sensitivity: the degree to which the composition is musically expressive, so that the music reflects the child’s aesthetic sensitivity in music. (7 = high aesthetic sensitivity in music, 1 = no aesthetic sensitivity in music)
Repetition of Song: the degree to which the second playing of the composition is the same as the first playing of the composition. (7 = almost the same, 1 = completely different)

Judge Ratings of the Compositions

Three judges rated the students' compositions for the five dimensions using a 7-point scale. They used the Composition Rating Form (Appendix D), which consisted of two parts: (a) descriptions of the five dimensions and their definitions, and (b) a rating sheet showing the five dimensions to be rated on a 7-point scale. Each judge was given 67 copies of the rating sheet, one sheet for each composition.

The three judges were a faculty member and two doctoral students in Music Education at Case Western Reserve University. The judges were good musicians, understood research in music education, and had experience in rating children's compositions for studies similar to this one. Each of the three judges had an individual training session for 40 minutes led by the researcher. The training session gave an introduction to the composition rating scales. During the training session, the judge read the definitions of the five dimensions and was given an opportunity to ask questions. At that point, a video-recording of select compositions was played and the judge was asked to rate them. This was done to give the judge a sample experience of the composition ratings and to have the judge present any possible problems before actually starting the composition ratings.

The original videotapes on which the students' compositions were recorded were edited to erase unnecessary parts on the videotapes. The
editing resulted in two master videotapes, the first containing compositions from subjects 1 to 35, and the second from subjects 36 to 67. The first tape lasted for 1 hour and 18 minutes; the second tape lasted for 1 hour and 12 minutes. Thus, the total time of the video-recording was 2 hours 30 minutes. Videotape copies for the judges were duplicated by a professional technician in a video store.

Analysis of the Data

The significance level of $p < .05$ was chosen for this study. The kinds of data collected for this study were as follows: (a) composition ratings by three judges, (b) formal musical experience scores, (c) informal musical experience scores, (d) musical self-esteem scores, (e) musical aptitude scores, (f) musical achievement scores, (g) academic grades, (h) IQ scores, and (i) gender. The composition ratings were averaged ranging from a minimum of one to a maximum of 7 for each dimension and from a minimum of 5 to a maximum of 35 for total dimensions. The maximum score of formal musical experience was not limited. Scores for informal musical experience ranged from 0 to 8. The maximum score of musical self-esteem was 172. Music aptitude scores had a maximum of 40 each for tonal and rhythm subtests and 80 for the composite. Musical achievement scores had a maximum of 25 for pitch subtest, 28 for interval subtest, 30 for meter subtest, and 83 for the composite. Academic grades were total scores of the seven academic subjects, which ranged from 0 [zero] to 28. As to gender, males were coded as 0 [zero], and females were coded as 1.
Ratings of the three judges were correlated with one another to
determine interjudge reliability. Means, standard deviations, and standard
effects of measurement were computed to describe the data in terms of the
average and the distribution of the scores.

Relationships between musical creativity in composition and the eight
independent variables, as listed above, were investigated by Pearson product-
moment correlation. Stepwise multiple regression analyses were computed to
determine which of the independent variables were the best predictors of
musical creativity in composition.
CHAPTER IV
RESULTS

Three research questions were raised in this study: (a) are there significant relationships between compositional creativity and selected variables of musical experiences, musical self-esteem, musical aptitude, musical achievement, academic grades, IQ, and gender for upper elementary students?; (b) what are the best predictors of compositional creativity among the selected variables for upper elementary students?; and (c) what is the strongest predictor of compositional creativity among the selected variables for upper elementary students? Compositional creativity was assessed for five dimensions: Craftsmanship, Musical Syntax, Musical Originality, Musical Sensitivity, and Repetition of Song. The composition dimensions served as dependent (criterion) variables, and the selected variables as independent variables. To answer the research questions, statistical analysis of the data and the results are reported in this chapter.

This chapter consists of the following: (a) composition dimensions—interjudge reliabilities, descriptive statistics, and intercorrelations of the dimensions; (b) selected examples of compositions with high and low ratings for each of the dimensions; (c) independent variables—split-halves reliabilities, descriptive statistics, and correlations among the independent variables; (d) relationships between musical creativity in composition and the independent variables; and (e) stepwise multiple regression analysis for the best predictors of musical creativity in composition.
Composition Dimensions

Interjudge Reliabilities

Pearson product-moment correlations were used to compute interjudge reliabilities of the composition ratings. Interjudge reliabilities for the composition dimensions and their medians are reported in Table 1. Since the interjudge reliabilities are ordinal level measures, the median is a better measure of their central tendency. The median interjudge reliabilities were .63 for Craftsmanship, .60 for Musical Syntax, .67 for Musical Originality, .65 for

Table 1

Interjudge Reliabilities for the Composition Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Interjudge Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>J1–J2</td>
</tr>
<tr>
<td>Craftsmanship</td>
<td>.71</td>
</tr>
<tr>
<td>Musical Syntax</td>
<td>.60</td>
</tr>
<tr>
<td>Musical Originality</td>
<td>.69</td>
</tr>
<tr>
<td>Musical Sensitivity</td>
<td>.65</td>
</tr>
<tr>
<td>Repetition of Song</td>
<td>.73</td>
</tr>
</tbody>
</table>

Total Dimensions          | .74   | .71   | .79   | .74    |

*Note.* J1–Judge 1; J2–Judge 2; and J3–Judge 3.
Musical Sensitivity, and .73 for Repetition of Song. The median interjudge reliability for the Total dimensions was .74.

The interjudge reliabilities were lower than those found in Kratus (1994), which were .90 and .80 for Tonal Cohesiveness and Metric Cohesiveness, respectively. However, the interjudge reliabilities of this study were comparable to Webster (1987b), Baltzer (1990), and Laycock (1992). Webster found that the interjudge reliabilities for Musical Syntax and Musical Originality of MCTM-II were .51 and .66, respectively. Baltzer also found moderate interjudge reliabilities for Musical Syntax and Musical Originality of MCTM-II, which were both .66. The interjudge reliabilities for [Musical] Originality and Replication of Song were .63 and .69 in Laycock’s study. However, if higher interjudge reliability had been found in this study, more reliable results could have been yielded.

Descriptive Statistics

Table 2 presents descriptive statistics for composition dimensions. The means for the five dimensions were in the range of 4 ± 0.5. (4 is the mid-point [median] of the 7-point scale). The distributions of scores for all composition dimensions were not markedly skewed (skewness < ± 1.00). Kurtosis values for Craftsmanship and Musical Syntax, which were larger than -1, showed that scores were centered around the mean within narrow ranges. In general, distributions for the composition dimensions were close to normal.
Table 2

Descriptive Statistics for the Composition Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craftsmanship</td>
<td>3.69</td>
<td>1.35</td>
<td>.03</td>
<td>-1.00</td>
</tr>
<tr>
<td>Musical Syntax</td>
<td>4.16</td>
<td>1.40</td>
<td>-.09</td>
<td>-1.07</td>
</tr>
<tr>
<td>Musical Originality</td>
<td>3.73</td>
<td>1.39</td>
<td>-.06</td>
<td>-.94</td>
</tr>
<tr>
<td>Musical Sensitivity</td>
<td>3.70</td>
<td>1.29</td>
<td>.06</td>
<td>-.77</td>
</tr>
<tr>
<td>Repetition of Song</td>
<td>4.49</td>
<td>1.55</td>
<td>-.24</td>
<td>-.58</td>
</tr>
<tr>
<td>Total Dimensions</td>
<td>19.88</td>
<td>5.19</td>
<td>.15</td>
<td>-.97</td>
</tr>
</tbody>
</table>

Intercorrelations

Intercorrelations among the composition dimensions (see Table 3) were computed by Pearson product-moment correlations. Craftsmanship was highly correlated with Musical Syntax, Musical Originality, and Musical Sensitivity, with correlations ranging from .68 to .77. However, the correlation between Craftsmanship and Repetition of Song, although significant ($p < .01$), was low. Musical Syntax was moderately correlated with Musical Originality, Musical Sensitivity, and Repetition of Song, with correlations ranging from .44 to .56. Musical Syntax was more strongly
Table 3
Intercorrelations Among the Composition Dimensions

<table>
<thead>
<tr>
<th></th>
<th>Syntax</th>
<th>Originality</th>
<th>Sensitivity</th>
<th>Repetition</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craftsmanship</td>
<td>.77***</td>
<td>.68***</td>
<td>.69***</td>
<td>.34**</td>
<td>.89***</td>
</tr>
<tr>
<td>Musical Syntax</td>
<td>.44***</td>
<td>.48***</td>
<td>.56***</td>
<td></td>
<td>.85***</td>
</tr>
<tr>
<td>Musical Originality</td>
<td>.80***</td>
<td>-.05</td>
<td></td>
<td></td>
<td>.72***</td>
</tr>
<tr>
<td>Musical Sensitivity</td>
<td></td>
<td>.17</td>
<td></td>
<td></td>
<td>.79***</td>
</tr>
<tr>
<td>Repetition of Song</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.56***</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01; ***p < .001

Note. Sample subject N = 67.

correlated with Repetition of Song than were the other dimensions. The
correlation between Musical Originality and Musical Sensitivity was very
high and statistically significant (p < .001). The correlations between Musical
Originality and Repetition of Song and between Musical Sensitivity and
Repetition of Song were near zero. As expected, correlations between the
individual dimensions (except for Repetition of Song) and the Total
Dimensions were high, ranging from .72 to .89. The relatively high
intercorrelations among the dimensions indicate that there is a substantial
overlap in the dimensions.
Selected Examples of Compositions

Selected examples of compositions with high and low ratings for the five dimensions are shown below. The musical examples chosen are representative of the compositions that had high and low ratings for the dimensions. The composition ratings could range from a minimum of 1 to a maximum of 7. It should be mentioned that the musical examples were transcribed by the researcher, and thus, when necessary, she made subjective judgements in transcribing rhythms. That is, the rhythmic and metric relationships were approximated due to lack of precision by the students. Accordingly, notations of the musical examples may not sound exactly the same with the actual sound of the compositions in the videotaped recording.

Craftsmanship

Craftsmanship is defined as the degree to which the tonal and rhythmic elements in a composition show technical mastery in terms of tonal center and rhythmic regularity. The key to this definition is “technical mastery.” Example 1 shows a composition with a high rating (6) for Craftsmanship. The composition is centered on the dominant intervals of d'-a" and g"-b'. It is in duple meter and was played in accurate beats. The song has three identical verses.

Example 2 is a composition with a low rating (1) for Craftsmanship. The C-scale song is in stepwise motion and starts with the lowest note of the Orff xylophone, i.e., C. The song shows little technical mastery in tonal center and rhythmic regularity. The rhythm of the composition is approximate in the transcription. The composition also received low ratings for Musical
Example 1. A composition with a high rating (6) for Craftsmanship.

Example 2. A composition with a low rating (1) for Craftsmanship.

Originality (1) and Musical Sensitivity (1); however, it obtained a high rating for Repetition of Song (7) partly because the song is short enough to repeat easily.
Musical Syntax

Musical Syntax refers to the degree to which the tonal and rhythmic patterns in a composition are structured in a logical manner to make sense of the music. "Well-organized" is the key to this definition. A composition with a high rating (6) for Musical Syntax is shown in Example 3. The song consists of two parts: the first part in an upward motion and the second part in a downward motion. In the first part, the two-measure phrase is developed in tonal sequences until reaching the highest note of a". In contrast, the melody of the second part descends in a simple stepwise motion to arrive at the lowest note of c. Therefore, the song is structured in binary form with an arch-type melodic line. The composition also had high ratings for Craftsmanship (6), Musical Originality (6), Musical Sensitivity (6), and Repetition of Song (7).

Example 4 shows an excerpt of a composition with a low rating (2) for Musical Syntax. The total length of the composition is 1 minute 2 seconds. The meter is irregular, and no sense of regularly occurring accents can be heard. The composition contains pitches with large skips between them. For example, the pitches a" and c in measure four are the highest and lowest pitches in an Orff alto-xylophone. The song sounds random throughout. The rhythm notation is approximate in the transcription. The composition also had a low rating (1) for Repetition of Song.
Example 3. A composition with a high rating (6) for Musical Syntax.

Example 4. A composition with a low rating (2) for Musical Syntax.
Musical Originality

Musical Originality is defined as the degree to which the composition is unique, when compared to the existing songs for children, and different from the songs by other children. The key to this definition is "uniqueness." Example 5 shows a composition with a high rating (6) for Musical Originality. The short phrase in the first measure, which starts with the decorative sixteenth note rhythm patterns, is repeated in the first two measures and developed in the next two measures. After a bridge of two measures, the phrase descends toward a conclusion. The decorative sixteenth rhythm pattern is a unifying element in the song. Few students in this study used such an original and coherent rhythm pattern in their songs. The composition also received high ratings for Musical Sensitivity (6) and Total Dimensions (29) (the maximum score for Total Dimensions is 35).

The composition in Example 6 is one of the compositions with a low rating (1) for Musical Originality. The song uses a pattern in the same pitch and octaves and in a simple rhythm repeated throughout the piece. The contour descends in stepwise motion. However, the composition had a high rating (7) for Repetition of Song.
Example 5. A composition with a high rating (6) for Musical Originality.

Example 6. A composition with a low rating (1) for Musical Originality.
Musical Sensitivity

Musical Sensitivity refers to the degree to which the composition is musically expressive, so that the music reflects the child's aesthetic sensitivity in music. The key to this definition is "aesthetic" and "expressive." A high rating (6) for Musical Sensitivity was given to the composition in Example 7. The rhythm pattern in measure 1 is a unifying factor of the song. The rhythm pattern is repeated five times (measures 1, 5, 7, 9, and 11) and developed three times (measures 3, 10, and 12) in the composition. The composition starts with the fifth of the dominant chord (V), i.e., d, and establishes the V chord (g-b-d') in measure 4. The melody in the second system goes around the tonic chord without its fifth (c-g) and establishes the key center of c. The third system is like a development in sonata allegro form as it develops the short unifying rhythm pattern vigorously. The melody in the third system sounds more vibrant and active in the high pitch range, which is contrasted with the calm and reserved melody in the low pitch range of the second system. The first two measures of the fourth system sound like the climax of the song. The last two measures of the song prepares for cadence by descending from the highest pitch of a" to c. Thus, the song does not sound simple and unfocused, but vibrant and intentional. Especially, the vigor in the third system and the climax and the ending in the fourth system sound expressive. Therefore, the composition represents a song of high musical sensitivity as it received a high rating for the dimension.

Example 8 is one of the compositions with a low rating (1) for Musical Sensitivity. The student repeated the C-scale song four times along with singing on unmatched pitches almost in her speaking voice. The composition
Example 7. A composition with a high rating (6) for Musical Sensitivity.

Example 8. A composition with a low rating (1) for Musical Sensitivity.
had a high rating (7) for Repetition of Song, which illustrates the low intercorrelation between Musical Sensitivity and Repetition of Song.

Repetition of Song

Repetition of Song is defined as the degree to which the second playing of the composition is the same as the first playing of the composition. "Sameness" is the key to this definition. A composition with a high rating (7) for Repetition of Song is shown in Example 9. The song is short and thus could be easily repeated. The song is, however, musically interesting. It consists of two phrases in sequences. The melody is centered on c and g', with the c as the tonic. The composition also received high ratings for Craftsmanship (6), Musical Syntax (7), and Total Dimensions (30).

A low rating (1) for Repetition of Song was given to a composition, excerpts of which are shown in Example 10. The total length of the song is 3 minutes, which is the maximum given time for a song. The melody wanders randomly over the pitches from the lowest c to the highest a". The song goes up and down in stepwise motion, as shown in the first line of the example. Also, the song repeats two pitches constantly, as shown in the second system of the notation. The composition also had a low rating (10) for Total Dimensions.
Example 9. A composition with a high rating (7) for Repetition of Song.

Example 10. A composition with a low rating (1) for Repetition of Song.

Total Dimensions

Total Dimensions are represented by the total score for the five dimensions. The maximum score for Total Dimensions is 35; the minimum score is 5. The compositions in Examples 3, 5, 7, and 9 received high ratings for Total Dimensions, which were 30, 29, 30, and 30, respectively. The compositions in Examples 2, 8, and 10 showed low ratings for Total Dimensions, which were 14, 16, and 10, respectively.
Independent Variables

Split-Halves Reliabilities

Split-halves reliabilities of the Self-Esteem of Musical Ability (SEMA) measure, the Musical Aptitude Profile (MAP)-Melody and Meter subtests, and the Music Achievement Test (MAT), Test 1 (see Table 4) were computed with Pearson product-moment correlation and corrected by Spearman-Brown Prophecy Formula. Split-halves reliability for SEMA was .70. The reliability for SEMA is moderately lower than those found by Schmitt (1979) ($r = .91$), Austin (1990) ($r = .94$), and Laycock (1992) ($r = .93$).

Table 4

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Reliability</th>
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<td>Musical Aptitude Profile:</td>
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<td>Rhythm</td>
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</tr>
<tr>
<td>Composite</td>
<td>.82</td>
</tr>
<tr>
<td>Music Achievement Test:</td>
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</tr>
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<td>Pitch</td>
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</tr>
<tr>
<td>Interval</td>
<td>.63</td>
</tr>
<tr>
<td>Meter</td>
<td>.36</td>
</tr>
<tr>
<td>Composite</td>
<td>.75</td>
</tr>
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</table>
Split-halves reliabilities for the MAP were .66 for Tonal (Melody subtest), .75 for Rhythm (Meter subtest), and .82 for the Composite. The split-halves reliability for MAP, Tonal was slightly lower than those reported in the MAP manual (Gordon, 1988), which were .75 and .76 for fifth and sixth grade, respectively. The split-halves reliability for MAP, Rhythm was comparable to those reported in the MAP manual, which were .70 and .75 for fifth and sixth grade, respectively.

The MAT, Test 1 showed split-halves reliabilities of .75 for Pitch, .63 for Interval, .36 for Meter, and .75 for the composite. The MAT, Test 1 showed slightly lower reliability than those reported in the MAT manual (Colwell, 1969), which were .84 and .87 for fifth and sixth grade, respectively.

In summary, the split-halves reliabilities of the measures of musical self-esteem, musical aptitude, and musical achievement were moderate ranging from .6 to .8, except for MAT, Meter.

Descriptive Statistics

Descriptive statistics for independent variables are shown in Table 5. Distribution of the scores for formal musical experience was not markedly different from normal (skewness = -.51, kurtosis = .77). However, distribution of scores for informal musical experience was skewed to the left and concentrated on the mean (skewness = 1.24, kurtosis = -1.25). Thus, the Kolmogorov-Smirnov test was computed to determine whether this distribution was significantly different from a normal distribution. The result showed that the distribution for informal musical experience was significantly
Table 5

Descriptive Statistics for the Independent Variables

<table>
<thead>
<tr>
<th>Variable (N = 67)</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
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<td></td>
</tr>
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<td>.07</td>
<td>.55</td>
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<tr>
<td>Interval</td>
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<td>-.07</td>
</tr>
<tr>
<td>Meter</td>
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<td>Academic Grades</td>
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<td>.45</td>
<td></td>
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</tr>
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</table>

Note. As to gender, male was given zero points, and female was given one point. Raw scores of the Musical Aptitude Profile and the Musical Achievement Test were used for the analysis of the data. The maximum scores of the independent variables are as follows: (a) formal musical experience—unlimited, informal musical experience—8; (b) musical self-esteem—172; (c) musical aptitude-tonal and rhythm—each 40, composite—80; (d) musical achievement-pitch—25, interval—28, meter—30, composite—83; and (e) academic grades—24.
(\(p < .001\)) different from normal. Skewness and kurtosis were not computed for gender because gender is a dichotomous variable. The high mean for gender indicates that there were considerably more female students than male students. The number of male students was 19, while that of female students was 48.

All the skewness and kurtosis values for the independent variables, except for the informal musical experience, did not exceed \(\pm 1\). That is, distributions of scores for formal musical experience, musical self-esteem, musical aptitude, musical achievement, academic grades, and IQ were not markedly different from a normal distribution.

**Correlations**

Pearson product–moment correlations were computed to examine correlations among independent variables. Information on the correlations was useful in considering any possible effects of highly correlated variables on determination of the best predictors by stepwise multiple regression analysis. Table 6 presents the correlation matrix of the variables.

Formal musical experience was significantly correlated with musical self-esteem and gender. Female students had higher formal musical experience than did male students. Informal musical experience was not significantly correlated with any of the independent variables except for gender. Female students had higher ratings for informal musical experience than did male students.

Musical aptitude-tonal was significantly correlated with musical achievement-pitch (\(p < .001\)). Musical aptitude-tonal, rhythm, and composite
Table 6

Correlations Among the Independent Variables

<table>
<thead>
<tr>
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<tbody>
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<td>.29*</td>
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<td>.37**</td>
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<td></td>
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<td>.17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01; *** p < .001

Note. N = 67 except IQ scores.
and musical achievement-pitch and composite were all significantly correlated with one another. Musical aptitude-tonal and musical achievement-pitch were, otherwise, not significantly correlated with any of the other variables. Musical achievement-interval was not significantly correlated with musical achievement-pitch; it was significantly correlated only with musical achievement-composite. Despite the low reliability of musical achievement-meter (r = .36), it was significantly correlated with musical achievement-pitch and composite.

Academic grades were not significantly correlated with any of the other independent variables except for IQ and gender. Female students had higher academic grades than did male students. IQ scores were not obtained for 16 subjects, and thus the number of subjects computed for IQ scores was 51. IQ scores were significantly related to musical aptitude-rhythm, musical achievement-pitch, musical achievement-composite, and academic grades. Finally, female students showed significantly higher scores for both formal and informal musical experience as well as for academic grades.

In summary, the independent variables were relatively uncorrelated except in the case of the composite and subtests scores of musical aptitude and musical achievement. Informal musical experience, musical aptitude-tonal, musical achievement-pitch, and academic grades were notably not significantly intercorrelated, except for the expected positive correlation between musical aptitude-tonal and musical achievement-pitch (r = .41, p < .001). These results are generally desirable, because highly correlated independent variables would have interfered with each other in the stepwise multiple regression analysis.
Relationships Between Compositional Creativity and the Independent Variables

To answer the first research question raised in this study, relationships between the composition dimensions and the independent variables were computed by Pearson product-moment correlation (see Table 7). Although formal musical experience was not significantly related to any of the composition dimensions, informal musical experience was significantly related to all composition dimensions except for Repetition of Song and the Total Dimensions. Musical aptitude-tonal was significantly related to Craftsmanship, Musical Sensitivity, and the Total Dimensions. Musical aptitude-composite, however, was significantly related only to Total Dimensions. Musical achievement-pitch was significantly related to Craftsmanship, Musical Syntax, Repetition of Song, and Total Dimensions. Accordingly, musical achievement-composite was significantly related to Musical Syntax, Repetition of Song, and Total Dimensions. Academic grades showed significant relationships with Musical Syntax and the Total Dimensions.

In summary, independent variables that showed significant relationships with composition dimensions were informal musical experience, musical aptitude-tonal and composite, musical achievement-pitch and composite, and academic grades. Those independent variables that had no significant relationships with any of the composition dimensions were formal musical experience, musical self-esteem, musical aptitude-rhythm, musical achievement-interval and meter, IQ, and gender.
<table>
<thead>
<tr>
<th>Independent V. (N = 67)</th>
<th>Craftsmanship</th>
<th>Syntax</th>
<th>Originality</th>
<th>Sensitivity</th>
<th>Repetition</th>
<th>Total</th>
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</thead>
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<td>.01</td>
<td>.13</td>
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<td>.31*</td>
<td>.31*</td>
<td>.09</td>
<td>.33**</td>
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<td>IQ (N = 51)</td>
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</table>

*p < .05; **p < .01.
The Best Predictors of Compositional Creativity

Stepwise multiple regression analyses were computed to answer the second and third research questions regarding the best predictors of compositional creativity among the independent variables (see Table 8). The best combination of predictors of compositional creativity was informal musical experience, musical achievement-pitch, and academic grades, which accounted for 25% of the variance in total composition ratings.

The best predictors of the individual composition dimensions were also computed. The best combination of predictors of Craftsmanship was informal musical experience and musical aptitude-tonal, which accounted for 20% of the variance. Musical Syntax was best predicted by a combination of musical achievement-pitch and informal musical experience, which accounted for 15% of the variance. Informal musical experience was the best single predictor of Musical Originality, accounting for 10% of the variance. The best combination of predictors of Musical Sensitivity was informal musical experience and musical aptitude-tonal, which accounted for 16% of the variance. Repetition of Song was best predicted by musical achievement-pitch, accounting for 14% of the variance.

The strongest predictor of compositional creativity was informal musical experience, which alone accounted for 11% of the variance in total composition ratings. Informal musical experience was one of the best predictors of all the composition dimensions except Repetition of Song.
Table 8
Stepwise Multiple Regression Analysis for the Best Predictors of Compositional Creativity

<table>
<thead>
<tr>
<th>Dimension:</th>
<th>Predictor</th>
<th>Beta</th>
<th>Correlation</th>
<th>Multiple r</th>
<th>Multiple R</th>
<th>Increase in $R^2$</th>
<th>$R^2$</th>
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Summary

This study sought to solve three research questions regarding compositional creativity of upper elementary students. Below is a summary of the results on the research questions and additional findings.

Compositional creativity, represented by total ratings of the dimensions, was significantly related to informal musical experience, musical aptitude-tonal, musical achievement-pitch, and academic grades. The results on relationships between the individual composition dimensions and the selected variables showed the following:

1. Craftsmanship was significantly related to informal musical experience, musical aptitude-tonal, and musical achievement-pitch.
2. Musical Syntax was significantly related to informal musical experience, musical achievement-pitch, and academic grades.
3. Musical Originality was significantly related only to informal musical experience.
4. Musical Sensitivity was significantly related to informal musical experience and musical aptitude-tonal.
5. Repetition of Song was significantly related to musical achievement-pitch.

The best combination of predictors of compositional creativity was informal musical experience, musical achievement-pitch, and academic grades, which accounted for 25% of the variance in total composition ratings. The results on the best predictors of the individual composition dimensions were as follows:
1. The best combination of predictors of Craftsmanship was informal musical experience and musical aptitude-tonal, which accounted for 20% of the variance.

2. The best combination of predictors of Musical Syntax was musical achievement-pitch and informal musical experience, which accounted for 15% of the variance.

3. The best single predictor of Musical Originality was informal musical experience, accounting for 10% of the variance.

4. The best combination of predictors of Musical Sensitivity was informal musical experience and musical aptitude-tonal, which accounted for 16% of the variance.

5. The best single predictor of Repetition of Song was musical achievement-pitch, accounting for 14% of the variance.

The strongest predictor of compositional creativity was informal musical experience, which alone accounted for 11% of the variance in total composition ratings. Informal musical experience was one of the best predictors of all the composition dimensions except Repetition of Song.

There were additional findings. High intercorrelations were found among the five composition dimensions except between Repetition of Song and Musical Originality and between Repetition of Song and Musical Sensitivity. The independent variables were relatively uncorrelated. Particularly, informal musical experience, musical aptitude-tonal, musical achievement-pitch, and academic grades were not significantly correlated.
except the expected significant correlation between musical aptitude-tonal
and musical achievement-pitch.
CHAPTER V
SUMMARY, DISCUSSION, AND IMPLICATIONS

The primary purpose of the study was to determine the best predictors of musical creativity in composition among selected variables of musical experiences, musical self-esteem, musical aptitude, musical achievement, academic grades, IQ, and gender for upper elementary students. Relationships between musical creativity in composition and the selected variables were also examined. To answer the research questions, data were collected and analyzed using stepwise multiple regression analysis and Pearson product-moment correlation. Selected examples of compositions were presented in Chapter IV highlighting which had high ratings and which had low ratings for the composition dimensions.

The final chapter of this dissertation begins with a summary of the major findings. The findings are compared with previous findings in terms of their being consistent, contradictory, or inconsistent. Then, the next section discusses several aspects of the findings which need further explanation or clarification; for example, why informal musical experience was found to be the strongest predictor of musical creativity and observed features of the compositions. The chapter concludes with implications for teaching and research.
Summary of the Major Findings

This study sought to examine three research questions regarding musical creativity in composition for upper elementary students. The three research questions and answers to the questions found in this study are presented below.

First, are there significant relationships between compositional creativity and the selected variables of musical experiences, musical self-esteem, musical aptitude, musical achievement, academic grades, IQ, and gender for upper elementary students?

Yes. Compositional creativity was significantly related to informal musical experience, musical aptitude-tonal, musical achievement-pitch, and academic grades. The results of relationships between the individual composition dimensions and the selected variables showed the following findings:

1. Informal musical experience was significantly related to all the five dimensions except Repetition of Song, i.e., Craftsmanship, Musical Syntax, Musical Originality, and Musical Sensitivity.
2. Musical aptitude-tonal was significantly related to Craftsmanship and Musical Sensitivity.
3. Musical achievement-pitch was significantly related to Craftsmanship, Musical Syntax, and Repetition of Song.
4. Academic grades were significantly related to Musical Syntax.
Second, what are the best predictors of compositional creativity among the selected variables of musical experiences, musical self-esteem, musical aptitude, musical achievement, academic grades, IQ, and gender for upper elementary students?

The best combination of predictors of compositional creativity was informal musical experience, musical achievement-pitch, and academic grades. In addition, musical aptitude-tonal was also found to be one of the best predictors when the individual composition dimensions were considered. The best predictors of the individual composition dimensions were as follows:

1. Craftsmanship: informal musical experience
   musical aptitude-tonal
2. Musical Syntax: musical achievement-pitch
   informal musical experience
3. Musical Originality: informal musical experience
   musical aptitude-tonal
5. Repetition of Song: musical achievement-pitch

Third, what is the strongest predictor of compositional creativity among the selected variables for upper elementary students?

The strongest predictor of compositional creativity for this group was informal musical experience. This was also the most prevalent among the best predictors of the individual composition dimensions. That is, informal musical experience was one of the best predictors of all the composition dimensions except Repetition of Song.
Comparison With Previous Findings

There are few researchers who compared research findings on musical creativity in detail. Previous research showed inconsistent results on several aspects of musical creativity. The current study is consistent with the previous findings in some aspects, but contradictory to others. Thus, it is important to accumulate and compare the research findings in order to provide an informative resource for teaching and research of musical creativity. Therefore, the current findings are compared with the previous ones.

The comparison is presented in three sections: (a) correlations among the independent variables, (b) relationships between musical creativity and the independent variables, and (c) the best predictors of musical creativity. In each section, the compared findings are listed in three categories: consistent, contradictory, and inconsistent findings. The categories of consistent and contradictory findings show that present findings are consistent with or contradictory to all selected prior studies. The category of inconsistent findings shows that present findings are consistent with some studies, but contradictory to others.

Each of the studies used different methodologies and different ages of subjects. Therefore, the comparison of the research findings should be understood with caution, since the contradictory and inconsistent findings may be due to the different methodologies.
Correlations Among the Independent Variables

Consistent findings

This study found that:

1. there were significant positive relationships between formal musical experience and musical self-esteem, which is consistent with previous findings (Austin, 1990; Klinedinst, 1991; Schmitt, 1979; Svengalis, 1978).

2. there were significant positive relationships between musical aptitude and musical achievement, which is consistent with previous findings (Azzara, 1993; Gordon, 1988; Harrison, 1990a, 1990b; Harrison, Asmus, & Serpe, 1994; Kehrberg, 1984; Klinedinst, 1991; Zdzinski, 1992).

3. there were no significant relationships between musical experiences (both formal and informal) and musical aptitude, which is consistent with previous findings (Brand, 1986; Gordon, 1988; Klinedinst, 1991).

4. there were no significant relationships between musical self-esteem and musical aptitude, which is consistent with Klinedinst (1991).

5. there was no significant relationship between musical self-esteem and academic grades, which is consistent with Klinedinst (1991).

6. there were no significant relationships between musical aptitude (except musical aptitude-rhythm) and IQ, which is consistent with Gordon (1988).

7. there were no significant relationships between musical aptitude and gender, which is consistent with Gordon (1988).
8. there were no significant relationships between musical achievement and gender, which is consistent with Hedden (1982).

**Contradictory findings**

This study found that:

1. there was no significant relationship between musical self-esteem and gender, which is contradictory to Austin (1990), who found that girls had significantly higher musical self-esteem than boys.

2. there were no significant relationships between musical achievement and academic grades, which is contradictory to previous findings (Harrison, 1990a, 1990b; Harrison et al., 1994; Hedden, 1982; Klinedinst, 1991).

**Inconsistent findings**

This study found that:

1. there were no significant relationships between musical experiences (both formal and informal) and musical achievement, which is consistent with Hedden (1982) and Klinedinst (1991), but contradictory to others (Brand, 1986; Harrison, 1990a, 1990b; Harrison et al., 1994; Kehrberg, 1984).

2. there were no significant relationships between musical self-esteem and musical achievement, which is consistent with Klinedinst (1991) and Mizener (1993), but contradictory to Hedden (1982) and Kehrberg (1984).

3. there were no significant relationships between musical aptitude and academic grades, which is consistent with Gordon (1988), but contradictory to Klinedinst (1991). Gordon (1988) found that
relationships between the two constructs were moderate, and although statistically significant, had no practical significance.

**Relationships Between Musical Creativity and the Independent Variables**

The comparison of the research findings on relationships between musical creativity and the independent variables is in two parts: (a) compositional creativity and (b) musical creativity. The first part, Compositional Creativity compares research findings only on compositional creativity, while the second part, Musical Creativity compares research findings on both compositional and improvisational creativity.

**Compositional Creativity**

The findings of the current study on relationships between compositional creativity and the independent variables are compared with previous ones.

**Consistent findings**

This study found that:

1. there were significant positive relationships between musical achievement and compositional creativity, which is consistent with previous findings (Morgan, 1985; Webster, 1979).
2. there were no significant relationships between IQ and compositional creativity, which is consistent with Webster (1979).
3. there were no significant relationships between gender and compositional creativity, which is consistent with Webster (1979).
Contradictory findings

This study found that:

1. there were no significant relationships between musical self-esteem and compositional creativity, which is contradictory to Laycock (1992). Laycock (1992) found significant positive relationships between the two constructs for high school students.

2. there were significant positive relationships between academic grades and compositional creativity, which is contradictory to Laycock (1992). Laycock (1992) found no significant relationships between the two constructs for high school students.

Inconsistent findings

This study found that:

1. there were significant positive relationships between musical aptitude and compositional creativity, which is consistent with Kratus (1994) and Laycock (1992), but contradictory to Webster (1979).

2. there were no significant relationships between formal musical experience and compositional creativity, which is consistent with Webster (1979), but contradictory to Laycock (1992).

Musical Creativity

The findings of the current study on relationships between musical creativity and the independent variables are compared with previous ones. Differences in the comparison of the findings could be due to different operational definitions of creativity; however the comparison is still important.
Consistent findings

This study found that:

1. there were significant positive relationships between musical achievement and musical creativity, which is consistent with previous findings (Baltzer, 1990; Morgan, 1985; Webster, 1979).

2. there were no significant relationships between IQ and musical creativity, which is consistent with previous findings (Swanner, 1986; Webster, 1979).

Contradictory findings

This study found that:

1. there were no significant relationships between musical self-esteem and musical creativity, which is contradictory to Laycock (1992).

Inconsistent findings

This study found that:

1. there were no significant relationships between formal musical experience and musical creativity, which is consistent with Webster (1979) [piano lesson background and improvisational creativity] and Gorder (1980), but contradictory to Webster (1979 [piano lesson background and compositional creativity], 1988) and Laycock (1992). Webster (1988) found that two years of Suzuki/Dalcroze musical training were significantly positively related to Musical Syntax of MCTM-II, but significantly negatively related to Musical Originality.

2. there were significant positive relationships between musical aptitude and musical creativity, which is consistent with Kratus
(1994) and Laycock (1992), but contradictory to others (Baltzer, 1990 [practically no significant relationships]; Gorder, 1980; Schmidt & Sinor, 1986; Swanner, 1986; Webster, 1987b).

3. There were significant positive relationships between academic grades and musical creativity, which is contradictory to Baltzer (1988), Laycock (1992), and Wig (1981). However, Baltzer (1990) found varied (both significant and non-significant) relationships between the two constructs by grade level and musical creativity measure.

4. There were no significant relationships between gender and musical creativity, which is consistent with Baltzer (1988, 1990), Swanner (1986), and Webster (1987b), but contradictory to Schmidt and Sinor (1986).

The Best Predictors of Musical Creativity

The results of this study regarding the best predictors of musical creativity are compared with previous findings by Baltzer (1990) and Webster (1977, 1979).

Consistent findings

This study found that:

1. Musical achievement, musical aptitude, and academic grades were among the best predictors of musical creativity, which is consistent with Baltzer (1990). Baltzer (1990) found that (a) musical achievement, musical aptitude, and gender were the best predictors of musical creativity measured by Webster’s MCTM-II; (b) musical
achievement, academic achievement, and age were the best predictors of musical creativity measured by Wang’s MCSM; and (c) musical achievement was the best single predictor of musical creativity measured by Baltzer’s SCM.

2. musical achievement was one of the best predictors of Musical Syntax (one of the compositional dimensions used in this study), which is consistent with Baltzer (1990). Baltzer (1990) found that musical achievement was the only best predictor of Musical Syntax of MCTM-II.

3. musical achievement was one of the best predictors of musical creativity in composition, which is consistent with Webster (1977, 1979). Webster (1977, 1979) found that (a) musical achievement was the strongest predictor of musical creativity in composition, improvisation, and analysis; and (b) the best combination of predictors of improvisational creativity was musical achievement and figural creativity, which accounted for 28% of the variance in MCTM-II scores.

**Contradictory findings**

This study found that:

1. musical aptitude was one of the best predictors of musical creativity dimensions (Craftsmanship and Musical Sensitivity), which is contradictory to Webster (1977, 1979). Webster (1977, 1979) found that musical aptitude was not one of the best predictors of musical creativity dimensions of MCTM-I.
Inconsistent findings

This study found that:

1. informal musical experience was the strongest predictor of musical creativity, which cannot be compared with Baltzer's (1990) finding that musical achievement was the strongest predictor of musical creativity. Because Baltzer (1990) did not examine informal musical experience among his independent variables.

2. gender was not one of the best predictors of musical creativity, which is consistent with Webster (1977, 1979), but contradictory to Baltzer (1990). Baltzer (1990) found that gender was one of the best predictors of musical creativity measured by MCTM-II. (Boys scored significantly higher in MCTM-II than did girls.)

Discussion

This section describes several aspects which were in need of explanation for the purpose of clarification, reasoning, or emphasis. They are (a) correlation and causation, (b) informal musical experience, (c) intercorrelations among the composition dimensions, (d) statistical vs. practical significance, (e) melodic decisions given precedence in composing, and (f) features of the compositions.

Correlation and Causation

The current study examined relationships between musical creativity and selected variables. Implications based on the results of this study should be suggested with caution, since the results do not show causal relationships.
For example, the results showed that informal musical experience was significantly related to musical creativity. It is not known from these results whether children with high levels of informal musical experience are musically creative or whether musically creative children have high levels of informal musical experience. What is known from the results, however, is that children are more likely to have high levels of informal musical experience when they are musically creative.

**Informal Musical Experience**

This study found that informal musical experience was the strongest predictor of musical creativity, while formal musical experience was not one of the best predictors. This finding suggests that students' musical experience outside the school environment may play an important role in their musical creativity. The types of musical experiences the students were asked about were watching MTV, making up songs, dancing with music, playing instruments at home, and going to concerts. These are the musical activities that many students do and enjoy at home or away from school with siblings and friends. The types of formal musical experience the students were asked about were school band, school orchestra, school choir, church choir, and private lessons. After collecting data, the researcher found out that the school had only a school choir; neither band nor orchestra. This would have limited scores for formal musical experience. Since the students were from low socioeconomic status, it is likely that they had few opportunities for private lessons. Therefore, formal musical experience may also be influential, but the
scores were too low and had too little variability to find relationships in this study.

The prevalence of informal musical experience is shown in descriptive statistics of musical experiences (see Table 5 in Chapter IV). The mean of informal musical experience was 6.10 on a scale of zero to 8. Although the measure of informal musical experience was crude (amount of time spent and frequency of activities were not measured), clearly informal musical experience was an important part of their lives.

Furthermore, the strong musical culture of the African-American students might have influenced their informal musical experience. Music serves an important social function at home, at church, in community meetings, and at other social occasions. The main source of musical understanding for the students in this study may not have been in school, but outside school.

The results of this study support the notions by Sherman (1991) and Davidson (1991). Sherman (1991) states that high school students' musical experience outside school was the main source for their creative involvement in music and knowing music. Davidson (1991) mentions that one of the environmental conditions to facilitate students' musical creativity is to make an open-ended classroom in which students are allowed to work on their own pace and explore freely in music. He also found from interviews with high school students that many of them compose and arrange music outside school, and their composed music is based on the music they listen to from radio, cassette tape, and other recorded music.

The finding of informal musical experience being the best predictor of musical creativity may also be explained by intrinsic motivation for music.
Intrinsic motivation for music is shown when students make music for the joy and enjoyment of music-making, not for extrinsic reward such as grades. Amabile (1985) found that intrinsic motivation is a critical factor for creativity. She compared creative writing scores between intrinsically-motivated writers and extrinsically-motivated writers. Results showed that intrinsically-motivated writers showed higher scores in creative writing than extrinsically-motivated writers. Therefore, it seems that students' high scores of informal musical experience may reflect their high intrinsic motivation.

**Intercorrelations Among the Composition Dimensions**

Intercorrelations among the composition dimensions were high, ranging from .44 to .89 (p < .001) except Repetition of Song. There are three possible reasons for these high intercorrelations. First, the composition dimensions of Craftsmanship, Musical Syntax, Musical Originality, and Musical Sensitivity may represent a single aspect of musical creativity. Second, when judges rated students' compositions, their judgements regarding the five dimensions might not have been discrete enough to distinguish each of the dimensions. Third, in general, students' creative abilities related to the composition dimensions seem to develop evenly. For instance, Example 3 (in Selected Examples of the Compositions in Chapter IV) received high ratings not only for Musical Syntax but also for Craftsmanship, Musical Originality, Musical Sensitivity, and Repetition of Song. Another example is shown in Example 9, which received high ratings not only for Repetition of Song but also for Craftsmanship, Musical Syntax, and Total Dimensions.
Statistical vs. Practical Significance

Statistically significant results found in this study should be interpreted with caution as some of them have little practical significance. The current findings showed that the best predictors of compositional creativity accounted for 25% of the variance in total ratings of composition dimensions. Predictors accounting for the other 75% of the variance are yet unknown. Therefore, further research remains to be done by including other independent variables not examined in this study.

Melodic Decisions Given Precedence in Composing

Tonal aspects of musical aptitude and musical achievement were found to be the best predictors of compositional creativity, while their rhythmic aspects were not. This result may be attributed to two possible reasons. First, novice student composers may pay more attention to tonal aspects than rhythmic aspects while composing. Kratus’ (1985) finding that repeated and developed melodic patterns were more common than repeated and developed rhythmic patterns for all age groups (5-, 7-, 9-, and 11-year olds) supports this notion. He states: “... when younger children played the [keyboard] instrument, the melodic decisions may have taken precedence over the rhythmic decisions” (Kratus, 1985, p. 6). Second, an Orff alto xylophone, the musical instrument used in this study, is more often used melodically than rhythmically. Orff xylophone does not have sustained sounds for rhythm, while it has separate bars for the pitches ranging from C to a”. Therefore, it is likely that the students paid more attention to pitches than to rhythm while composing.
Features of the Compositions

Several features of the compositions were observed which were of interest. First of all, the most common feature was a rap-style song in which a short song or phrase was repeated continuously.

Secondly, some students composed a song with lyrics. They seemed to think that a song has to have words. When the investigator asked the students to make up a song, they asked if they might make up a song with words. This was allowed since adding words to a composition could be counted for musical originality. One example of a song with lyrics is that the song was in rap style in which a four-measure phrase repeated several times. The lyrics were spontaneous reflecting the composition testing situation: “Miss Auh is here, to teach us a song.” (Miss Auh refers to the investigator.)

Third, some students created very convergent songs; for example, a song in two-measure length and lasting only for a few seconds. On the other extreme, some students composed very divergent songs, which lasted for more than three minutes (three minutes were the time limit given for length of the song) and oftentimes sounded like random exploration.

Finally, there was a tendency that a composition receiving a high rating for one composition dimension also received high ratings for other dimensions. By the same token, a composition receiving a low rating for one dimension tended to receive low ratings for other dimensions. An exception to this tendency was in rating for Repetition of Song. For example, a song in simplest form, such as a C-scale song of C-D-E-F-G, received a high rating for Repetition of Song, since the song was short enough to be repeated easily.
However, the song received low ratings for other dimensions (e.g., Examples 2, 6, and 8).

**Implications for Teaching**

The results of this study showed that the best predictors of musical creativity in composition were informal musical experience, musical aptitude-tonal, musical achievement-pitch, and academic grades. Based on these results, implications for teaching are suggested below.

Music teachers should emphasize the joy of music-making in class and also encourage students to enjoy music-making at home and church with friends, brothers and sisters, and other family members. Teachers should also find out what outside experience students have to individualize instruction better.

Music teachers could help students in creating music by suggesting good ideas and strategies for composing, such as developing musical ideas, and using musical resources from outside school, such as good-quality popular music and multicultural music. Additionally, the teachers could show students how to invent musical instruments with objects that are easily available, such as recyclables (e.g., bottle, can, paper), kitchen utensils (wooden spoon, pan), and other common objects (e.g., wood, water, cloth, thread, box).

Since informal musical experience was found to be the strongest predictor of musical creativity in composition, music classroom should be designed to allow students to feel free to explore new musical ideas in music-making and have enjoyable musical experience.
Activities to improve students’ musical understanding of pitch and melody may facilitate their musical creativity in composition.

Finally, music teachers’ efforts to improve musical aptitude of their students, as a way to positively influence musical creativity, should start before students get to age nine, since musical aptitude is stabilized at age nine. Therefore, teachers of preschool through third-grade children should create a rich musical environment in music class and also encourage parents of the children to make such an environment at home.

**Implications for Research**

The results of this study suggest several implications for future research. Some of the independent variables investigated in this study should be reexamined because the results were contradictory to or inconsistent with previous findings:

1. Muscular self-esteem and academic grades should be reexamined for their relationships with compositional creativity, since opposite results were found in Laycock (1992) with high school students.

2. The present finding that formal musical experience is not significantly related to musical creativity should be re-investigated due to its inconsistency with previous findings (e.g., Webster, 1988).

3. Further studies should be conducted to determine whether gender is a good predictor of musical creativity, for which inconsistent results were found. Baltzer (1990) used improvisation and found
gender as a good predictor, while the current study used composition and found gender as a poor predictor.

4. The current finding that musical aptitude is significantly related to musical creativity supports Kratus (1994). However, further research is needed, since other researchers (Webster, 1987b) found no significant relationships between the two constructs using improvisation tasks.

Using the best predictors of musical creativity found in this study, further research should examine their effects on improving musical creativity of upper elementary students. A longitudinal study is recommended for such research.

A further study could be conducted to determine whether the current finding on informal musical experience is replicated. There has been no study examining the role of informal musical experience in musical creativity, and thus the results could not be compared with any previous findings.

It is necessary to develop a more reliable measure of informal musical experience. The measure could have a greater number of items with detailed questions on informal musical experience. For example, the measure may ask students how they make music outside school, what are their reasons for doing so, and with whom they enjoy making music. Also, the measure would ask questions about their home musical environment, which would reveal environmental conditions fostering their informal musical experience at home. Open-ended questions could be included to give students an opportunity to describe a wide variety of activities. Likert-type rating scales could be used to measure the degree that students are involved in the informal musical
experience. The measure could also ask about amount of time devoted to musical activities.

Different measures of musical creativity, such as different composition tasks and/or improvisation tasks, could be employed in further studies. For example, a composition task using a computer allows for notation and playback of a song as well as storing it for later revision.

Methods to improve interjudge reliability of composition ratings should be found. Further studies may compare the effect of different rating scales, as suggested by Hickey and Webster (1994), with global and musical-characteristics categories and implicit and explicit definitions. The consensual assessment technique developed by Amabile (1982) also should be examined in the context of musical creativity research. Varying combinations of compositional dimensions may be employed to assess musical creativity in composition. The results of this study showed that there was a high correlation between Craftsmanship and Musical Syntax. Therefore, a question is raised: Should the two dimensions be combined in a further study?

Further study should be conducted by including personality traits among independent variables. Swanner (1986) found that imagination, curiosity, and anxiety were significant predictors of improvisational creativity among several personality traits, accounting for 29% of the MCTM-II total scores. However, she did not compare personality traits with other independent variables.

A further study could measure intrinsic motivation, instead of musical self-esteem, to assess students' motivation toward music. This study found that musical self-esteem was not significantly related to musical creativity.
However, music educators have observed that motivation in music is an important factor of students' music learning. Amabile (1984, 1985) found that intrinsic motivation is a critical factor of creativity. Therefore, a question for further research is: How is intrinsic motivation related to musical creativity?

Different populations of subjects should be employed for further research in terms of socioeconomic status, grade level, culture, and geographic area. Students from high socioeconomic status may have higher levels of formal musical experience (e.g., private lessons, music performance groups in school). Students of different cultures may compose songs which reflect their own musical culture just as several students of this study composed rap-style songs.

A testing condition close to a real music classroom (i.e., group testing) may be desirable for composition testing in a future study. These results could then be compared with those of this study by individual testing to examine whether there are significant differences in musical creativity scores between the two testing methods.

Finally, further research could be conducted to examine emotional aspects related to musical creativity. The Affect in Play Scale developed by Russ (1993) would be a good instrument for such an investigation.
REFERENCES


APPENDICES
APPENDIX A
Musical Experiences Questionnaire

Name __________________________________________

Formal Musical Experience

Have you ever participated in organized musical activities such as private lesson, choir, band, orchestra, and/or other performance groups? The following asks you about your musical experiences in the past and at present. Please answer the following questions:

1. Have you ever participated in any musical activities shown below? If “Yes,” please mark X on the column for the musical activities and write the number of years of your participation in the blank space. If “No,” please mark X on the “None” column.

2. Are you currently participating in any musical activities shown below? If “Yes,” please mark X on the column for the musical activities.

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<th>Currently participating?</th>
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<tr>
<td>School orchestra</td>
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<tr>
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<tr>
<td>Church choir</td>
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<tr>
<td>Private lesson</td>
<td></td>
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<tr>
<td>Other musical activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(please name)</td>
<td></td>
<td></td>
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</tbody>
</table>

None ___________
Informal Musical Experience

What musical activities have you done with your family or friends or on your own? Please mark X on the column for the musical activities that you have done and describe how much you do.

E.g. Music listening  **X**  ? hours a week

<table>
<thead>
<tr>
<th>Kinds of Musical Activity</th>
<th>Yes?</th>
<th>how much?/ how often?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watch MTV</td>
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<tr>
<td>Listen to records, CDs, or tapes</td>
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<tr>
<td>Listen to radio</td>
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<tr>
<td>Singing</td>
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<tr>
<td>Making up a song</td>
<td></td>
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<tr>
<td>Playing musical instruments</td>
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<tr>
<td>Dancing</td>
<td></td>
<td></td>
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<tr>
<td>Go to concerts</td>
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<tr>
<td>Others</td>
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</tbody>
</table>
APPENDIX B

Self-Esteem of Musical Ability

Name:______________________________  Boy _____ Girl _____

Directions: These are statements about your musical ability. Some may be true for you; others may not. Read each statement. Then:

1) If you **strongly disagree** that the statement is true for you, place a mark (X) in column one.
2) If you **disagree** that the statement is true for you, place a mark (X) in column two.
3) If you **agree** that the statement is true for you, place a mark (X) in column three.
4) If you **strongly agree** that the statement is true for you, place a mark (X) in column four.

SD – Strongly disagree
D – Disagree
A – Agree
SA – Strongly agree

<table>
<thead>
<tr>
<th>SD</th>
<th>D</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
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<tr>
<td>1.</td>
<td>I can read music well.</td>
<td></td>
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<tr>
<td>2.</td>
<td>I know music well enough to help others learn it.</td>
<td></td>
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<tr>
<td>3.</td>
<td>I could write music if I got a little help.</td>
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<tr>
<td>4.</td>
<td>Leading others in singing or playing music would be difficult for me.</td>
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<tr>
<td>5.</td>
<td>I can play or sing difficult rhythms.</td>
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<td>6.</td>
<td>I think I could win a music contest if I really tried.</td>
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<tr>
<td>7.</td>
<td>I am glad when asked to sing or play for others.</td>
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<tr>
<td>8.</td>
<td>Music teachers often embarrass me by asking questions which I can’t answer.</td>
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<tr>
<td>9.</td>
<td>I am glad my parents expect a lot from me in music.</td>
<td></td>
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<tr>
<td>10.</td>
<td>I usually feel uncomfortable when I am around music.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>I feel good when my parents notice my progress in music and praise me.</td>
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</table>
12. When I stop and think about it, I really believe I’m talented in music.

13. My parents believe I can learn to play or sing very well.

14. Teachers notice my progress in music and give me credit.

15. My friends really like my playing or singing.

16. My music teachers don’t expect much of me.

17. I come from a musical family.

18. I could lead the class if my music teachers asked me to take their places.

19. I feel that kids would laugh at me if I made mistakes in music.

20. I’d be glad if teachers asked me to play or sing for programs.

21. I believe I could become a professional singer or player.

22. Kids notice my progress in music and give me credit for what I can do.

23. Music is all right for others but not for me.

24. I will not be good enough to be in choir or band in college.

25. I enjoy playing for others.

26. I expect a lot of myself in music.

27. People my age admire my musical ability.

28. I have such a rough time in music class that I often feel worthless.

29. I find myself helping my friends with their music.

30. I am glad my family likes to listen to me perform music.

31. Music is harder for me than for the other kids.

32. I am not satisfied with my progress in music.

33. At least one member of my family says I am really good in music.
34. I would like to have a professional career in music.
35. Usually I enjoy practicing music.
36. I like it when music teachers give me difficult music to learn.
37. If my friends chose a music leader, they would probably pick me.
38. Other kids sometimes ask me to play or sing with them.
39. I expect to play or sing in performing groups in high school.
40. No one pays much attention to my musical activities at home.
41. I don’t have even one friend who would say I am any good in music.
42. I practice more because my teacher thinks I can do well in music.
43. Compared with other kids, I think I am talented.
APPENDIX C
Parental Permission Form

Dear Parent:

My name is Myung-Sook Auh. I am a doctoral candidate in music education at Case Western Reserve University in Cleveland, Ohio. I am working on my dissertation on musical creativity. With an intention of contributing to the improvement of music teaching and learning, I am going to conduct an experimental study. Therefore, I am writing to you asking for your agreement on your child’s participation in this study.

Your child will be asked to compose a song on an Orff xylophone individually. Also, he/she will be asked to take two short music listening tests if you wish to know the results of the standardized music tests. I will be happy to share the results with you. The testings for this study will start on January 6, 1994 and be finished by the end of February, 1994.

The music teacher of your child, Ms. Ella Lee, has offered her cooperation with this project. Your child’s results will be kept entirely confidential, and they will not affect your child’s grades in any way. Please complete the bottom portion of this sheet, and have your son or daughter return it to school as soon as possible. Thank you very much.

Sincerely,

Myung-Sook Auh

Your child’s name ________________________________

Your child’s birthday ______________________________

Would you agree on your child’s participation in this research project (circle one)?

Yes  No

Your signature ___________________________________
APPENDIX D
Composition Rating Form

Scoring Dimensions & Their Definitions

Craftsmanship: the degree to which the tonal and rhythmic elements in a composition show technical mastery.

Musical Syntax: the degree to which the tonal and rhythmic patterns in a composition are structured in a logical manner, so that the music makes sense.

Musical Originality: the degree to which the composition is unique, when compared to the existing songs for children, and different from the songs by other children.

Musical Sensitivity: the degree to which the composition is musically expressive, so that the music reflects the child’s aesthetic sensitivity in music.

Repetition of Song: the degree to which the second playing of the composition is the same as the first playing of the composition.

Rating Scales

1. Use a 7-point rating scale in the following way:

   1  2  3  4  5  6  7
   Low  Medium  High

2. Rate the composition for the five dimensions, i.e., Craftsmanship, Musical Syntax, Musical Originality, Musical Sensitivity, and Repetition of Song. Definitions of the five scoring dimensions are shown above. Write the ratings on the provided space in the rating sheet.

3. Please make sure that 1) your ratings are accurate; and 2) if you do the ratings again, your second ratings will be consistent with your first ratings.
No. ____________

Craftsmanship (1–7) ____________

Musical Syntax (1–7) ____________

Musical Originality (1–7) ____________

Musical Sensitivity (1–7) ____________

Repetition of Song (1–7) ____________