This is to certify that the

dissertation entitled

The Effects of Pattern Instruction, Repeated Composing Opportunities, and Musical Aptitude on the Compositional Processes and Products of Fourth-Grade Students

presented by

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has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Music Education

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Date 4/7/95

THE EFFECTS OF PATTERN INSTRUCTION, REPEATED COMPOSING OPPORTUNITIES, AND MUSICAL APTITUDE ON THE COMPOSITIONAL PROCESSES AND PRODUCTS OF FOURTH-GRADE STUDENTS

by

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

School of Music

1995

ABSTRACT

THE EFFECTS OF PATTERN INSTRUCTION, REPEATED COMPOSING OPPORTUNITIES, AND MUSICAL APTITUDE ON THE COMPOSITIONAL PROCESSES AND PRODUCTS OF FOURTH-GRADE STUDENTS

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The purpose of this study was to determine how four intact classes of fourth-grade students' (N=64) processes and products are affected by music aptitude and different instructional methods. Each student's music aptitude was measured using the *Intermediate Measures of Music Aptitude.* One class received repeated composing opportunities and pattern instruction; another received repeated composing opportunities; the third received pattern instruction; the fourth served as the control group. At the end of the 12-week period, students were individually recorded composing an original song. Two independent judges analyzed each composing process for the presence of exploration, development, repetition, and silence. Another pair of judges analyzed the compositional product for its cohesiveness, pattern use, and extensiveness. In addition, they rated the students' ability to replicate their song. The data were analyzed using two-way analysis of variance ($p < .05$).

The class that received pattern instruction and repeated composing opportunities used significantly less exploration than all other groups. High aptitude students used significantly less exploration than low aptitude students. The class that received repeated composing opportunities and pattern instruction, and the class that received pattern instruction used significantly more development than the control group. The class that received pattern instruction used significantly more repetition than the class that received repeated composing opportunities and the control group. No significant

differences were found in students' use of silence. The group that received pattern instruction used significantly more time to compose than any other group.

No significant differences were found for metric cohesiveness, developed rhythmic pattern, repeated melodic pattern, developed melodic pattern, or length of finished product. Significant interactions among treatment groups and aptitude were found for tonal cohesiveness, repeated rhythmic pattern, range, and replication. Students with low aptitude who received repeated opportunities to compose were less able to replicate their songs than students in all other groups.

To my mother and father.

ACKNOWLEDGMENTS

I wish to extend my appreciation to Dr. Robert Erbes, Dr. John Kratus, Dr. Judith Palac, Dr. Theodore Johnson, Dr. Michael Largey, and Dr. Richard Laurence for serving on my doctoral committee.

Most importantly, I wish to extend my appreciation and gratitude to my dissertation advisor, Dr. Cynthia Taggart, whose constant support, guidance, and patience throughout this project deepened my understanding of what it means to be a teacher.

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CHAPTER I

CREATIVITY AND ITS ROLE IN MUSIC EDUCATION

Introduction

How can we ensure the pursuit of meaning in musical studies? The key is creative involvement. The creative process must accompany all, and especially the earliest, study of musical information. Discovery and understanding of meaning flow most naturally from the experience of using and manipulating information. (Castaldo, 1969, p. 38)

Getting involved with music by actually manipulating the materials . . . into formally organized shapes can reveal a great deal to the student. (Benson, 1973, p. 40)

Products are the artifacts of thoughts. (Rhodes, 1961)

Creativity is one of the most complex of human functions. (Treffinger, 1986, p.16)

For nearly a century, education, particularly in the arts, has explored the phenomenon of creativity. Music education saw evidence of interest in creativity as early as 1922 with the publication of Satis N. Coleman's *Creative Music for Children.* She believed that exploration, improvisation, and composition should precede the instruction of musical notation. This was radical thinking when one considers the pedantic "drill" philosophy of music education during the 1920's.

Creative activities in education are finally receiving some attention, now that one of the trends in education is focused on the development of creative and critical thinking skills. In 1994, the National Committee for Standards in the Arts published the *National Standards for Arts Education.* Included in the new curriculum is the development of creative skills: "The curriculum for every student should include

improvisation and composition. Many students gain considerable information about music and acquire rudimentary performing skills, but too few have ample opportunities to improvise and compose music. Teachers who lack these skills tend to assign them a low priority" (1994, p. 4).

Creative and critical thinking are both higher-level thinking skills. Creative thinking is generative, and critical thinking is evalutive. However, the two are related. "Evaluation is a primary goal of critical thinking, and music is evaluated in cognitive and affective ways that are informed by experience. . . Like critical thinking, creative thinking is higher-level thinking with a specialized purpose -- the focus on something new" (DeTurk, 1989, p. 21, 27). Although these two terms seem to be specialized as they relate to music, they are both complementary in nature (DeTurk, 1989).

Hitz (1987) states that "if children are to grow cognitively, they must encounter problems, have opportunities to solve these problems for themselves, and experience the consequences of their decisions. Knowledge is constructed as children solve everyday problems they encounter" (p.12). Cleall (1983) further states that ". . . without the creative experience, there results intellectually deficient pupils . . ." (p.46).

When presented the challenging task of creating, children are faced with divergent questions that enhance problem solving skills (Hitz, 1987). Whereas convergent tasks are designed to solicit a single answer, divergent tasks allow for several possible answers (Webster, 1990). As children create, they explore, make critical judgments, shape ideas, and revise their work in order to produce a finished product. Davidson (1990) states that "the process of revision plays an important role in the development of judgment. By being confronted constantly with the results of past choices, a student must constantly reevaluate the nature of the problem and the appropriateness of the solution" (p.51). He further states that "making choices, evaluating them, and shaping them are central activities in the arts. From this perspective, revisions are the footprints of thought" (p.49).

Unfortunately, in the past, creative activities have not been an integral part of education. In *A Place Called School*, Goodlad (1984) found that almost no attention was given to higher order thinking skills when teachers posed questions to their students. Almost all questions could be categorized at the lowest level of Bloom's taxonomy (knowledge); few questions were asked that elicited responses of reasoning, problem solving, or opinions. He also found that nearly 70% of instruction was through lecture. Seven years later, Levi (1991b), stated that "educators have been slow to recognize both how much children can learn when they create and what can be discovered about children from their original work" (p.2).

The Pillsbury Foundation School of Santa Barbara (1937-1948) demonstrated early interest in children's creativity. The goal of the school was to discover natural forms of children's musical expression and "determine a means of developing their musical creativity" (Shelley, 1981, p. 27). Philosophically, the founders of the Pillsbury Foundation School believed that children were inherently creative, and creativity would emerge at its own rate. This type of thinking reflected the ideas of philosophers who helped pave the way for more progressive education before the 1950's: Rousseau, Pestalozzi, and Mason (Wilson, 1981). Ironically, "although the School was created in harmony with educational philosophies typical of its time, it was nevertheless ahead of its time; the Pillsbury Foundation School came and went when the music education profession was not ready for the information it offered" (p. 15).

Music education missed yet another opportunity to assume a prominent role for creativity and critical thinking in education. Nearly 50 years ago the Music Educators National Conference (MENC) addressed the issue of creativity. In the 1947 *Music Education Source Book*, MENC stated two future goals related to creativity. MENC believed that music educators should: (a) understand and encourage the process of creativity in each child on a daily basis as a means of expression, and (b) evaluate the discriminative ability as the child experiences the creative process in order to nurture

this discriminative ability and evaluate the methods used (Richardson, 1983). Sadly, Richardson states that she was "unable to identify a single musical creativity study undertaken during the eleven years following the MENC statement" (p.4).

Examples of this dichotomy between professional philosophy and professional practice are numerous. Regelski (1981) and Reimer (1989), two prominent music educators, both advocate creativity in music education. However, Ainsworth (1970), Goodlad (1984), Levi (1991a), Ling (1974), Sherman (1971), and Webster (1987) have stated that creative musical activities are rarely employed. Oehrle (1984), in a study of elementary music textbooks in this country and England, cited the inconsistency between the relative absence of genuine creative activities and the philosophical endorsement of such activities.

Schmidt and Sinor (1986) suggest that this "situation may be attributable to several factors, among which has been incomplete knowledge of the creative process and lack of adequate means of measurement and evaluation of divergent musical behavior" (p.161). Davidson and Welsh (1988) and Levi (1991b) support Schmidt and Sinor's explanation. If creativity is to be given any attention, teachers must understand the creative process in order to establish appropriate expectations for students and implement appropriate pedagogical practices; *process* in addition to *product* must be investigated.

The Creative Process

Researchers and theoreticians have been investigating the nature of the creative process. The existence of four stages in the creative process was suggested as early as 1926 in Wallas' *The Art of Thought.* After much dialogue with creative thinkers, Wallas (1926) proposed the following stages of the creative process: (a) *preparation* -- the time when problems are considered, (b) *incubation* -- time away from active

consideration of the problem, (c) *illumination* -- the moment of insight, and (d) *verification* -- the time when solutions are tested and refined.

The research literature generally supports Wallas' theory (Balkin, 1990). For example, J. P. Guilford and E. P. Torrance attempted to minimize the ellusive nature of creativity by refining and standardizing its definition and by establishing criteria for evaluation (Richardson, 1983, p. 4). Guilford's taxonomy of creativity includes three categories (content of thought, kinds of operations, and products), all of which are a part of his Structure-of-Intellect (SI) model. Balkin (1990) calls this "'the creativity equation,' C=3P" (p.29). The P's stand for *Person*, *Process*, and *Product*.

Richardson (1983) provides a succinct summary of the five steps comprising the *process* component of Guilford's taxonomy of creativity:

> Step one is an awareness of the problem or cognition of implication. In step two the problem is structured or understood in terms of the kinds of information needed for its solution. This step involves cognition of relations and systems. Step three involves the divergent and convergent production of ideas for the solution. Step four is evaluation of both the conception of the problem and the suggested solutions. Step five occurs when the information is stored in the memory for later use. (p. 5)

Torrance built his theories of creativity on Guilford's research and subsequently developed his *Tests of Creative Thinking*, a test that measures an individual's creative potential. As a result of his research, Torrence defined the creative process as follows:

> . . . the process of sensing gaps or disturbing missing elements; forming ideas or hypotheses concerning them; testing these hypotheses; and communicating the results, possibly modifying and restating the hypothesis. (Torrance, 1966, p. 19)

Creativity in music often takes the form of composition. In order to investigate the compositional processes of music, it is important to note the distinction between composition and composing. According to Kratus (1989):

> the word *composition* refers to both process (the activity of composing) and product (the resulting music) . . . A composition, when referring to a product, is a unique sequence of pitches and durations that its composer can replicate. A composition reflects closure on a compositional problem. If one cannot replicate an original melody, then it can be inferred that there is no closure, and the music does not exist as a composed product. When referring to a process, composition is the act leading to the production of a unique, replicable sequence of pitches and durations. (p. 7-8)

Another distinction must be made between composition and improvisation. Both are creative activities, and both involve the creative processes similarly described by Guilford and Torrance (problem finding, idea generation, modification of ideas, and evaluation of tentative solutions). However, composition involves reflection and revision before the product is considered finished. Improvisation may be a part of the compositional process, but considered in isolation, improvisation does not involve revision and is not replicable; it is more of an immediate stringing of events (Kratus, 1989; Pressing, 1988; Webster, 1992).

Much of early research on the creative process was directed toward the adult population. Results of this research support the model: *preparation*, *incubation*, *illumination*, and *verification*. Bennett (1976) investigated the process of musical creation through extensive interviews with eight professional composers of classical music. He found that they all followed similar steps in the creative process: germinal idea, sketch, first draft, elaboration and refinement, final draft copying, and revision. Evidence of the four stages of creative development previously mentioned are apparent in Bennett's conclusions: germinal idea = preparation; first draft = incubation;

elaboration and refinement = illumination; final draft and revisions = verification (Kratus, 1989).

Sessions (1970) found that adult composers proceeded through four stages of composition: subconscious (improvisation), conscious (development of ideas), working (parts become a whole), and assessment. Again, Kratus (1989) links these four stages to *preparation*, *incubation*, *illumination*, and *verification*.

Bennett (1976) cites Graf's assessment of the adult creative process. Graf postulates that composers move through four stages. The first stage, *productive mood*, is reflected by improvisation or possibly other variables, such as the seasons of the year. The second stage, *musical conception*, sees the emergence of musical motives or themes. A *sketch* is then produced before the actual *composing process* expands the ideas.

Research on children's compositional processes is in its infancy. As recently as 1989, Kratus stated that although there is literature that "offers some insight into adult compositional processes, there is no published research to suggest that children compose in a similar manner" (p.6). Investigating children's compositional processes poses some interesting challenges. A common approach to process assessment is examination of composers' sketchbooks; the general population of children does not have these. Another approach involves interviews with composers. Children, however, are unlikely to be able to discuss meaningfully their compositional processes; even adult composers are notoriously unreliable at doing so (Perkins, 1981).

Kratus (1989) pioneered a technique to study children's compositional processes by audio-taping children composing during 10-minute sessions. He created a process-analysis measure by dividing the composing session into 120 intervals of 5 seconds each. Independent judges subsequently listen to students' composing sessions and categorize each 5-second interval as involving one of four categories labeled as exploration, repetition, development, or silence. Unlike the models established by

Guilford (1950), Torrance (1966), and Wallas (1926) [preparation, incubation, illumination, and verification], the four categories identified by Kratus do not occur in strict sequence; each process category can be used throughout the compositional process, freely moving from one to another. However, Kratus' process model still reflects the models established by Guilford (1950), Wallas (1926), and Torrance (1966): exploration = preparation; development and silence = incubation and illumination; repetition = verification.

Kratus and others (Hoffman, 1992; Hoffman, Hedden, & Mims, 1991) have employed this compositional-process measure to study how time spent in exploration, repetition, development, and silence affects the compositional product. Additionally, these studies have investigated how other variables (i.e., instruction, aptitude, age) affect the ways in which children use exploration, development, repetition, and silence as they compose. For example, Hoffman, Hedden, and Mims (1992) and Kratus (1989) found that as children get older, less compositional time is spent exploring, and more compositional time is spent developing and repeating musical ideas.

Other literature exists regarding the relationship of age to the creative process. Dacey (1989) suggests that there are peak periods of creative growth across the lifespan. He states two major points of view on creativity: psychoanalytic and humanist. The psychoanalytic school believes that creativity must be fostered during the first five years of development; "if creative attitudes and ability are not inculcated in the child during this period, there is no hope of them later" (p.226). The humanist school, to which Dacey belongs, believes that creativity can be fostered regardless of age. According to Dacey's theory, adolescence should be a very creative period. However, this is inconsistent with a study by Hassler (1991) who found that in adolescence "children who display creative musical behavior early often lose the ability to compose in the course of puberty" (p.62).

An important consideration for creative activities is equipping students with the necessary tools with which to be creative. Davidson and Welsh (1988) found that college students composed differently according to their level of musical development. They state that "the definition of a task like writing a melody is very different for musicians at different levels of cognitive development. We see that these differences play an important role not only in the definition and goals of the task, but also in the strategies employed and in the quality of the results" (p.284).

This information is also applicable to children. Henle (1975) suggests the importance of "creative tools" for creativity. She states the following:

> Another factor making for individual differences in creativity is said to be the number of associations a person has: "The greater the number of associations that an individual has to the requisite elements of a problem, the greater the probability of his reaching a creative solution" [quote not identified]. In other words, the more items in your fishbowl, the more likely you are to find the one needed for a creative combination. (p.798)

If students have a broad knowledge base with which to make creative decisions, then they can evaluate and revise their work with more meaning and more musicianship (Davidson, 1990).

Gordon (1993) states that a child's degree of creativity is incumbent upon a vocabulary of tonal and rhythmic patterns and an understanding of different tonalities and meters. The patterns become "vocabularies" (Gordon, 1993, p. 94) that children can use within a musical context; children are able to experience the patterns in a musical context as they relate to the harmonic framework and rhythmic framework in which the pattern occurs. "The larger the student's vocabulary of tonal patterns and rhythm patterns, the better he will be able to make decisions and choose appropriate tonal patterns and rhythm patterns from his 'audiation dictionary' that will contribute to the artistry and syntax of the music that he is creating and improvising" (p. 96).

Gordon's Learning Theory is similar to the stages of language development proposed by Gagné (Jordan-DeCarbo, 1986); the child acquires language skills by first listening, followed by babbling, imitating, putting meaning to words, combining words into meaningful thoughts, and finally reading and writing. Music development, like language development, depends on aural stimuli.

Others have also compared music development and language development. Bennett (1975), after discussing the stages of language development, states: "Young children cannot explain the rules of grammar they have so cleverly deciphered and learned to use; but they can operate on the basis of these rules, which matters most" (p. 207). He further adds: ". . . how much more interesting life would be if one could also 'speak' musically - at the very least to one's self, and maybe also with other people" (p. 207).

Gordon's extensive research culminated in a highly sequential learning theory in which *when* to teach is emphasized rather than *what* to teach (Walters, 1989). His approach takes students through the following stages of musical development:

Discrimination	Inference
1. Aural/oral	1. Generalization
2. Verbal Association	2. Creativity/Improvisation
3. Partial Synthesis	3. Theoretical Understanding.
4. Symbolic Association	
5. Composite Synthesis	

What children are taught in the discrimination level can be applied in the creativity/improvisation level; students are given the necessary "tools" with which to be creative. Gordon (1993) states, "It would be difficult to overestimate the importance of teaching tonal patterns and rhythm patterns at the aural/oral and verbal association levels of discrimination learning as preparation for developing creativity/improvisation skill in inference learning" (p. 96). This is supported by Davidson (1990), who suggests that when children compose, they can draw from their aural knowledge and

"evaluate their work on the basis of a fuller representation, and, if necessary, can revise it to better match the melody they have in mind" (p.49).

Critical to Gordon's learning theory is a knowledge of students' musical aptitude. Music aptitude can be defined as one's potential to learn music. Aptitude is not synonymous with ability or talent, which confound potential to achieve with achievement itself. A student's music aptitude level is used to determine not the general *content* that a student learns, but rather the *level of difficulty* of the specific content of music instruction (Gordon, 1993). For example, all students are taught rhythm patterns, but the number and difficulty of patterns that students are expected to master vary for each individual, based on their music aptitude. "The role of music aptitude in inference learning is more important than it is in discrimination learning. The higher a student's tonal and rhythm developmental and stabilized music aptitudes, the more successfully he will be able to engage in inference learning" (p. 94). Logic would infer, therefore, that students with higher aptitudes would be more likely to compose differently than students with lower aptitudes; students with higher aptitudes would be more likely to produce a more successful compositional product than students with lower aptitudes. However, there is conflicting research regarding the relationship between aptitude and creativity. Swanner (1985) and Vaughan and Meyers (1971) found no relationship between aptitude and creativity; Kratus (1994b) reported a positive correlation between aptitude and creative keyboard composition.

The Creative Product

According to Rhodes (1961), "When an idea becomes embodied into tangible form it is called a product. Each product of a man's mind or hands presents a record of his thinking at some point in time" (p. 309). Besemer and Treffinger (1981) further add: "Metaphorically, the creative product may be thought as a manifest 'brain-child.' . . . Products are a tangible result of the creative process" (p. 159). Therefore,

investigation into the nature of creativity must include careful study of *product* as well as process.

Establishing criteria for evaluating creative products can be hindered by subjectivity. Barron, Gaines, Lee, and Marlow (1973) found that, when two teams of judges rated art products, interjudge reliability was high for the objective criteria but was significantly negatively correlated when they were asked to rate for merit, a subjective criteria. This seems to suggest that specific criteria are needed to remove the subjective dimension from product evaluation. "If there really is a group of characteristics which contribute [sic] to the creativeness of a product, then it must be possible (albeit difficult) to identify those qualities, to measure the extent of their presence in a product and ultimately to train people to develop their abilities to make their products more creative" (Besemer and Treffinger, 1981, p. 160).

According to Colley, Banton, Down, and Pither (1992), product evaluation of musical composition is difficult to evaluate because there are not "explicit goals containing a set of subroutines which either accomplish their purpose or fail" (p. 125). Reitman (1965) characterizes composition as an ill-structured problem in which there are numerous solutions and few constraints. There may be some constraints in composition (length, tonality, meter), but many other choices exist, all of which are affected by the decisions of the composer. Voss, Greene, Post, and Penner (1983) investigated how students approached solutions to political science problems (ill-structured) and physics problems (well-structured). They found a high degree of agreement for solutions to the physics problems and a low degree of agreement to the political science problems. "In composition as in political science there is no 'correct' solution and often no obvious explicit reference upon which to base judgements of quality" (Colley, Banton, Down, and Pither, 1992, p. 125).

Just as models of the creative process have been established by Guilford (1950), Torrance (1966), and Wallas (1926), some models for evaluating the creative product

have been developed. Brogden and Sprecher (1964) set four criteria for product evaluation:

1. novelty (unusualness),
2. appropriateness of the solution (to both the problem and to the solutions' various parts),
3. transformation (the ability of the product to actually create new forms rather than to merely improve upon pre-existent ones), and
4. the power of "condensation" of the product, the combined economy and elegance of the solution which is not simply "right" but "just right."

Another evaluation for the creative product was designed by Besemer and Treffinger (1981). Through a review of literature of more than 90 sources, they grouped criteria for product evaluation into 14 general categories, which were subsequently classified into three general dimensions: (a) Novelty - transformational, germinal, and original, (b) Resolution - valuable, useful, adequate, appropriate, and logical, and (c) Elaboration and Synthesis - elegant, organic, attractive, well-crafted, complex, and expressive. They concluded their review by stating problems with product evaluation: "Often the problems have semantic bases: problems in definition, aspects of originality, the perceptions of those other that [sic] the creator of the product and the practical administration of a measuring instrument" (p. 173).

When applied in a musical context, the creative product is the result of improvisation, composition, or performance (Kratus, 1990; Webster, 1990). "As students improvise, compose, and perform music creatively, their understanding of musical elements and musical organization increases. Another term for musical organization is musical syntax. Meter and tonality are examples of syntax, and when a student composes a song in duple meter, it is an indication that he or she has learned syntax for meter" (Kratus, 1990, p. 37). Therefore, it is important to evaluate musical

creative products for metric and tonal cohesiveness, because this will show the degree to which the student understands musical syntax.

According to Kratus (1990), "analysis of musical products could include a description of how musical elements such as form, timbre, the use of tonality, texture, rhythm, meter, and dynamics are used" (p. 34). Kratus' (1994a, 1994b) research on children's musical compositions has included a measure for the creative compositional product for which judges rate the product for metric and tonal cohesiveness, percentage of pattern use, extensiveness (range and length), and replication.

Hickey and Webster (1994) investigated assessment scales used for evaluating children's musical compositions. Their review of literature revealed a myriad of techniques used to evaluate compositional products. They found that rating scales were most commonly used for product evaluation. "A content analysis of these rating scales for children's composition used in previous research studies revealed two types of item design: (1) open-ended, implicit, and (2) explicit criteria definitions. Items also fell into two content categories of 'musical characteristics' and more 'global considerations'" (p. 1). The purpose of the study was to compare interjudge reliability of the two types of item design in the rating of children's compositions. They state, "Our overall intent was to provide better information about (1) the content and design of rating scales, (2) interjudge reliability of rating scales, and (3) concurrent validity of rating scales with the global constructs of "craftsmanship," "creativity," and "overall aesthetic value" (p. 1).

Hickey and Webster constructed two separate composition rating forms based on the design of items from rating scales of previous studies. One form used only implicit items; the second form used only explicit items. They selected ten fifth-and sixth-grade children's compositions from a pool of 24 compositions. Four independent judges rated the compositions using the two types of forms. They also chose the two "best" and two "worst" compositions for craftsmanship, creativity, and overall aesthetic value.

All ratings were used for statistical analysis. Results showed high interjudge reliability for both types of forms.

Effects of the Creative Process on the Creative Product

Research has shown that the creative process and the creative product are closely linked (DeLorenzo, 1989; Hoffman, 1991; Kratus, 1989, 1994a). Any investigation into compositional creativity should include these two components, because "*how* children compose music affects *what* they compose" (Kratus, 1995, p. 118). One way in which the creative process and product are linked is by age. Kratus (1989) investigated how children, ages 7 to 11, spent their time composing. He found that children use different strategies to compose as they get older; repetition and development are employed more with older children. Hoffman, Hedden, and Mims (1991) also found that older students spend more time in development and repetition than younger students.

Kratus (1994a) investigated how the tempo at which children compose affects the final product. He found that "those children who began composing with a slower tempo tended to compose music that was shorter and more cohesive, tonally and metrically. The children who began composing at a faster tempo tended to compose longer, less structured music" (p. 5).

Finally, Kratus (1991) used a rating process to determine if children's compositions were "high-success" or "low-success." Of the 60 songs in the study, 10 were designated as "high-success" and 10 were designated as "low-success." Each composition was analyzed for composing strategies (identified by Kratus) used during the compositional process. He found that the difference between "high-success" songs and "low-success" songs resulted from how children used exploration, development, repetition, and silence as they composed. "In other words, the success of the product appears to be dependent upon the nature of the process" (p. 102). DeLorenzo (1989)

found that students who spend more time developing and repeating ideas will create better finished products because they spend their decision-making on musical considerations.

Continued research into creativity will enable educators to gather more information that could serve as a basis for establishing curricular and pedagogical guidelines for the music classroom. "By encouraging our children to think imaginatively about sound and by capturing this imagination in the form of products that others can share, we can increase their musical understanding, deepen their aesthetic sensitivity, and uncover new ways for them to understand the subtleties of humanness" (Webster, 1990, p. 21).

Purpose and Problems

Dewey (1933) proposed that reflective thinking should be encouraged by education, and research has found that children have an innate curiosity for exploring and creating music (Moorehead & Pond, 1978). However, the literature suggests that creative activities, particularly composing, have not secured a firm foundation in most music curricula.

According to Castaldo (1969), subjects such as theory, solfege, or instrument playing

> are taught as if they reach ends, not means, so that playing a clarinet is taken to mean that one has studied music. Actually, the only tangible result may be the development of a kind of physical prowess, an ability to read notes, or to react quickly to the stimuli of musical symbols, but this does not guarantee an understanding. (p.37)

Giving children the opportunity to produce their own music can provide insight into music's structure, symbol system, and aesthetic import, concepts that pose difficult challenges for even the most gifted teachers. In fact, Azzara (1993) found that students

from an improvisation curriculum showed significantly higher achievement levels on their instrument than students who received instruction without an improvisation emphasis, suggesting that creative approaches to music education can improve music achievement.

The following chapter will examine studies that have taken the first steps toward finding answers about children's compositional processes. The limited research in this area has begun to offer some insight into the child's creative domain. However, continued research is needed if creativity is to become an integral part of music education.

The purpose of this study is to investigate the creative processes and products of children's keyboard compositions. The study is intended to provide pedagogical implications for creative activities in the general music classroom.

The specific problems of the study are as follows:

1. To determine the effect of instruction and music aptitude on the processes of fourth-grade children's composing. Specifically, how long does it take children to compose a song, and how much time is spent in exploration, development, repetition, and silence during their compositional processes?
2. To determine the effect of instruction and music aptitude on the tonal cohesiveness and metric cohesiveness of fourth-grade children's compositions.
3. To determine the effect of instruction and music aptitude on the melodic and rhythmic pattern-use in fourth-grade children's compositions.

4. To determine the effect of instruction and music aptitude on the extensiveness (range and length) of fourth-grade children's compositions.
5. To determine the effect of instruction and music aptitude on the ability of fourth-grade children to replicate their finished compositional product.

Students involved in this study will not have had any prior pattern instruction; the students will also have not had any formal keyboard instruction.

CHAPTER I I

REVIEW OF LITERATURE

This study will focus on the effect of instruction on musical creative process and product. Additionally, it will investigate the effect of music aptitude on the creative processes and products of children. Therefore, the literature that is directly related to this study falls into four categories. They are the following: (1) studies of creative processes of children's musical compositions, (2) studies of creative products of children's musical compositions, (3) studies of the effects of musical aptitude on the creative process and product of children's musical compositions, and (4) studies of the effects of instruction on the creative process and product of children's musical compositions. This review of literature comprises a discussion of each of those categories of study.

Creative Process Studies

During the 1940's, the Pillsbury Foundation for the Advancement of Music Education published *Music of Young Children,* a series of four studies, three of which were written by Moorehead and Pond, and the fourth was written by Moorehead and Wight (Moorehead and Pond, 1978). Additionally, a recording (78 rpm) was produced called "Recordings of Spontaneous Music." This represents one of the initial and most influential efforts toward the understanding of children's creative processes. According to Wilson (1981), these publications and recordings asked "the profession to recognize the complexity of children's musical creations and they challenge(d) educators to compare this view of children's musicality with the prevailing practice of beginning children's music education with a simplified version of adult harmonic music" (p. 19-20).

The studies at the Pillsbury Foundation involved pre-school children ranging in age from one and one-half to eight and one-half. The number of children involved at the school averaged between ten and twenty, depending on the school's enrollment. Children were provided with a myriad of musical instruments on which they would predominantly explore and improvise. Teachers facilitated the activities; they also kept meticulous notes based on their observations. They found that children did not improvise randomly; children "have an innate apprehension of the function of formal procedures when sounds are being structured" (Pond, 1981, p. 11). Research has found that improvisation/exploration is a critical component in the creative process. Perkins (1981) stated that "a pattern of exploration in the early stages of narrowing down and readiness to revise earlier decisions in the later stages is characteristic of creating" (p. 187). This is supported by the models of the creative process developed by Guilford (1967), Torrance (1988), Wallas (1926), and Webster (1987).

The Pillsbury study, despite its valuable contributions to musical creativity, presents limitations as they relate to this study. Children improvised and explored in an environment that was atypical of environments found in schools then and today. "By any standard of comparison it was a most unusual nursery school, . . . even now as then" (Wilson, 1981, p. 13). Because the study was conducted during World War II, some children remained in the school for weeks or months; others remained in the school for as many as two years. This inconsistency causes one to accept the data cautiously. Furthermore, the students' average age was primarily three and four; children aged eight and nine years of age will be the focus of this study. Nevertheless, the data gathered by the Pillsbury School relating to children's exploration and improvisation serves as a valuable foundation on which to base future studies.

Kratus (1989) investigated the use of exploration, development, repetition, and silence by children composing a melody. He found a preponderance of exploration in 7-year-olds' creative processes. The subjects (N=60) were 10 boys and 10 girls for

each age group (ages 7, 9, and 11). The children were given 10 minutes to compose a song on an electric keyboard. The restrictions, beginning the song with middle C and using only the white keys, helped the students begin the task. This is consistent with Regelski's (1988) suggestions for creativity in the classroom: "If too much free choice is allowed . . . students can quickly become lost, waste time or lose interest for lack of guidance" (p. 294). The song had to be played successfully twice at the end of the period in order to be considered composed. If a student was unable to play the song the same way twice, it indicated that the student was exploring/improvising and not composing; composition requires a finished product. Although Kratus was not investigating improvisation, children's improvisational processes could be examined in future research.

Judges then listened to tapes of the children's 10-minute compositional period and labeled the children's behavior every 5 seconds (120 intervals) as being one of four activities: exploration, development, repetition, or silence. These terms are defined as follows:

> Exploration - - The music in a 5-second interval sounds unlike music played in earlier 5-second intervals. No specific references to music played earlier can be heard.
>
> Development - - The music in a 5-second interval sounds similar to, yet different from, music played in an earlier 5-second interval. Clear references to music played earlier can be heard in the melody, the rhythm, or both.
>
> Repetition - - The music in a 5-second interval sounds the same as music played in an earlier 5-second interval.
>
> Silence - - No music is heard in a 5-second interval. (Kratus, 1989, p. 9)

Interjudge reliability was correlated between the judges' ratings and the researcher's ratings for exploration, repetition, development, and silence. The coefficients were high, ranging from .76 to .98, suggesting high agreement among judges.

Judges marked their observations on a form containing 120 numbered blanks. As the judges listened to each student's 10-minute composing period, they marked an E (exploration), D (development), R (repetition), or S (silence) at the end of each 5-second interval. If more than one process was heard in a 5-second interval, the judge selected the process that predominated during that interval.

Seven-year-olds used more exploration than 9-and 11-year olds, suggesting that there are developmental differences in children's strategies for composing music. As children grow older and their musical syntax develops, the use of exploration diminishes and the use of development and repetition increases, thus their compositional processes become more similar to the processes used by adult composers. Kratus noted that subjects exhibited *preparation*, *incubation*, and *verification* during their creative processes but not *illumination*. He also stated that "subjects did not suddenly shift from using exploration to development to repetition. Rather, they intermingled processes, with one process and then another tending to predominate at various times" (p.17).

Kratus noted that the "7-year-old subjects had no difficulty in generating musical ideas on a keyboard, as shown by their infrequent use of silence. The problem that many 7-year-olds encountered was that they did not or could not develop and review their musical ideas" (p. 18). He concluded that because of the different approaches used to solve a compositional problem, the students (7-, 9-, and 11-year-olds) who were able to replicate their songs, thus confirming a composed product, may be more *product* oriented; those that could not replicate their songs tended to be more *process* oriented. He did not note, however, what the common link might be between

the students (7-, 9-, and 11-year-olds) who *were* able to replicate their songs. Is it possible that the majority were high aptitude students?

In a later publication, Kratus (1991) analyzed the compositions of the subjects in his 1989 study in order to characterize the musical decisions used by the successful composers as compared to the students with the least successful compositions. Success was determined by the rating of two dimensions of each student's song: Craftsmanship and Replication. Two independent judges, music teachers pursuing graduate degrees in music education, rated the tapes. Kratus defined and rated craftsmanship and replication as follows:

> Craftsmanship: Assign the first song in each pair of songs a number from 7 to 1 with . . .
>
> 7 = the song forms a cohesive whole and makes interesting use of melodic and rhythmic patterns.
>
> 1 = the song appears to have no structure, with seemingly random pitches and rhythmic durations.
>
> Replication: Assign each pair of songs a number from 7 to 1, with . . .
>
> 7 = the repetition of the song is the same as the original
>
> 1 = none of the repetition of the song is the same as the original.
>
> (p. 98)

To determine the success of the song, both judges' combined ratings of Craftsmanship and Replication were totaled. Success ratings, therefore, could range from 4 to 28. Subjects whose compositions received a score between 24 and 28 were designated as high-success songs; subjects whose compositions received a score between 4 and 7 were designated as low-success songs. There were ten high-success songs and ten low-success songs, creating a total of 20 songs to be used for further analysis.

Kratus then recorded another set of tapes that included all twenty songs in random order. Each subject's song was played and followed by the 10-minute

composing period in which the song was created. Three independent judges listened to each song and its corresponding composing period. They characterized each subject's composing strategies by using the following definitions:

Stepping movement:	exploration of new musical material using adjacent scale steps.
Skipping movement:	exploration of new musical material using intervals larger than a step.
Changing pitch of pattern:	development of a pattern by changing one or more pitches of an established pattern, while keeping the rhythm constant.
Transposing pattern:	development of a pattern by shifting the contour of an established pattern up or down the scale, while keeping the rhythm constant.
Extending pattern:	development of an established pattern by adding notes to the end of the pattern.
Repeating pitch:	one or more consecutive repetitions of a pitch.
Repeating whole song:	one or more consecutive repetitions of the whole song.
Speaking:	subject asks a question or makes a statement.
Silence:	subject stops playing the keyboard for 10 seconds or more. (p.99)

"For the purposes of this study, a compositional strategy was considered to be present in a 2-minute interval if at least two of the three judges rated it as being present" (p. 99).

Kratus found that there were definite similarities and differences between the groups creating high-success and low-success compositions. For example, both groups explored in the early stages of composition, and repetition of patterns was common as both groups composed. Students creating high-success compositions used step/skip movement early in their exploration, but it decreased with each passing minute; patterns were developed, and transposition was used infrequently. Low-success students explored for a longer period of time and did not develop musical patterns as frequently as high-success students.

Results of this analysis "suggest that successful songs are the product of certain compositional strategies, and that these strategies are quite different from those used to produce unsuccessful songs. In other words, success of the product appears to be dependent upon the nature of the process" (p. 102). It would be of interest to know how many students in each age group were categorized as having successful compositions and what processes the successful compositions had in common. If there were some successful compositions of 7-year-old children, age may not be the determining factor that differentiates the composing strategies of children. If all ages were represented in the successful composition group, further research is warranted to determine what characteristics they hold in common. It is possible that all the successful students had high musical aptitude. The present study intends to explore the effects of aptitude on the compositional processes and products of children's musical compositions.

In a later study, Kratus (1994a) examined the compositional process as it was affected by the tempos used by children during compositional opportunities. He found that the tempos used in the first minute of composition affect the tonal cohesiveness, metric cohesiveness, and length of the resulting compositions. The subjects (age 9, N=40) were asked to compose a song in 10 minutes. Some restrictions were applied: subjects had to begin their composition on middle C, and they were able to used only

17 white keys on the keyboard -- G below middle C to B two octaves above middle C. The recorded sessions were then analyzed for tempo during the 1st minute, 5th minute, and 10th minute, each being rated as slow, medium, or fast. Judges then rated each composition for tonal cohesiveness and metric cohesiveness.

Kratus found that students who composed at slower tempos "tended to compose music that was shorter and more cohesive, tonally and metrically. The children who began composing at a faster tempo tended to compose longer, less structured music" (p.5). These results are supported in an earlier study by Kratus (1989). Packard (1973) found the same to be true of the artistic creation process in children. Children's artwork tended to be rated higher (more successful) when produced at a slower rate.

Kratus (1994a) supplies a possible explanation for his results:

> It may be that a child who begins composing too rapidly will not leave enough time to reflect on the creative decisions made, and thus produce a less cohesive song. An alternative possibility is that a child who does not know how to compose a cohesive song will begin composing impulsively because he does not know what else to do. (p.6).

Hoffman, Hedden, and Mims (1991) conducted a study similar to Kratus' (1989) study. They used the same methods of data analysis that Kratus used in his study. However, the composing environment and subjects differed from those of the Kratus study in several ways: (1) Kratus' subjects were 7-, 9-, and 11-year-olds; Hoffman, Hedden, and Mims' subjects were second-, third- and fourth-grade students (ages 7 to 9), (2) Kratus' compositional period was 10 minutes; Hoffman, Hedden, and Mims' compositional period had no limitations, and (3) students in Hoffman, Hedden, and Mims' study were provided a text on which to base their composition: "Will you buy some food today? Any kind will do."

One of the questions asked in this study was ". . . given an open-ended situation, how much time would second, third, and fourth graders use in creating their

compositions?" (p. 1). Data revealed that students composed their songs in an average of 115.3 seconds, or slightly less than two minutes. For each grade level, the composing process lasted different lengths of time: second grade, 58.67 seconds, third grade, 98.89 seconds, and fourth grade, 118.33 seconds. These data suggest that students need less than two minutes to create a composition, implying that the inclusion of keyboard compositional experiences in the general music classroom would not necessarily have to preclude or replace other curricula. Future research should consider the length of the composing period.

DeLorenzo (1989) investigated the problem-solving processes of sixth-grade students in a general music class setting. This study differed from many other studies because its environment was a natural classroom setting rather than individual interview situations. The research involved one intact sixth-grade general music class at each of four different schools. The researcher videotaped one to three different creative activities at each school and analyzed the children's processes on a total of 16 videotapes. She found the following:

> . . . four interrelated characteristics of creative musical problem solving emerged as a framework for interpreting students' musical decision making process. In the 16 tapes analyzed, these four characteristics seemed to guide the musical decision-making processes of all students observed: (a) perception of the problem structure -- the openness with which students perceived the creating task, (b) search for musical form -- the degree to which students allowed the musical events to determine the form of the music, (c) capacity to sense musical possibilities -- the depth to which students developed and shaped musical events, and (d) degree of personal investment -- the level of absorption and intensity with which students engaged in the creating process. (p. 193)

Results of this study suggest that the structure of the problem ("the quality of choice given the problem solver within the parameters of the problem" [p. 195]) has a

relationship to the creativeness of the problem-solving process and resulting product. "When students used preexisting structural forms, . . . their decision making centered less on musical content and more on the operational aspects of performance" (p. 196). In other words, providing children text as a basis for composing music seems to draw students away from the musical content of their compositions. She also found that exploration depends on the ability to evaluate its expressive import, and that the more control students have over musical decisions, the more they will exhibit interest and participation in the finished product. These results would suggest that Hoffman, Hedden, and Mims' (1991) study, if they had not provided their student composers a text on which to compose, might have shown different results. More time might have been spent in exploration (Grade 2: 65.6%; Grade 4: 14.5%) and less time in development and repetition (Grade 2: 25.9%; Grade 4: 61.2%).

Interestingly, creative processes seem to be similar regardless of the creative medium. Levi (1991b) investigated the compositional processes of children involved in both musical and written language sign systems. Second grade students (N=6) were provided many opportunities to compose musical works and literary works. Unlike Kratus, Levi did not set any time limitations or choice limitations for the compositional process. All composing sessions were videotaped and analyzed according to a process model constructed by the researcher. Five process stages were observed for both domains (language and music) of composition: exploration, focus, rehearsal, composing, and editing. Results showed that the process of composition was similar for both language and music domains. The exploration, focus, and rehearsal phases of Levi's study are germane to the present study.

Levi noted that exploration occurred throughout the creative process for both young authors and young composers. "At times, particularly when engaging in major revisions of pieces, children returned to the exploration phase after having composed sections of their pieces, searching for new patterns that might catch their ears and

provide effective material" (p. 293). Levi also found that exploration served different purposes in the language domain and the musical domain. Whereas the young composers used exploration to develop the piece they were working on, the young authors used exploration to develop ideas that they would use in the future.

"The focus phase of the composing process signifies a shift from process to product-orientation" (p. 313). During the focus phase, students selected an idea that would begin to give the piece structure. Levi observed that children composing in the language domain and the musical domain pursued ideas that were ultimately not included in their final product; the phase was "multidimensional" (p. 314) and determined the manner in which compositions emerged. Levi states:

> *The understandings about what constitutes a piece vary depending upon the experiences students bring to composing* (emphasis by the author). Of importance here is the acknowledgment of the children's perspectives. What they produce when asked to compose an original piece is shaped both by the distinctions made by investigators and teachers and by the children's understandings of what constitutes a piece. (p. 314)

The rehearsal phase was characterized by divergent thinking. Students developed motives in the musical domain; they discussed their ideas in an interview in the language domain. Levi notes that the students' audiation skills were still developing and that "they considered how an idea that they heard in their inner hearing actually sounded when realized on an instrument. The children spoke to ideas as heard in their heads that they then checked by playing" (p. 315). In the present study, the aptitudes of most children will have stabilized, and their audiation skills will be more refined than those of the students in Levi's (1991a) study. How children use the pattern instruction with their audiation skills will be an important area of examination in this study.

This review shows that the compositional processes of children are similar regardless of the medium in which the child is composing. Age and musical "tools" are among the variables that affect the compositional process. However, important questions are raised from this section of the review: Is the compositional process affected by musical aptitude? Would a curriculum based on tonal and rhythm pattern instruction provide the necessary tools with which to create "successful" songs?

Creative Product Studies

One of the earliest investigations into children's compositions was conducted at the Cleveland Museum of Art and reported in a series of three articles by Doig (1941, 1942a, and 1942b). The study investigated the compositional products of children with no compositional training using three methods: creating music for a given text, creating music for a given subject or theme, and creating music to illustrate a given musical problem. Students, ages 6 through 16, composed in similar age groups by singing or whistling their ideas to the teacher who acted as a transcriber; other teachers observed and made written records of the activities. The data collected in this study, therefore, reflect composing characteristics of groups of children who are similar in age rather than the composing characteristics of individuals.

Doig (1942a) reported that "both older and younger children showed a strong tendency to prefer scalewise melodies, but the older children used all three types, namely scalewise, chordal and combinations of the two, while younger children scarcely used any except scalewise melodies" (p. 354-355). Interestingly, Doig (1942b) notes that the groups of 8-year-olds were unable to complete the assigned task until a model was provided, suggesting that there are disparate composing characteristics with each increasing age group. This would imply that creative activities warrant different approaches in different grades; the pre-school and primary aged children may need more time with creativity/improvisation readiness activities,

whereas the upper elementary grades may be developmentally ready for actual composing activities.

Data of a 1986 study by Kratus support the Doig (1941, 1942a, 1942b) report. Kratus examined the rhythmic and melodic motives in songs composed by children aged 5 to 13. The study examined five types of motive use in order to determine how each type was used by children of different ages and whether there were significant developmental differences in the use of each type. Eighty children, aged 5, 7, 9, 11, and 13, participated in the study; four schools were used to avoid the effect of a single music curriculum.

Subjects, composing on a hand-held electronic keyboard, were required to begin their piece on the pitches C-D-E. "Providing an opening three-note motive not only helped subjects get started, it also provided the subject with a ready-made motive which could be repeated or developed, if he wished" (p. 2). Additionally, the students were allowed to use only the white keys of the instrument, which "would facilitate the compositional process by limiting the musical choices at the subject's disposal" (p. 2). Students had ten minutes to compose their songs; at the end of the ten minute period, each song was recorded on a cassette recorder.

The songs were examined by two judges for five types of motivic use: melodic motivic repetition, same direction melodic motivic development, different direction melodic motivic development, rhythmic motivic repetition, and rhythmic motivic development. The resulting melodic data suggest the following: (a) children may already understand that music is made up of repeating melodic patterns before they enter school, (b) how to vary melodic patterns may develop during the elementary years, and (c) a logical learning sequence for composition would be melodic motivic repetition, same direction development, and different direction development. The resulting rhythmic data suggest the following: (a) an understanding of repeating

rhythmic patterns may develop during the elementary years, and (b) before age 13, children may not understand variation in rhythmic patterns.

Kratus (1986) notes the possible effects of developmental variables in this study. Playing a keyboard requires refined motor skills, skills that are significantly different in terms of development between 5 and 13 year-olds. Consequently, the results need to be considered cautiously.

Another view of children's compositions was provided by Swanwick and Tillman (1986). Their study investigated the compositions of 48 children, aged 3 to 15. Children were asked to compose songs on pitched and unpitched instruments during interviews; the final composition was a vocal song. Similar to the Kratus (1985) study, this study found that melodic and rhythmic repetitions begin to appear between ages six and eight. The older children demonstrated development of melodic ideas that were not present in the younger children's compositions.

Hedden (1992) investigated the compositional products of children in second, third and fourth grade. Students in the study received music instruction from an Orff specialist; the curriculum employed many creative and improvisational activities. The study (N=27) required children to compose a song on a keyboard during an individual interview with the researcher. The song had to use the following text: "Will you buy some food today? Any kind will do." The songs were audio taped and judged by two judges. They labeled every five-second interval of the students' compositions as being in one of four categories (as defined and established by Kratus [1989]): exploration, development, repetition, or silence. Additionally, the compositional product was rated by two different judges for its melodic and rhythmic cohesiveness (as defined and established by Kratus [1991]).

Hedden found that the number of highly rated compositions was significantly greater for the fourth grade students; ". . . one composition by a second grader appeared in the group of higher-rated compositions, and no compositions by fourth

graders were in the lower-rated group" (p. 6). Hedden suggests that the older students were more successful because they spent more time during the compositional process in development and repetition. Additionally, most of the students with higher-rated compositions were able to replicate their songs with no errors; of the children writing lower-rated compositions, only two of the nine could replicate their songs exactly. Implications would suggest that the more time students spend in development and repetition, the more likely they will produce a melodically and rhythmically cohesive compositional product. It may be that these characteristics are due to developmental differences. However, research is needed to ascertain whether specific instruction would affect students' compositional processes and products, regardless of age.

This review of children's compositional product studies suggests that product is affected by the age of the child; children in their early years (5-7-year-olds) tend to explore/improvise more whereas older children (9-11-year-olds) appear to be more capable of creating a finished product. For this reason, fourth grade students will be used in this study. The review of children's compositional products also suggests that melodic pattern development and rhythmic pattern development evolve differently. This study will investigate whether specific pattern instruction, melodic and rhythmic, will affect the compositional product in terms of use of melodic and rhythmic patterns and in terms of metric and tonal cohesiveness. Additionally, the review of literature in this section suggests that the compositional product may be affected by limited technical ability on the keyboard. Students in this study who have had more than a year of piano instruction will be omitted to avoid spurious results.

Music Aptitude Studies

There is a paucity of research investigating the effect of musical aptitude on creativity, particularly relating to children's compositions. Furthermore, the available data are conflicting (Kratus, 1994b; Vaughan, 1977). Kratus (1994b) states that "the

apparent conflict between the empirical research with children and the reports of composers may be related to the way musical creativity is conceived of and measured in the research" (p. 116). Since previous research has shown that musical aptitude does affect musical achievement (Kehrberg, 1984; Zdzinski, 1991), it would seem to follow that musical aptitude would also affect the compositional creative process and product in music.

Vaughan and Myers (1971) conducted a study to investigate the effects of a training program on musical creativity and the relationship between musical aptitude and creative thinking ability. The study involved two classes of fourth grade students. The control group was taught in a conventional manner (primarily involved in convergent thinking); the experimental group was engaged in the creative training program (encouraging divergent thinking). Both classes were taught by Vaughan twice a week for three months. The following tests were administered: (1) Torrence *Tests of Creative Thinking* (TTCT), figural form B (pre- and posttests), (2) Henmon-Nelson *Tests of Mental Ability*-IQ (TMA), (3) Bentley's *Measures of Musical Abilities* (MMA), (4) Vaughan-Myers *Test of Musical Creativity* (TMC), and (5) Cunnington and Torrance's "Sounds and Images."

The control group engaged in conventional general music classroom activities for the duration of the study: singing, ear training, and listening. The experimental group engaged in "activities designed to show that there is a parallel in musical process for every factor in creative thinking (fluency, flexibility, originality, elaboration) and that many more associated dynamics can find their musical counterparts in improvisation of rhythms, thematic development, counterpoint, dissonance, and so on" (p. 338). This study differs from the other studies discussed in that no technical skills were required; much of the instruction involved formal listening and improvising on classroom instruments.

Using analysis of covariance, the pretest scores on TTCT, TMA, and MMA were correlated with the posttest scores on TTCT. Vaughan and Myers collected found no relationship "between musical aptitude and the various factors in creative thinking [fluency, flexibility, originality, and elaboration]" (p. 341).

Using Webster's *Measure of Creative Thinking in Music* (MCTM), version II, Swanner (1985) investigated the relationships between musical creativity, personality traits, motivation, musical aptitude, and cognitive intelligence with children in first through third grades. Data were collected using Gordon's *Primary Measures of Music Audiation* (PMMA) and the Early School Personality Questionnaire. Gordon (1986) measures aptitude by a student's ability to audiate: ". . . the level of one's music aptitude is commensurate with how well one audiates (hears and feels music for which the sound is not physically present)" (p. 3). Results revealed that gender, cognitive intelligence, and musical aptitude were *not* related to scores on the MCTM-II.

Schmidt and Sinor (1986), in a similar study with second grade subjects, found significant negative correlations between the MCTM-II composite as well as two of the four subscores (flexibility and syntax) and PMMA-Rhythm. Additionally, Baltzer (1990) and Josuweit (1991) found a significant negative correlation between rhythm audiation and fluency.

Much of the research investigating the relationship between musical aptitude and creativity (Baltzer, 1990; Josuweit, 1991; Schmidt and Sinor, 1986; Swanner, 1985) involves Webster's (1987) MCTM. The instrument consists of ten activities that elicit creativity through "the imitation, on temple blocks, of a growing rainstorm; the imitation, with a Nerf ball on a piano, of an ascending elevator; and improvisations, with the voice through a microphone, of truck music and robot songs" (Baltzer, 1988, p. 234). The activities are videotaped and judged on musical extensiveness (time, in seconds, of a musical response), flexibility (freely moving from one extreme to another, i.e., high to low), originality (unique use of sounds), and syntax (shaping of

ideas in relation to the whole response). MCTM appears to measure a child's creative use of instruments to simulate a given situation or place (sounds of rain, outer space, etc.), but it does not appear to measure a child's creativity within a musical context. Furthermore, MCTM does not measure creative composition; students are engaged in activities that solicit improvisational responses.

Kratus (1994b) also suggested that many of the aptitude studies found in the literature (Baltzer, 1990; Josuweit, 1991; Schmidt and Sinor, 1986; Swanner, 1985) using MCTM did not measure the effect of aptitude on musical composition. He states:

> . . . the trait measured by the tests (Josuweit, 1991; Webster, 1987b) should not be confused with the ability to compose. Tasks on the tests are largely improvisational and offer subjects little, if any, time to reflect upon or revise their responses, as would be the case in composition. Furthermore, scoring systems on the tests reward divergent thinking, which is the generation of multiple and diverse responses, over convergent thinking, which results in the selection of a single, most appropriate response. Composition requires both types of thought. (p. 116-117)

Other studies found in the literature suggest a significant positive relationship between aptitude and compositional ability. Laycock (1992) investigated the relationship between the quality of high school students' (ages 15 to 18) musical compositions and those students' musical experience, musical aptitude, self-concept, age, and academic achievement. Subjects consisted of 56 high school students attending a suburban high school. Gordon's *Musical Aptitude Profile* (MAP) was administered to determine each student's aptitude. Individually, students were given a minimum of 10 minutes and a maximum of 20 minutes in which to compose an original song on an upright piano. The song had to be monophonic in nature. Students were required to begin their piece on middle C (indicated by a sticker on that key), and they

were only allowed to use the white keys of the piano; students were alone during the compositional process. When their composition was completed, the student was required to play the song twice for the researcher; both performances were audio-taped. Immediate replication of the composition indicated that the student had composed rather than improvised.

Analysis of the compositional product employed the same constructs used by Kratus (1985). The songs were analyzed by the researcher and two independent judges. A seven-point Likert-type scale was used by the judges to rate tonality, meter, cohesiveness, originality, complexity, motive development, phrasing, and replication. Data suggested that the compositions of students with high musical aptitude were most likely to receive high ratings for tonal, metric, and phrasal aspects of their compositions. Laycock concluded by stating: "By correlating the MAP composite scores with the musical characteristics, it was shown that aptitude, indeed, was significantly related to musical achievement in the form of composition" (p. 109).

Some of the students involved in this study had previous keyboard experience. Laycock (1992) stated, "There were a number of students who, having had previous keyboard experience, used chord progressions, utilizing both hands. In most cases, when questioned about their procedure, they expressed a need to hear some type of harmony. . ." (p. 64). Logically, it is possible that students with previous keyboard experience would be likely to produce higher rated compositions than those without keyboard experience, regardless of their musical aptitude scores. Knowing exactly how the compositions of students with and without keyboard experiences were rated, and their respective aptitude scores, would provide valuable information about the effect of keyboard experiences on the compositional product and the effect of aptitude on the compositional product.

Kratus (1994b) provides evidence that supports a positive relationship between musical aptitude and the compositional process and product. Subjects were 40 9-year-

old, third-grade children from a school that provided a varied music curriculum but lacked composing or improvising opportunities. Students were administered Gordon's *Intermediate Measures of Music Audiation* (IMMA). They then were engaged in compositional activity on an individual basis. Students began by imitating patterns performed by the researcher to get them used to performing on the keyboard; they included melodic movement by steps, skips, and repeated notes. Then, students were given ten minutes to compose an original song. A clock was placed near the students to let them know how much time had elapsed during the compositional process. As in previous studies (Kratus, 1989, 1991, 1994), students were required to begin on middle C, marked with a red dot, and they were restricted to the white keys, from G below middle C to B two octaves above middle C.

Four judges analyzed the compositional process and product of each student's song. Process was analyzed by examining the student's use of exploration, development, repetition, or silence, as defined in the Kratus (1989) study. The compositional product was analyzed by its cohesiveness, pattern use, and extensiveness. These terms were defined as follows:

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

Metric Cohesiveness - the degree to which the durations in a composition are constructed of regularly occurring accented and unaccented beats. (7=very strong metric cohesiveness, 1=no metric cohesiveness)

Melodic Pattern - two to seven pitches that form a distinct pitch pattern that is perceived as a unified whole.

Repeated Melodic Pattern - a melodic pattern that is identical to a previously occurring melodic pattern. (Y=pattern exists, N=pattern does not exist)

Developed Melodic Pattern - a melodic pattern that is similar to, yet different from, a previously occurring melodic pattern. In most cases, the rhythm is held the same, the melody changes, and the melodic contour is similar. (Y=pattern exists, N=pattern does not exist)

Rhythmic Pattern - two to seven durations that form a distinct durational pattern that is perceived as a unified whole.

Repeated Rhythmic Pattern - a rhythmic pattern that is identical to a previously occurring rhythmic pattern. (Y=pattern exists, N=pattern does not exist)

Developed Rhythmic Pattern - a rhythmic pattern that is similar to, yet different from, a previously occurring rhythmic pattern. In most cases, the melody is the same or similar and the rhythm changes. (Y=pattern exists, N=pattern does not exist) [Kratus, 1994b, p. 121]

Results of this study found "a link between audiation and some aspects of creative musical behavior. Audiation was found to be related to the ways in which 9-year-old children compose and to the musical characteristics of their compositions" (p. 12). Similarly, DeLorenzo (1989) suggested that creative activities of students who were unable to "think in sound" (p.196) remained more of a physical activity than a musical activity. "Whereas some students became locked into repetitive hypnotic patterns, others seized the opportunity to develop, transform, and shape a particular sound event or chain of events into an expressive musical idea" (p.196).

Interestingly, Kratus found that "subjects spent a mean of 63% of the composition time in exploration. By contrast, only 40% of the time spent by 9-year-olds in a previous study (Kratus, 1989) was in exploration" (p. 10). The mean IMMA scores in the Kratus (1994b) study were lower than those in Gordon's (1986) third-grade standardization sample. It is possible that more time was spent in exploration because of a lower aptitude average for these subjects as compared to the subjects in his

1989 study. Additionally, the subjects in the 1994 study employed a wider pitch range for their compositions than the subjects in an earlier study (Kratus, 1986). Use of a wide pitch range is characteristic of younger children (5-7 year-olds). It is also possible that the use of wider pitch ranges could be a result of the subjects' below average IMMA scores.

Aptitude can be summarized as one's potential to learn (Gordon, 1986). There are few, if any, areas of education that are designed specifically to address individual needs according to students' aptitudes. However, Gordon (1986) states, "With valid measures of music aptitude, a teacher is able to adapt instruction effectively and efficiently to the individual musical differences among children and to make decisions and offer suggestions about giving children special music instruction" (p. 3). Therefore, any study investigating how aptitude affects students' music learning would make significant contributions to music education. Currently, studies that investigate musical aptitude as it relates to children's compositional processes and products are limited; more research is needed. Furthermore, conflicting data from the studies reviewed underscore the need to continue investigations into the effects of aptitude on children's compositional processes and products.

Effect of Instruction Studies

The learning experience can be said to include three components: curriculum, teacher, and student. An effective teacher will use appropriate instructional techniques in order to present curricula effectively and maximize student learning. Research investigating the effects of instructional techniques, therefore, is a worthwhile endeavor. The present study is intended to investigate the effects of instruction on the creative processes and products of children's musical compositions.

Several researchers have found that creative approaches to music education can increase students' creativity (Bradley, 1974; Madsen, 1977; Vaughan and Meyers,

1971). The effect of a creative curriculum was studied by Bradley (1974). A comparison of pre-test and post-test scores of fourth grade students in a creative-based curriculum revealed a significant gain on aural perception and visual perception tests. The study involved seven fourth-grade classes over a one-year period: one class acted as the experimental group, five classes acted as the control group, and one additional class was used to determine the reliability of the test instrument. Student instruction for the creative-based (experimental) group was based on the thesis that students are more likely to be motivated and more likely to comprehend concepts in a curriculum based on composition, performing, and listening. Students learned through discovery and creative experiences, using twentieth-century techniques as a point of departure. "Commencing with the four essential dimensions of sound, each concept was further developed until a conceptual understanding of rhythm, melody, tone color, texture, and form was gained by subjects participating in the study" (p. 237). The control groups received traditional music instruction. The focus was "mainly on singing throughout the year, although teachers paid lip service to reading development. Listening activities appeared to be minimal and mostly casual in nature. However, . . . the classroom teachers insisted that a usual program of music instruction was in progress . . ." (p. 238).

All students were administered a pre-test and post-test consisting of two parts. Part A tested visual recognition and perception of music (staff, symbols, note values, etc.); Part B tested aural acuity (timbre, rhythm patterns, pitch levels, etc.). The significant gains in aural and visual recognition for the experimental group suggests that creative activities effectively enhance students' musical learning. Bradley (1974) concluded by stating that ". . .music educators should seriously consider developing and testing suitable pedagogical routines to further aid the classroom teacher in the pursuit of effective and efficient methodology" (p. 240).

Madsen (1977) compared creative-based music classes with traditional text book-focused music classes and found that students taught through creative methods tended to be more creative. Subjects were seventh-grade general music students. The experimental group, which was taught using a creative-based curriculum, used an open classroom setting. Students explored, improvised, and created songs with indirect guidance from the instructor. Madsen found that "creative students improved their academic abilities and enjoyment of music" (p.539A). Additionally, the students' creativity improved and their cognitive and affective growth occurred simultaneously. Results of this study show the positive effects of creativity in the classroom.

Vaughan and Myers (1971) also investigated the effects of a creative-based curriculum. The experimental group consisted of a class of 28 fourth- and fifth-grade students; the control group consisted of a class of 32 fourth- grade students. The experimental group's creative-based curriculum "consisted of activities designed to show that there is a parallel in musical process for every factor in creative thinking ..., and that many more associated dynamics can find their musical counterparts in improvisation of rhythms, thematic development, counterpoint, dissonance, and so on" (p. 338). The control group's instruction included singing activities, ear training, and listening.

Both groups were administered pre-tests and post-tests of the Torrence *Tests of Creative Thinking* (TTCT). Comparing the post-test scores of the two groups revealed significant gains for the experimental group on the TTCT. Both groups were also administered the Vaughan-Myers *Test of Musical Creativity* at the conclusion of the study. Again, the experimental group surpassed the control group, suggesting that specific instructional techniques can affect the creative thinking of children. Vaughan and Myers (1971) concluded by stating "the impact of curricular content upon both the learner and teacher is an intriguing area of study and one that demands future research and thinking on the part of all concerned" (p. 37).

The effect of different instructional approaches was also mentioned in DeLorenzo's (1989) qualitative investigation of sixth-grade students' creative problem-solving processes. She observed creative activities in four schools, all of which "had music programs that included sustained music problem-solving activities" (p. 192). Three used creative activities as the culmination of a unit of study; the remaining school employed creativity in most of the learning experiences. All creative activities were videotaped and subsequently analyzed by the researcher. DeLorenzo noticed that children approached composing differently, depending on how the musical task was presented. She noted:

> When students used preexisting structural forms, such as a matrix or story line, their decision making centered less on musical content and more on the operational aspects of performance. These students spent most of the total work time practicing their piece with little time talking or thinking about the musical substance of the piece. In contrast, when students allowed the musical material to determine the form of the composition, they demonstrated increasing concern for the musical relevance of each sound gesture. (p. 196)

The students' behavior, therefore, suggested that the compositional process and product are affected by the instructional techniques provided by the teacher.

Seminal work has been done investigating the effects of repeated composing opportunities, an area of exploration for the present study. Moorhead and Pond (1978) found that repeated opportunities to explore rhythm instruments changed the manner in which children explored. Children's initial experiences with the instruments was described as uninteresting, possibly due to lack of mallet experience. With each increasing opportunity, children displayed more interest in tonal and rhythm pattern development and musical form. Moorhead and Pond stated that the instrumental experiences "led to growth in understanding timbre, pitch, vibration, rhythm, tonal relationship, and melody" (p. 117).

A 1990 study by Reinhart investigated the effect of repeated keyboard composition experiences on the tonal structure of fifth-grade students' compositions. Subjects (N=37) were provided one opportunity per week to compose for five weeks; songs were composed on an individual basis with the researcher present. Compositions from the first, third, and fifth experience were analyzed by the researcher and three independent judges. Significant differences were found in the subjects' ability to replicate their compositions after repeated experiences. However, no significant difference was found in the tonal structure of the compositions between the first and final composing experience.

These results may reflect a short treatment period; perhaps the students were not provided enough opportunities over the five-week period to develop their tonal syntax. Also, if students were to be taught tonal patterns to employ in their compositions, the tonal structure might have been affected. Furthermore, a more conducive environment in which to nurture creativity, as employed in a study by Levi (1991a, 1991b) might have affected the tonal structure of the subjects' compositions.

Levi's (1991a) study provided repeated composing opportunities for second-grade students. The study differed from Reinhart's (1990) study in that the students composed in a social setting in the context of their classroom. Students worked on Orff xylophones and composed original musical compositions; no time limits were set. Students performed for one another in weekly performing sessions. When the compositions were completed, students were asked to notate their pieces.

Using the product analysis developed by Kratus (1985), the composing products were analyzed. Levi (1991a) found an increase in the use of melodic motives for each composing opportunity, showing that regular composing experiences positively affects the compositional process. He stated that this study marks only the beginning of curricular impacts on the composing process and product, and he concluded by asking

"How do compositions compare to those by children of comparable age who haven't been given regular opportunities to compose?" (p. 135).

Hoffman, Hedden, and Mims (1991) studied the compositional processes of students who had been instructed in improvisatory and creative activities since kindergarten; students in this study were labeled "knowledgeable." The subjects for this study comprised 27 randomly selected students from second, third, and fourth grade. The study closely followed the analysis procedures used in the Kratus (1989) study. Students were asked to compose a song. The compositional period was administered differently from that of the Kratus (1989) study in several ways: (a) students were allowed to used only ten white keys; (b) students had to make up their song to fit the words, "Will you buy some food today? Any kind will do;" (c) Kratus used students aged 7, 9, and 11; this study used subjects in grades 2, 3, or 4 (ages 7-9); and (d) students had no time limitations for the compositional period.

Tapes were evaluated on a blind basis; judges did not know whether the composition was created by a second, third, or fourth grader. The judges evaluated student's use of exploration, development, repetition, or silence. In order to investigate the effects of creative-based instruction, student compositional processes (labeled "knowledgeable") in this study were compared to the compositional processes (labeled "naive" to represent students who had not received improvisatory and creative activities) in the Kratus (1989) study. Data suggested that there were differences between the "knowledgeable" and "naive" students' use of time during the compositional process. However, because of the differences between the two studies, it is not possible to arrive at definitive conclusions. It seems surprising that this study attached a text to the compositional activity if its goal was to compare "knowledgeable" to "naive" students' compositional processes. Adding text provided rhythmic and phrase structure, removing that dimension from the compositional process. It is not surprising, therefore, that these students used less exploration. DeLorenzo (1989)

suggested that adding a text to the compositional process tends to draw children's attention away from the musical content of the piece. However, differences between the two groups do suggest that creative instruction may affect the manner in which children compose.

The studies reviewed in this section demonstrate that creative approaches to music education affect a child's musical creativity (Bradley, 1974; Madsen, 1977; Vaughan and Myers, 1971). However, except for the Hoffman and Hedden (1991) study, no studies exist that investigate the effects of specific types of instruction on the creative process and product of children's compositions. If creativity is to be included in music curricula, more research is needed on which to base pedagogical methods.

Conclusions

It is clear that the information provided as a result of the previous studies on musical creativity is not enough to supply music educators with the necessary knowledge to set comprehensive curricular goals and objectives for the creative development of children. More research is needed for many unanswered questions. What is the effect of aptitude on compositional processes? Will a child with established tonality[1] compose differently than a child without established tonality? What is the common link between a 7 year-old and an 11 year-old who both create successful compositions? Does the ability to sing on pitch affect the compositional process and finished product?

A conspicuously small number of studies have investigated creative compositional processes and products within the context of an actual music classroom setting (DeLorenzo, 1989; Levi, 1991a, 1991b). The majority of studies have investigated children's compositions during individual composing sessions (Kratus,

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[1] Established tonality is defined as the ability to sing the resting tone after hearing a series of tonic and dominant tonal patterns (Gordon, 1993).

1986, 1989, 1991, 1994a, 1994b; Reinhart, 1990). The studies have provided important caveats for providing children creative experiences. However, the review of literature suggests a need for more research directed toward children's compositional processes and products that is more easily applicable to a traditional, music-education setting.

Research investigating the effects of specific curricular strategies that are creative in nature appears to be nonexistent in music education research. All of the researchers reviewed have observed and studied children's compositional processes and products; few have studied how children's compositions are affected by a specific instructional treatment.

In summary, this research project will investigate several aspects of children's compositional processes and products. The present study will *differ* from most research in two unique and important ways:

1. Subjects' compositional processes and products will be analyzed for the effects of repeated keyboard composing opportunities in a natural classroom setting.
2. Subjects' compositional processes and products will be analyzed for the effects of specific instructional techniques.

In addition, the effects of music aptitude on the compositional process and the compositional product will be investigated. This study is designed to take the initial steps in addressing these significant needs.

CHAPTER III

METHOD

This chapter will present a description of the research setting, the subjects participating in the study, the research design, and the method used to collect and analyze the data. Explanations for the procedures used in the project will be given.

Sample

Subjects for this study comprised four intact, fourth-grade classes. The classes contained 21, 22, 22, and 23 students, for a total of 88 students. The classes were from the same public elementary school, comprising kindergarten through fifth grade students of diverse ethnic backgrounds. For the sake of validity, only students who had no previous composing experience or keyboard experience were included in the analysis (previous keyboard experience was defined as a minimum of one year of private piano lessons). Children with keyboard experience might have had an advantage over children without keyboard experience, which could have caused spurious results. Therefore, 24 of the 88 students were not included in the analysis for this study, leaving a total of 64 subjects. All 88 students, however, participated in all classroom activities.

Procedure

Students in the school received two, thirty-minute general music classes per week. During the course of the study, all treatment occurred during those music-class periods. The instruction, which was normally provided by a music specialist hired by the school district, was provided by the researcher. The researcher was trained to teach the curriculum to be used in this study. In addition, every effort was made by the researcher to teach concepts from the fourth-grade music curriculum for that school.

A cover letter and a permission slip was sent to the parents of each student the week before school began (see Appendix A). The letter was sent by the Assistant Superintendent for Instruction for the Okemos Public School District explaining that a research project would be conducted in the elementary school. Parents were required to return a permission slip notifying the researcher and the school of their permission to involve their children in the project. Additionally, the researcher received approval from Michigan State University's Committe on Research Involving Human Subjects (see Appendix B).

The students received instruction from the beginning of school (September 1, 1994) until their Thanksgiving vacation (November 21, 1994), a total of 12 weeks comprising 24 thirty-minute music classes. During the first week of instruction, students were administered the *Intermediate Measures of Music Audiation* (IMMA) as a measure of each student's musical aptitude. Gordon's (1986a) IMMA is "designed to be used with children in grade one, grade two, grade three, and grade four" (p. 1). The test is administered in two parts: tonal and rhythm. The tests do not require students to have short-term or long-term memory. Students are required to listen and react to immediate impressions of two patterns. "The quality of one's formal achievement in memory is dependent upon how well one can derive immediate impressions and make intuitive responses in audiation" (p. 8). IMMA, despite its use of the word "audiation," measures the best indication of the child's aptitude. Gordon (1986a) explains,

> As the quality of the musical environment changes, the way each child audiates those impressions and responses fluctuates until he is approximately nine years old. The fluctuations result from the continuous interaction between a child's innate capacities and his environment. Because stabilized music aptitude becomes the actual measure of one's potential for achievement in music in later years, and because music aptitude does not stabilize until age nine, these

> tests are called measures of music audiation rather than measures of music aptitude. Before age nine, the degree to which a child can audiate immediate impressions and give intuitive responses at any given time is the best indication of the level at which his music aptitude will stabilize at age nine. (p. 8-9)

There are 40 questions in each subtest of IMMA. Each test item consists of two audio-taped patterns; they are either the same pattern or two different patterns. Students do not need to know how to read a language or music, or know numbers in order to answer the questions; they are simply asked to draw circles around pictures of faces for the response they choose. Two identical happy faces indicates that the patterns are the same; one happy face and one sad face indicates that the patterns are different. Each test question is identified by picture references (see Appendix C).

Each subtest is approximately 12 minutes long; with the taped directions and practice examples, each subtest lasts approximately 20 minutes. The two subtests should be administered on separate days, no longer than two weeks apart. For this study, the researcher administered the tonal test on the second day of class and the rhythm test on the third day of class.

The reliability coefficients and the standard error of measurement for IMMA are shown in Table 1. According to Gordon (1986), ". . . the split-halves coefficient (derived from only one administration of each test) is more influenced by the homogeneity of test content, and the test-retest coefficient (derived from two administrations of each test) is more influenced by physical and psychological changes in the child and by different environmental conditions" (p. 89). The reliabiltiy coefficients are high and the standard error of measurement is low, indicating that IMMA is a reliable measure.

Table 1

Intermediate Measures of Music Audiation Reliabilities

Grade 4

	Tonal	Rhythm	Composite
Split-Halves	.72	.70	.80
Test-Retest with Raw Scores	.85	.83	.90
Test-Retest with Criterion Scores	.86	.84	.76
Standard Error of Measurement	1.1	1.3	1.5

Gordon (1986) has also shown IMMA to be a valid measure. In his manual he offers subjective and objective evidence of the validity of IMMA. Discussions on content validity, criterion-related validity, congruent validity, and longitudinal predictive validity demonstrate the validity of IMMA.

Of the four classes in this study, three received an instructional treatment and one served as a control group. Group A received repeated keyboard compositional opportunities and tonal and rhythm pattern instruction. The pattern instruction was performed orally and on the keyboards. Group B received repeated keyboard compositional opportunities but no pattern instruction. Group C received tonal and rhythm pattern instruction, and Group D served as the control group.

Group A and Group C received tonal and rhythm pattern instruction according to Gordon's Music Learning Theory, a method identified by the Music Educators National Conference as one of six major approaches to music education (Shehan, 1986). Gordon's learning theory is structured according to levels of learning:

Discrimination	Inference
1. Aural/oral	1. Generalization
2. Verbal association	2. Creativity/improvisation
3. Partial synthesis	3. Theoretical understanding
4. Symbolic association	
5. Composite synthesis	

Each level in the discrimination level builds upon the learning that has taken place in the previous level. Inference learning occurs during all levels of discrimination as well as after the discrimination learning. When this theory is applied, formal pattern instruction begins at the aural/oral level after children have moved out of tonal and rhythm babble.

According to Gordon (1993), people are in a music babble stage until they can sing in tune and move with a consistent tempo. Most children move out of the babble stage between the ages of five and seven, after which time they are ready for formal music instruction. Therefore, because the subjects of this study were approximately 9-years-old, pattern instruction began at the aural/oral level of the learning sequence.

At the aural/oral level, children develop "a sense of meter, a sense of tonality, and the beginning of a vocabulary of rhythm patterns and a vocabulary of tonal patterns" (Walters, 1989, p. 16). Success at the aural/oral level serves as the foundation for all subsequent levels of learning.

Students in this study echoed tonal and rhythm patterns according to Gordon's *Jump Right In* Tonal Register Book (1990) and Rhythm Register Book (1990). The register book comprised 21 units. The researcher taught Tonal Unit 1 and Rhythm Unit 1 during this study. The register book contained specific patterns (labeled easy, medium, or difficult) and directions telling how students should respond to the patterns. Tonal and rhythm patterns were selected and categorized according to difficulty from Gordon's (1976) *Tonal and Rhythm Patterns: An Objective Analysis.* Each unit contained one to three sections; each section included one to three criteria.

Additionally, each unit contained a seating chart in which to place students' names and their aptitude scores (Appendix D and Appendix E). Students were expected to sing difficult, medium, or easy patterns depending upon their aptitude score (high, medium, or low). In this manner, students received instruction according to their individual potential. According to Gordon (1990), when 80% of the class has achieved its potential on a criterion, the instructor can move to the next criterion in the register book.

Tonal pattern instruction followed the sequence outlined in Gordon's *Jump Right In* Tonal Register Book 1. Tonally, students echoed major tonic and dominant patterns using a neutral syllable ("bum"). Students heard a pattern and were asked to echo only the first pitch; they heard different patterns and were asked to sing the resting tone; they were also asked to sing the complete pattern. Minor tonic and dominant patterns were also included in the instruction (see Appendix F). For this study, all of Tonal Unit 1 was completed.

Rhythm pattern instruction followed the sequence outlined in Gordon's *Jump Right In* Rhythm Register Book 1; students echoed rhythm patterns in duple or triple meter (see Appendix G). At the aural/oral level, students echoed rhythm patterns using a neutral syllable ("bah") that was performed by the researcher using the same neutral syllable. Students were asked to keep the macro beat[1] simultaneously with their heels as they patted the micro beat[2] and echoed rhythm patterns. Rhythm Unit 1 was completed during this study.

Each class period for Group A and Group C began with pattern instruction. Students echoed tonal patterns during the first week of instruction and rhythm patterns

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[1] A macro beat is defined as the largest unit of pulse in which music is felt (Jordan, 1989).

[2] A micro beat is defined as the natural division of the macro beat in simple or compound meter (Jordan, 1989).

during the second week of instruction. Subsequent weeks continued alternating between tonal and rhythm pattern instruction.

Pattern instruction was also echoed using keyboards (Group A). The music classroom was provided with 19 small, battery operated keyboards, 17 of which included a set of headphones. Engaging an entire class in pattern performance or composing activities without headphone sets would have created an environment not conducive to learning. Headphone sets provided students the opportunity to hear their work clearly without outside distractions. Providing students the opportunity to echo patterns on the keyboard allowed them to experience the patterns in a visual and tactile manner. It was hoped that this would enable students to experiment with and use the patterns while they composed. To facilitate performance of tonal patterns on the keyboard, tonal pattern instruction was sung with middle C as the tonal center for major tonality and A just below middle C for minor tonality. Therefore, tonal patterns were performed in the same key both vocally and on the keyboard. This required transposing the tonal pattern instruction published in Tonal Book 1, Unit 1 to the key of C major.

Groups A and B of this study received repeated opportunities to compose on an electronic piano keyboard. Students were asked to spend nine minutes creating a song during each class period; *they were not taught formally.* Rather, they were allowed to explore, improvise, and become familiar with the keyboard instrument without guidance as they composed. Students were restricted to use of the white keys of the keyboard. According to Regelski (1981) restrictions during creative activities are more likely to keep students on task and interested. If students finished composing early, the researcher asked them to try to improve the piece during the remaining time.

During the composing period, the researcher monitored students' progress and asked them to play their songs. At the end of each composing period, several students were asked to play their songs for the class. This helped keep the students accountable

for their work and ensured their staying on task. An environment of support and encouragement was fostered during the solo performances.

Group D served as the control group. The instruction for this class consisted of traditional general music activities: singing, listening, and moving. Content of the instruction was planned by the researcher to include musical concepts that are traditionally taught in fourth-grade in the school district. These types of activities were also a part of the instruction for Groups A, B, and C, only to a lesser extent, because a portion of their class time was spent in pattern instruction, keyboard composing, or both.

Design of the Study

The treatment groups were structured as follows:

Group A: Pattern instruction.
Weekly keyboard compositional activities.

Group B: No pattern instruction.
Weekly keyboard compositional activities.

Group C: Pattern Instruction.
No keyboard compositional activities.

Group D: No pattern instruction.
No weekly compositional activites.

Pattern instruction required approximately ten minutes of the 30-minute instructional period; compositional activities, provided during each class, required approximately ten minutes of the 30-minute instructional period. Therefore, time was allotted for each group as follows:

Group A: 10 minutes of pattern instruction
10 minutes of composing activities
10 minutes of traditional music activities

Group B: 10 minutes of composing activities

20 minutes of traditional music activities

Group C: 10 minutes of pattern instruction
20 minutes of traditional music activities

Group D: 30 minutes of traditional music activites

After the 12 week instructional period, each student (N=64) was asked to compose a song. Each subject's final composing opportunity was completed individually with the researcher present. This study differed from previous studies in that the students had known the researcher for three months and had established a positive rapport with him. Students were provided with a Yamaha Porta-Sound PSS-470 keyboard. The keyboard had a total of 59 mid-size keys. Students were restricted to the following parameters when composing: (a) they must begin their composition on middle C, and (b) they must use only the white keys between G below middle C and C two octaves above middle C. The researcher marked middle C with a colored sticker and the highest and lowest white key with stickers of another color. Subjects were asked to work for at least five minutes and no longer than ten mintues.

Subjects in Groups C and D were first engaged in a series of imitative exercises that required subjects to play steps, skips, and repeated notes on the keyboard. The purpose of these exercises was to familiarize the students with the keyboard and make them more comfortable for their composing experience. They were then read the following instructions:

> Your project today is to make up a song on the keyboard. Your song will be a brand-new song, one that no one has ever heard before. You may use only the white keys for your song. The keys you may choose from are from the lowest marked key to the highest marked key. Your song music begin on C, the key with the red mark. You will have 10 minutes to make up your song; you must work for at least five minutes. When you are finished, I will ask you to play

your song two times for me. Be sure you can remember your song so that you can play it the same way two times. Do you have any questions?

Subjects in Groups A and B were read the following instructions:

Today is your last day to compose a song for me. In a minute I am going to ask you to compose a song in a similar way to how we composed songs in music class. Your song may not be the same as one of the songs you composed for me in our previous classes; it must be brand-new. This song may only use the white keys between the two blue marked keys. Your song must begin on the key marked with the red sticker [middle C]. You will have 10 minutes to make up your song; you must work for at least five minutes. When you are finished, I will ask you to play your song two times for me. Be sure you can remember your song so that you can play it the same way two times. Do you have any questions?

These directions are similar to the directions that Kratus (1989) used when he asked his subjects to compose. All final composing opportunities were audio-taped for analysis.

Analysis of the Data

The composing process was analyzed using the same process used in the Kratus studies (1989, 1991, 1994a). The audio-tapes of each student's final composition were analyzed by two independent judges, both of whom were qualified music educators. One judge was completing a Master's Degree in Music Education; the other judge was pursuing a Ph.D. in Music Education. Both judges had completed a Bachelor of Music in Music Education.

To study the compositional *process*, the ten-minute final composing session was divided into 120 intervals of five seconds each. Each interval was categorized as described in the Kratus (1994a) study:

> Exploration - The music in a 5-second interval sounds unlike music played in earlier 5-second intervals. No specific references to music played earlier can be heard.
>
> Development - The music in a 5-second interval sounds similar to, yet different from, music played in an earlier 5-second interval. Clear references to music played earlier can be heard in the melody, the rhythm, or both.
>
> Repetition - The music in a 5-second interval sounds the same as music played in an earlier 5-second interval.
>
> Silence - No music is heard in a 5-second interval. (p. 9)

Judges recorded their analyses on printed forms, marking each 5-second interval with an "E" (exploration), "D" (development), "R" (Repetition), and "S" (Silence). Judges timed the 5-second intervals with a stop watch. If more than one category was heard during a five second interval, they chose the category that predominated. A copy of the process evaluation sheet can be found in Appendix H.

Judges were trained by the researcher. The researcher and the two judges analyzed three excerpts of students' compositional processes. Ratings were compared and discussed. After the two independent judges completed ten process analyses, the researcher totaled the number of observed 5-second intervals of exploration, development, repetition, and silence for each subject. The correlation between the totals for each judge was used as an indicator of reliability.

Product evaluation followed the procedure used in the Kratus (1985, 1994a) study. Each student's composition was rated for its cohesiveness and replication on a seven point Likert-type scale. Kratus (1995) defined these terms as follows:

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

Metric Cohesiveness - the degree to which the durations in a composition are constructed of regularly occurring accented and unaccented beats. (7=very strong metric cohesiveness, 1=no metric cohesiveness)

Replication - the degree to which the students are able to replicate their songs. (1= unable to replicate, 7=able to perfectly replicate)

The means of the two judges' ratings were used for analysis. The judges also rated the compositional product for the percentage of each composition using patterns, following the same procedure used in the Kratus (1995) study. Each student's composition was rated for its pattern use on a 10-point Likert-type scale. These terms were defined as follows:

% of Melodic Pattern - two to seven pitches that form a distinct pitch pattern that is perceived as a unified whole.

Repeated Melodic Pattern - a melodic pattern that is identical to a previously occurring melodic pattern. (0%=no repeated melodic patterns, 100%=all repeated melodic patterns)

Developed Melodic Pattern - a melodic pattern that is similar to, yet different from, a previously occurring melodic pattern. In most cases, the rhythm is held the same, the melody changes, and the melodic contour is similar. (0%= no developed melodic patterns, 100%=all developed melodic patterns)

Rhythmic Pattern - two to seven durations that form a distinct durational pattern that is perceived as a unified whole.

Repeated Rhythmic Pattern - a rhythmic pattern that is identical to a previously occurring rhythmic pattern. (0% = no repeated rhythmic pattern, 100% = all repeated rhythmic patterns)

Developed Rhythmic Pattern - a rhythmic pattern that is similar to, yet different from, a previously occurring rhythmic pattern. In most cases, the melody is the same or similar and the rhythm changes. (0% = no developed rhythmic patterns, 100% = all repeated rhythmic patterns) [unpublished]

The means of the two judges' rating were used for analysis.

The composed song's extensiveness (range and length) was measured by the researcher because it did not require subjective rating. This information was obtained through analysis of the audio recordings. A copy of the product evaluation sheet can be found in Appendix I.

The following questions of this study were answered by the researcher by using two-way analysis of variance (treatment by levels of music aptitude):

1. The effect of instruction and aptitude on the processes of fourth-grade children's keyboard composing. Specifically, how long does it take children to compose a song, and how much time do children spend in exploration, development, repetition, and silence during the compositional process?
2. The effect of instruction and aptitude on the tonal cohesiveness and metric cohesiveness of fourth-grade children's keyboard compositions.
3. The effect of instruction and aptitude on pattern-use in fourth-grade children's keyboard compositional products.
4. The effect of instruction and aptitude on the extensiveness (range and length) of fourth-grade children's keyboard compositions.

5. The effect of instruction and aptitude on the ability of fourth-grade children to replicate their finished keyboard compositional product.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this chapter is to report the results of the data analysis and interpret those results. The chapter is divided into several sections: reliability of aptitude measure, process results and interpretations, and product results and interpretations.

Reliability of Aptitude Measure

Students' aptitude was measured using Gordon's *Intermediate Measures of Music Aptitude* (IMMA). Each student received a raw score for tonal aptitude and rhythm aptitude (the highest possible being 40 for each student) and a raw score for composite aptitude (the highest possible being 80). Students then received a percentile rank for their tonal, rhythm, and composite scores according to the Intermediate Measures of Music Audiation Percentile Norms (Gordon, 1986b). Table 2 shows means and standard deviations for the norm sample as reported in the IMMA manual and the mean scores and standard deviation for the subjects in this study. The mean scores are similar to, but slightly lower, than those reported in the manual; the tonal mean differs from the norm by .8, rhythm differs by .9, and composite differs by 1.8. The standard deviations are smaller than those reported in the manual.

Table 2

Means and Standard Deviations Norms

	Tonal		Rhythm		Composite	
	Mean	SD	Mean	SD	Mean	SD
Norm Sample	35.2	3.03	33.6	3.50	68.8	5.48
Study	34.4	2.55	32.7	3.14	67	4.64

Item difficulty and item discrimination were calculated for each test item. The item difficulty indices for the tonal and rhythm subtests were similar to those reported by Gordon (1986). The item discrimination indices were dramatically different than those reported in the manual. Whereas the majority of the test items fell between .11-.30 for the norm sample for both the tonal and rhythm subtests, the majority of the test items in this study fell between .00 - .10 for the tonal subtest and .00 - .20 for the rhythm subtest. Following are summaries of those results for each subtest (Tables 3 and 4) .

Table 3

Item Difficulty and Item Discrimination

Tonal Subtest

Item Difficulty # of Items			Item Discrimination # of Items		
	Norms Sample	Study		Norms Sample	Study
Diff. Level			Disc. Level		
.00-.10	0	1	.00-.10	4	30
.11-.20	1	1	.11-.20	10	7
.21-.30	1	0	.21-.30	14	1
.31-.40	1	2	.31-.40	9	0
.41-.50	0	1	.41-.50	3	1
.51-.60	1	0	.51-.60	0	1
.61-.70	1	0	.61-.70	0	0
.71-.80	1	1	.71-.80	0	0
.81-.90	2	4	.81-.90	0	0
.91-1.00	32	30	.91-1.00	0	0

Table 4

Item Difficulty and Item Discrimination

Rhythm Subtest

Item Difficulty # of Items			Item Discrimination # of Items		
	Norms Sample	Study		Norms Sample	Study
Diff. Level			Disc. Level		
.00-.10	0	0	.00-.10	1	19
.11-.20	0	0	.11-.20	20	14
.21-.30	0	0	.21-.30	11	7
.31-.40	1	0	.31-.40	8	0
.41-.50	0	2	.41-.50	0	0
.51-.60	5	4	.51-.60	0	0
.61-.70	1	3	.61-.70	0	0
.71-.80	4	5	.71-.80	0	0
.81-.90	7	8	.81-.90	0	0
.91-1.00	22	18	.91-1.00	0	0

Based on item difficulty and discrimination levels, the test was split into two equivalent halves. Using those halves, the researcher calculated split-halves reliability. Table 5 shows the corrected split-halves reliability coefficients for the aptitude measure. All reliabilities were lower than those reported in the test manual. However, reliability for the rhythm subtest was dramatically lower than the reliability of the norms sample. Reliabilities in the Kratus (1994b) study were also lower than the norms scores reported by Gordon, possibly because the subjects in his study "were less diverse in age and musical experience than were Gordon's sample" (p.122). The same reasons may hold true for the present study. Also, the students in this study who received piano instruction for one year or more were removed from the final data analysis. Many of those students were higher aptitude students. The result was less variability and therefore less reliability.

Table 5

Reliability for IMMA

	Study	Norms Sample
Tonal	.63	.72
Rhythm	.20	.70
Composite	.57	.80

Process Analysis

Interjudge Reliability

Subjects (N=64) were asked to compose for a minimum of five minutes and a maximum of ten minutes and were audio-recorded during their final composing session with the researcher. Each subject's composing processes during this session were analyzed subsequently by two independent judges. The judges listened for the use of exploration, development, repetition, or silence. Their analysis was recorded on

printed forms (see Appendix F), by marking an "E" (exploration), "D" (development), "R" (repetition), or "S" (silence) in the blank for each 5-second interval. The researcher totaled the number of observed 5-second intervals of exploration, development, repetition, and silence for each judge's rating sheet.

Interjudge reliability for the process rating was computed by the researcher by correlating the number of E's, D's, R's, and S's of the two independent judges (see Table 6). The reliabilities were extremely high, which is consistent with other studies that have employed this method of compositional process analysis (Hoffman, Hedden, and Mims, 1991; Kratus, 1989, 1991, 1994b).

Table 6

Interjudge Reliability for Process

Rating	r
Exploration	.94
Development	.90
Repetition	.96
Silence	.99

Analysis of Data

This study investigated the effect of instruction and aptitude on the process of children's keyboard composing as defined by the amount of time that children spent using exploration, development, repetition, and silence. (The instructional groups were as follows: Group A - repeated keyboard composing opportunities and pattern instruction [K,P]; Group B - repeated keyboard composing opportunities [K]; Group C - pattern instruction [P]; Group D - control group [C].) The mean of the judges' ratings for each subject exploration was computed; these figures were used for

subsequent analysis for exploration. The same procedure was used for development, repetition, and silence.

Students were categorized as either high aptitude or low aptitude. Normally, when assigning students to high and low aptitude groups, those students scoring below the 50th percentile would be included in the low group, and those scoring at the 50th percentile and above would be included in the high group. However, many high-aptitude students were not part of the final analysis because they studied piano. Balance between high and low aptitude students in each treatment group had to be achieved by changing the traditional dividing point between high and low aptitude. Therefore, for the purpose of this study, low aptitude students were those with a composite percentile rank of 0%-39%, and high aptitude students were those with a composite percentile rank of 40%-100%.

Exploration Results

The mean and standard deviation for exploration were 27.16 and 22.46, respectively. Process data were analyzed through two-way analysis of variance (ANOVA), treatment by levels of music aptitude. Table 7 shows the ANOVA results for Exploration. There was a significant difference ($p < .05$) among the treatment groups' use of exploration. Table 8 shows the results of Fisher's PLSD for the effect of instruction on exploration. The class that received repeated keyboard composing opportunities and pattern instruction used significantly less exploration than any of the other groups.

Table 7

ANOVA Table for Exploration

	DF	SS	MS	F
Treatment Category	3	5972.964	1990.997	4.997*
Aptitude Category	1	1042.410	1042.410	2.616
Treat. Cat. x Apt. Cat.	3	3016.348	1005.449	2.523
Residual	56	22313.972	398.464	

* $p < .05$

Table 8

Fisher's PLSD for Exploration

Effect: Treatment Category

	MD	CD
KP,K	-23.667	14.555 *
KP,P	-19.131	14.250 *
KP,C	-17.982	13.153 *
K,P	4.536	15.402
K,C	5.684	14.393
P,C	1.148	14.085

* $p < .05$

Note: KP = class that received repeated keyboard composing opportunities and pattern instruction; K = class that received repeated keyboard composing opportunities; P = class that received pattern instruction; C = control group.

Development Results

The mean and standard deviation for development were 11.56 and 11.82, respectively. Tables 9 and 10 show the ANOVA results for Development. There was a significant difference ($p < .05$) among treatment groups in the use of development. The class that received repeated keyboard composing opportunities and pattern

instruction used significantly more development than the control group. Additionally, the class that received only pattern instruction used significantly more development than the control group. There were no significant differences between aptitude groups.

Table 9

ANOVA Table for Development

	DF	SS	MS	F
Treatment Category	3	1119.989	373.330	2.838*
Aptitude Category	1	88.311	88.311	.671
Treat. Cat. x Apt. Cat.	3	332.361	110.787	.842
Residual	56	7366.262	131.540	

* $p < .05$

Table 10

Fisher's PLSD for Development

Effect: Treatment Category

	MD	CD
KP,K	3.235	8.362
KP,P	-2.683	8.187
KP,C	7.599	7.557*
K,P	-5.918	8.849
K,C	4.364	8.270
P,C	10.282	8.092*

* $p < .05$

Note: KP = class that received repeated keyboard composing opportuities and pattern instruction; K = class that received repeated keyboard composing opportunities; P = class that received pattern instruction; C = control group.

Repetition Results

The mean and standard deviation for repetition were 28.39 and 22.67, respectively. Tables 11 and 12 show the ANOVA results for Repetition. There was a significant difference ($p < .05$) among treatment groups' use of repetition. The class that received pattern instruction used significantly more repetition than the control group or the class that received repeated keyboard composing opportunities.

Table 11

ANOVA Table for Repetition

	DF	SS	MS	F
Treatment Category	3	5156.559	1718.853	3.954*
Aptitude Category	1	449.405	449.405	1.034
Treat. Cat. x Apt. Cat.	3	3083.015	1027.672	2.364
Residual	56	24345.462	434.740	

* $p < .05$

Table 12

Fisher's PLSD for Repetition

Effect: Treatment Category

	MD	CD
KP,K	14.643	15.203
KP,P	-7.258	14.884
KP,C	10.949	13.738
K,P	-21.901	16.088*
K,C	-3.694	15.034
P,C	18.207	14.712 *

* $p < .05$

Note: KP = class that received repeated keyboard composing opportunities and pattern instruction; K = class that received repeated keyboard composing opportunities; P = class that received pattern instruction; C = control group.

Silence Results

The mean and standard deviation for silence were 8.04 and 16.89, respectively. No significant differences were found among treatment groups' or aptitude groups' in the use of silence (see Table 13).

Table 13

ANOVA Table for Silence

	DF	SS	MS	F
Treatment Category	3	901.466	300.489	1.003
Aptitude Category	1	14.275	12.275	.048
Treat. Cat. x Apt. Cat.	3	215.898	71.966	.240
Residual	56	16775.384	299.560	

* $p < .05$

Length of Composing Period Results

The mean and standard deviation for the length of the composing period were 369.91 and 142.87, respectively. Significant differences were found between the treatment groups for the length of the composing period (see Tables 14 and 15). The class that received pattern instruction took significantly more time to compose a song than any other group.

Table 14

ANOVA Table for Length of Composing Period

	DF	SS	MS	F
Treatment Category	3	168087.268	56029.268	2.927*
Aptitude Category	1	12307.067	12397.067	.643
Treat. Cat. x Apt. Cat.	3	32458.469	10819.490	.565
Residual	56	1071945.888	19141.891	

* $p < .05$

Table 15

Fisher's PLSD for Length of Composing Period

Effect: Treatment Category

	MD	CD
KP,K	37.756	100.878
KP,P	-112.167	98.764*
KP, C	-4.061	91.162
K,P	-149.923	106.751*
K,C	-41.818	99.759
P,C	108.105	97.621*

* $p < .05$

Note: KP = class that received repeated keyboard composing opportunities and pattern instruction; K = class that received repeated keyboard composing opportunities; P = class that received pattern instruction; C = control group.

Process Interpretations

Some of the results showed significance for the effect of instructional treatment. However, none of the process results were significant for the effect of aptitude. Several reasons might explain this. Twenty-four students were removed from the final analysis because they had received a year or more of private piano instruction. Many of those were high aptitude students. Therefore, the aptitude scores included in the final data analysis were lower and less varied, causing low reliabilities for the IMMA. It is difficult to find significance with low reliability.

Music aptitude results also might have been different if it had been possible to label high and low aptitude students differently. In this study, each aptitude group contained not only high or low aptitude students, but also many students of average aptitude. As a result, the groups did not clearly represent only students with high aptitude and students with low aptitude; there were students in each group who were similar to one another. It is possible that this obscured aptitude findings in the analysis.

The results also might have been different if the treatment period had been longer. Music aptitude may have had more of an effect over time as students began achieving at higher levels. Also, pattern instruction was so different from what the students were used to that it took approximately two weeks to accustom the students to the pattern instruction/teaching process. The twelve-week treatment period provided only enough time to acclimate the students to pattern instruction and complete Rhythm Unit 1 and Tonal Unit 1. However, a longer treatment period would have allowed the students to learn more patterns, perhaps causing different results for aptitude for the group that received pattern instruction.

The class that received repeated opportunities to compose and pattern instruction used significantly less exploration than the class that received only pattern instruction.

It is possible that the students in the pattern instruction class needed to initially explore and familiarize themselves with the keyboard, after which time they were able to develop and repeat ideas.

The class that received repeated keyboard composing opportunities spent much of the final composing period exploring. The results for this group might have been different if the researcher had taught composing during the instructional period rather than allowing students to compose without guidance. Perhaps the lack of pattern instruction, resulting in a lack of musical vocabulary with which to compose, caused them to spend too much time during their composing sessions exploring, which has been shown by Kratus (1991) and Hedden (1991) to be detrimental to the quality of the compositional product.

Another reason that pattern instruction alone yielded more exploration than the class that received repeated keyboard compositional activities and pattern instruction may be that some of the students in this study were not out of tonal or rhythm babble; some were unable to maintain an even micro/macro beat pattern, and some were unable to sing the resting tone after hearing a series of tonic/dominant patterns. For these students, pattern instruction was probably not appropriate, and therefore not effective. Additionally, students not out of tonal or rhythm babble were most likely less effective during the composing session than students who were out of tonal or rhythm babble. Students who are still in tonal babble cannot hear the relationships among the sounds that they make and cannot use tonal patterns in syntax. Students who are still in rhythm babble cannot keep a consistent tempo and cannot use rhythm patterns in syntax. In both cases, the compositional process would be affected. Therefore, the results in this study might have been different if the treatment period had been longer so that students had had the opportunity to emerge from tonal or rhythm babble before beginning pattern instruction.

The class that received pattern instruction used significantly more repetition than the control group and the class that received repeated keyboard composing opportunities. Possibly, the class that received pattern instruction focused on specific rhythm patterns or tonal patterns that were familiar as a result of instruction to facilitate their composing, thus explaining their significant use of repetition during the composing session. Also, it is possible that the class that received repeated keyboard composing opportunities in combination with pattern instruction might not have needed to repeat their composing ideas as frequently as the class that received pattern instruction because of their experience on the keyboards, which provided them opportunities to practice patterns orally and on the keyboards.

No significant differences were found among treatment groups in the use of silence. It is possible that the low aptitude students may have used little silence during their compositional processes because they did not have the audiation skills to remember their work while they were composing. High aptitude students might have used more silence so that they could audiate their work and make critical judgments. Because low aptitude students' audiation skills are low, they used little silence during the compositional process.

The class that received pattern instruction took significantly more time to compose a song than any other group. The results of the study might have been influenced by the group's lack of keyboard opportunities coupled with their newly acquired "music vocabulary" from the pattern instruction. In other words, this group may have had ideas with which to compose but lacked the facility on the keyboard to apply these ideas efficiently toward a finished product. Therefore, they needed more time at the keyboard before they were satisfied with their performance of their finished product. The classes that had received repeated opportunities to compose were already familiar with the process of composing and the use of the keyboard. The control group might have used less time than the class that received pattern instruction because the

control group did not have the tools (patterns) or keyboard facility with which to compose.

Product Analysis

Interjudge Reliability

Two independent judges rated the final compositions for cohesiveness (tonal and metric), pattern use (repeated melodic pattern, developed melodic pattern, repeated rhythmic pattern, developed rhythmic pattern), and replication. The judges' scores were correlated to obtain interjudge reliability (see Table 16). The reliability for metric cohesiveness found in this study (.77) is comparable to what Kratus (1994b) reported in his study (.80); reliability for tonal cohesiveness found in this study (.87) was also comparable to what Kratus reported (.90). No comparison can be made to other studies for the reliabilities of repeated melodic pattern, developed melodic pattern, repeated rhythmic pattern, or developed rhythmic pattern, because the measure used in this study is different from that of Kratus' published studies. The reliabilities for tonal and metric cohesiveness are acceptable. However, the reliabilities for pattern use are not particularly high, with that of developed rhythmic pattern being considerably lower than acceptable.

Table 16

Interjudge reliability

Compositional Product Analysis

Rating	r
Metric Cohesiveness	.77
Tonal Cohesiveness	.87
Repeated Melodic Pattern	.64
Developed Melodic Pattern	.51
Repeated Rhythmic Pattern	.60
Developed Rhythmic Pattern	.31
Replication	.91

Intercorrelation Between Product Variables

Table 17 shows the intercorrelation between product variables. There are many significant correlations between tonal cohesiveness and metric cohesiveness and other product variables. Therefore, it is possible that the variables were not sufficiently discrete. The results show some high correlations between metric cohesiveness and tonal cohesiveness, showing that the compositions that were metrically cohesive were also likely to be tonally cohesive. Additionally, the students who were able to replicate their finished product probably produced a tonally cohesive composition. Compositions that received high ratings for developed rhythm pattern were likely also to be metrically cohesive. Finally, replication is less likely as students' compositional products lengthen.

Table 17

Correlation Matrix for Compositional Product

	Ton. Coh.	Met. Coh.	RMP	DMP	RRP	DRP	Repl.	Rng.	Length
Ton. Coh.	1								
Met. Coh.	.53*	1							
RMP	.07	.28*	1						
DMP	.23	.32*	-.02	1					
RRP	.26*	.50*	.48*	.41*	1				
DRP	.48*	.62*	.08	.28*	.33*	1			
Repl.	.52*	.35I	.03	.22	.18	.25	1		
Rng.	-.39*	-.34*	-.11	-.06	-.24	-.29*	-.23	1	
Length	-.39*	-.15	.12	-.07	-.09	-.17	-.52*	.39*	1

* < .05

Note: Ton. Coh. = Tonal Cohesiveness; Met. Coh. = Metric Cohesiveness; RMP = Repeated Melodic Pattern; DMP = Developed Melodic Pattern; RRP = Repeated Rhythmic Pattern; DRP = Developed Rhythmic Pattern; Repl. = Replication; Rng. = Range.

Analysis of Data

The means of the judges' scores for metric and tonal cohesiveness, pattern use, and replication were used for analysis. The extensiveness (range and length) of the final compositions, because it could be objectively determined, was established by the researcher and subsequently used for analysis. A two-way analysis of variance, treatment by levels of music aptitude, was used to answer the following questions as they relate to compositional product:

1. The effect of instruction and music aptitude on the tonal cohesiveness and metric cohesiveness of children's compositions.
2. The effect of instruction and music aptitude on the use of repeated rhythmic patterns and developed rhythmic patterns.
3. The effect of instruction and music aptitude on the use of repeated melodic patterns and developed melodic patterns.
4. The effect of instruction and music aptitude on the extensiveness (range and length) of children's compositions.
5. The effect of instruction and music aptitude on students' ability to replicate their song.

Metric Cohesiveness Results

The judges rated each compositional product on metric cohesiveness. Metric cohesiveness was defined as the degree to which the durations in a composition were constructed of regularly occurring accented and unaccented beats (Kratus, 1994b).

Figures 1 and 2 show representative compositional products that received high and low ratings for metric cohesiveness. These musical examples, and all subsequent musical examples, represent the closest possible representation of what the students composed. Tonally, the composition examples are accurate, because all work was done on a keyboard with fixed pitches. However, the rhythms used by some of the students

could not be accurately transcribed to fit traditional Western notation. Therefore, the musical examples presented in this study represent the closest approximation of students' rhythms and meters.

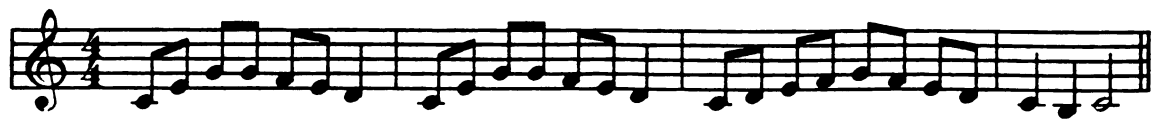


Figure 1. Compositional product rated high for metric cohesiveness.

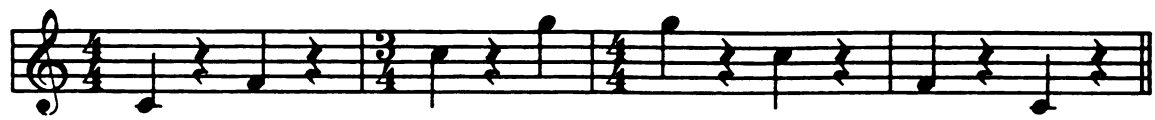


Figure 2. Compositional product rated low for metric cohesiveness.

The mean for metric cohesiveness was 2.75, and the standard deviation was 1.44. Table 18 shows the ANOVA for metric cohesiveness. There were no significant differences.

Table 18

ANOVA Table for Metric Cohesiveness

	DF	SS	MS	F
Treatment Category	3	5.135	1.712	.842
Aptitude Category	1	1.471	1.471	.724
Treat. Cat. x Apt. Cat.	3	11.483	3.828	1.884
Residual	56	113.779	2.032	

* $p < .05$

Tonal Cohesiveness Results

The judges rated each compositional product on tonal cohesiveness. Tonal cohesiveness was defined as the degree to which the pitches in a composition were constructed around a tonal center or centers (Kratus, 1994b). Figures 3 and 4 show representative compositional products that received high and low ratings for tonal cohesiveness.

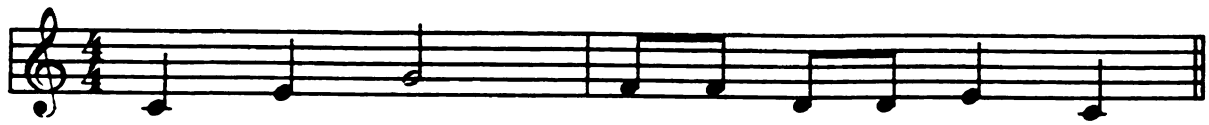


Figure 3. Compositional product rated high for tonal cohesiveness.

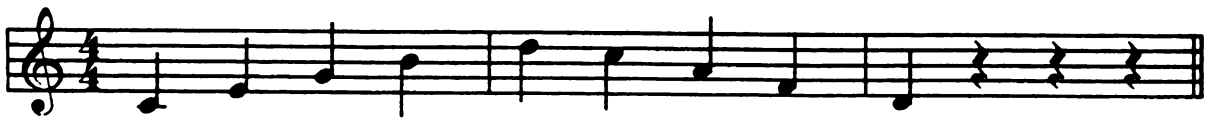


Figure 4. Compositional product rated low for tonal cohesiveness.

The mean was 4.18, and the standard deviation was 1.74 for tonal cohesiveness. Table 19 shows the ANOVA results for tonal cohesiveness. There was significant interaction between treatment and aptitude for tonal cohesiveness. Post-hoc analysis revealed that students in the class that received repeated keyboard compositional opportunities and pattern instruction and high aptitude students in the class that received repeated keyboard compositional opportunities composed with significantly more tonal cohesiveness than high aptitude students in the pattern instruction class. Additionally, the low aptitude students in the class that received repeated keyboard compositional opportunities created products significantly less cohesive than those of all other groups (see Table 20).

Table 19

ANOVA Table for Tonal Cohesiveness

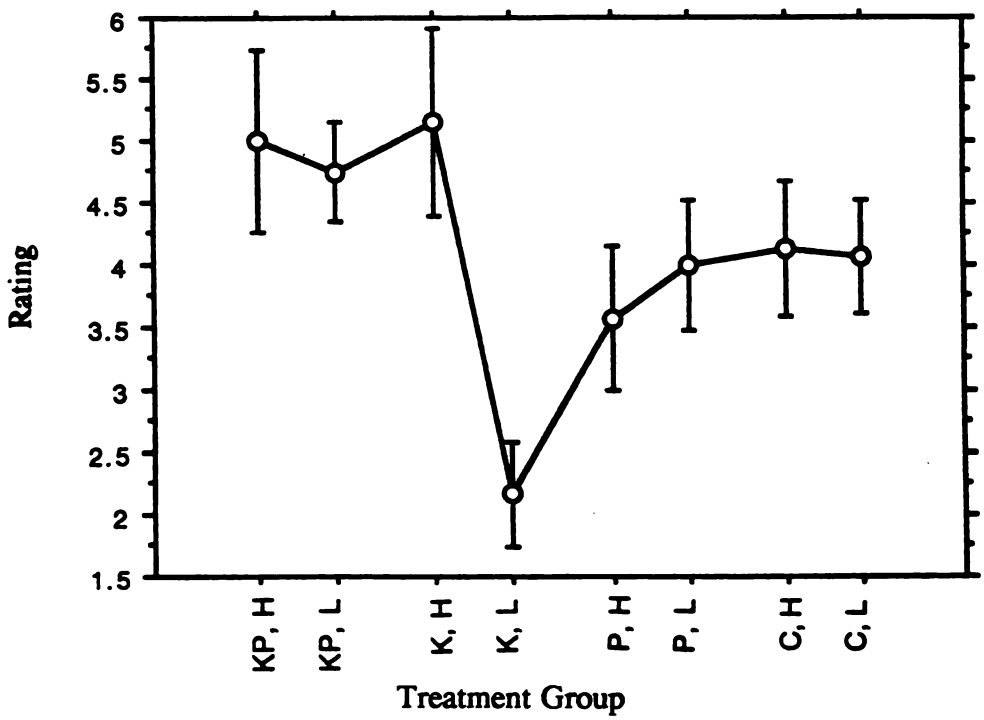
	DF	SS	MS	F
Treatment Category	3	14.416	4.805	1.821
Aptitude Category	1	7.769	7.769	2.943
Treat. Cat. x Apt. Cat.	3	23.808	7.936	3.007*
Residual	56	147.807	2.639	

* $p < .05$

Table 20

Cell Line Chart for Tonal Cohesiveness

Grouping Variables: (Treatment Category, Aptitude Category)



$p < .05$

Note. H = High aptitude students; L = Low aptitude students; KP = Class that received repeated keyboard composing opportunities and pattern instruction; K = Class that received repeated keyboard composing opportunities; P = Class that received pattern instruction; C = Control group.

Repeated Melodic Pattern Results

The judges rated each compositional product for use of repeated melodic patterns. Repeated melodic pattern was defined as a melodic pattern that was identical to a previously occurring melodic pattern (Kratus, 1995b). Figures 5 and 6 show representative compositional products that received high and low ratings for repeated melodic pattern.

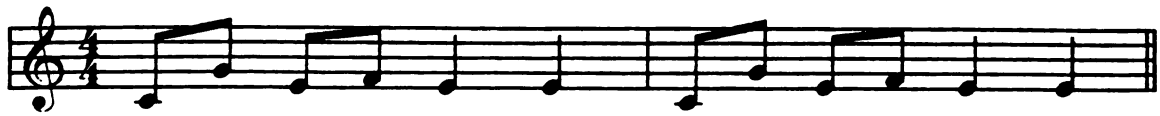


Figure 5. Compositional product rated high for repeated melodic pattern.

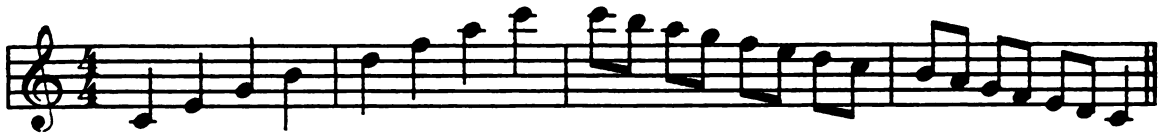


Figure 6. Compositional product rated low for repeated melodic pattern.

The mean was 15.94, and the standard deviation was 13.60 for repeated melodic pattern. Table 21 show the ANOVA for repeated melodic pattern. There were no significant differences for use of repeated melodic pattern.

Table 21

ANOVA Table for Repeated Melodic Pattern

	DF	SS	MS	F
Treatment Category	3	835.938	278.646	1.574
Aptitude Category	1	15.702	15.702	.089
Treat. Cat. x Apt. Cat.	3	675.432	225.144	1.271
Residual	56	9916.696	177.084	

* $p < .05$

Developed Melodic Pattern Results

The judges rated each compositional product for use of developed melodic pattern. Developed melodic pattern was defined as a melodic pattern that was similar to, yet different from, a previously occurring melodic pattern. In most cases, the rhythm is held the same, the melody changes, and the melodic contour is similar (Kratus, 1994b). Figures 7 and 8 show representative compositional products that received high and low ratings for developed melodic pattern.

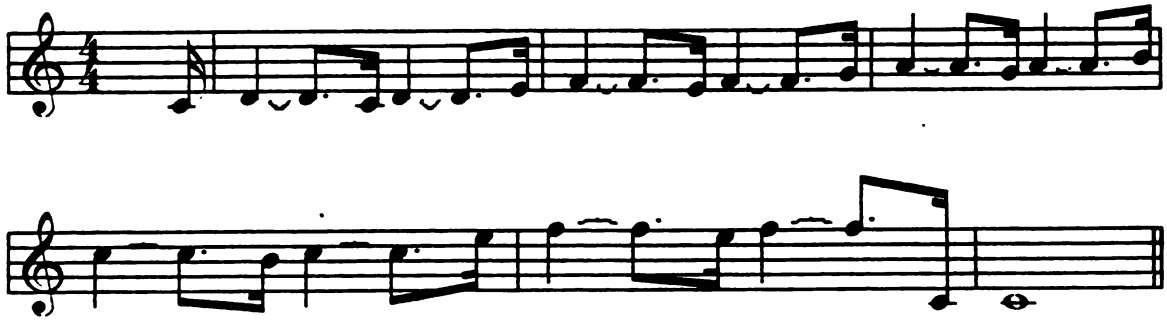


Figure 7. Compositonal product rated high for developed melodic pattern.

Figure 8. Compositional product rated low for developed melodic pattern.

The mean was 10, and the standard deviation was 9.34 for developed melodic pattern. Table 22 shows the ANOVA for developed melodic pattern. There were no significant differences for the use of developed melodic pattern.

Table 22

ANOVA Table for Developed Melodic Pattern

	DF	SS	MS	F
Treatment Category	3	188.914	62.971	.689
Aptitude Category	1	31.989	31.989	.350
Treat. Cat. x Apt. Cat.	3	149.372	49.791	.545
Residual	56	5119.464	91.419	

* $p < .05$

Repeated Rhythmic Pattern Results

The judges rated each compositional product for use of repeated rhythmic pattern. Repeated rhythmic pattern was defined as a rhythmic pattern that was identical to a previously occurring rhythmic pattern. Figures 9 and 10 show representative compositional products that received high and low ratings for repeated rhythmic patterns.

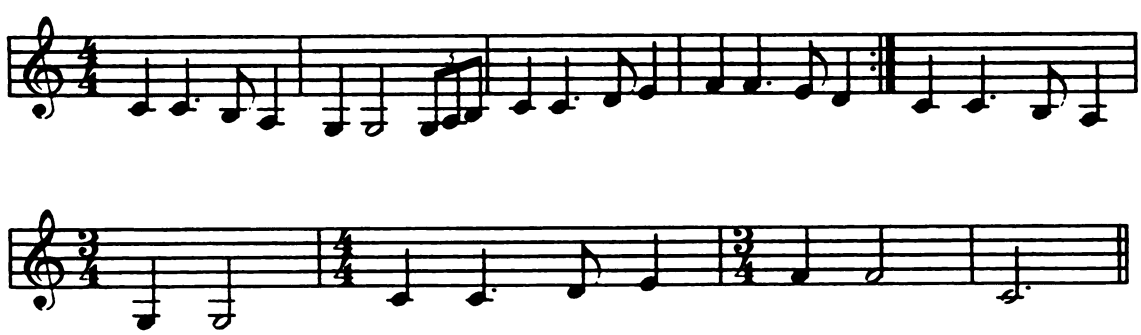


Figure 9. Compositional product rated high for repeated rhythmic pattern.

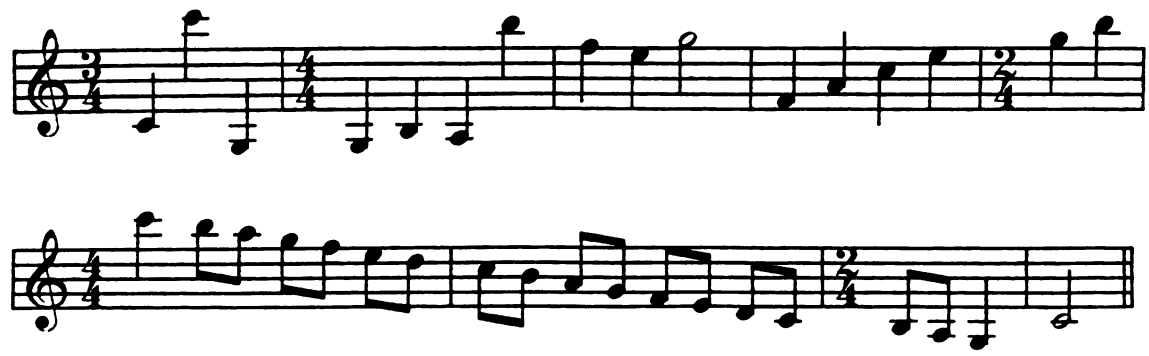


Figure 10. Compositional product rated low for repeated rhythmic pattern.

The mean and standard deviation for repeated rhythmic pattern was 19 and 12.02, respectively. A significant interaction (Table 23) was found between treatment groups and aptitude for use of repeated rhythmic pattern.

Table 23

ANOVA Table for Repeated Rhythmic Pattern

	DF	SS	MS	F
Treatment Category	3	780.788	260.263	2.127
Aptitude Category	1	72.669	72.669	.594
Treat. Cat. x Apt. Cat.	3	1196.066	398.689	3.258*
Residual	56	6853.610	122.386	

* $p < .05$

Post-hoc analysis revealed the following:

1. Students with high aptitude in the class that received repeated keyboard compositional opportunities and low aptitude students in the class that received both repeated keyboard compositional opportunities and pattern instruction used significantly more repeated rhythmic patterns than students in the control group.

2. Low aptitude students in the class that received repeated keyboard compositional opportunities and pattern instruction used significantly more repeated

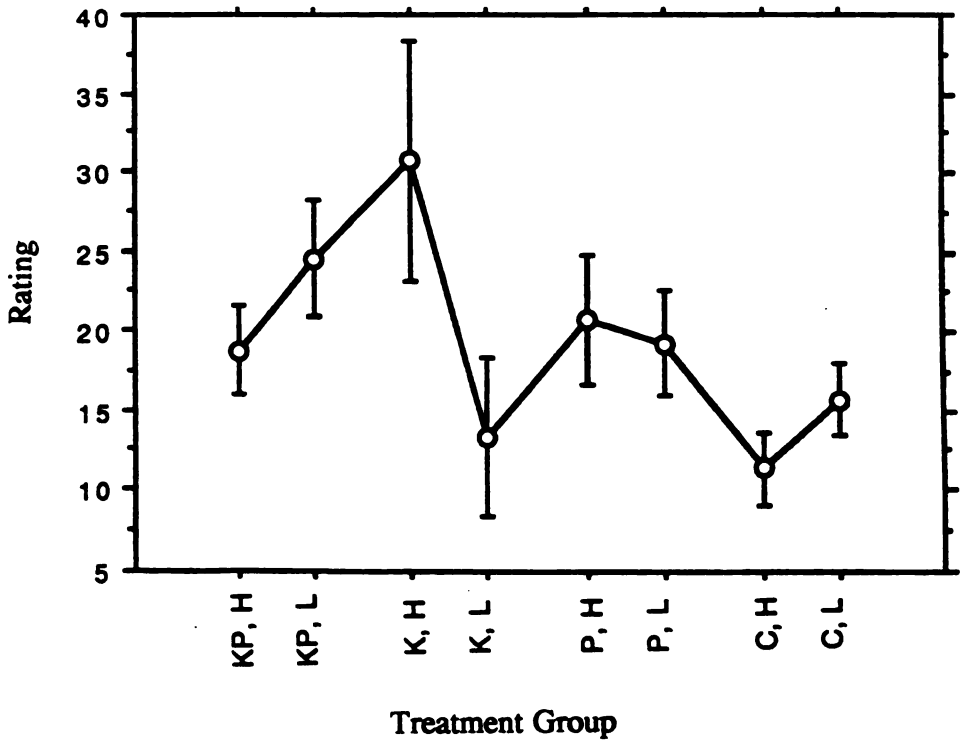
rhythmic patterns than the low aptitude students who received repeated keyboard compositional opportunities.

3. High aptitude students in the class that received repeated keyboard compositional opportunities used significantly more repeated rhythmic patterns than high aptitude students in the class that received repeated keyboard compositional opportunities and pattern instruction, low aptitude students who received repeated keyboard compositional opportunities, and low aptitude students who received pattern instruction.

4. High and low aptitude students in the class that received pattern instruction used significantly more repeated rhythmic patterns than high aptitude students in the control group (see Table 24).

Table 24

Cell Line Chart for Repeated Rhythmic Pattern



$p < .05$

Note. KP = class that received repeated keyboard compositional activities and pattern instruction; K = class that received repeated keyboard compositional activities; P = class that received pattern instruction; C = control group.

Developed Rhythmic Pattern Results

The judges rated each compositional product for use of developed rhythmic pattern. Developed rhythmic pattern was defined as a rhythmic pattern that was similar to, yet different from, a previously occurring rhythmic pattern. In most cases, the melody is the same or similar and the rhythm changes (Kratus, 1994b). Figures 11 and 12 show representative compositional products that received high and low ratings for developed rhythmic pattern.

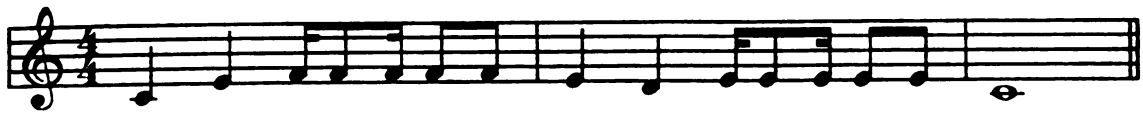


Figure 11. Compositional product rated high for developed rhythmic pattern.

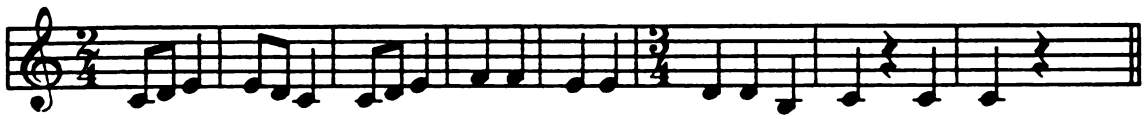


Figure 12. Compositional product rated low for developed rhythmic pattern.

The mean was 3.44, and the standard deviation was 4.79 for developed rhythmic pattern. Table 25 shows the ANOVA for developed rhythmic pattern. There were no significant differences for developed rhythmic pattern.

Table 25

ANOVA for Developed Rhythmic Pattern

	DF	SS	MS	F
Treatment Category	3	49.660	16.553	.741
Aptitude Category	1	.152	.152	6.803E-3
Treat. Cat. x Apt. Cat.	3	120.973	40.324	1.805
Residual	56	1251.161	22.342	

* $p < .05$

Replication Results

Figures 13 and 14 show representative compositional products that were rated high and low for replication.

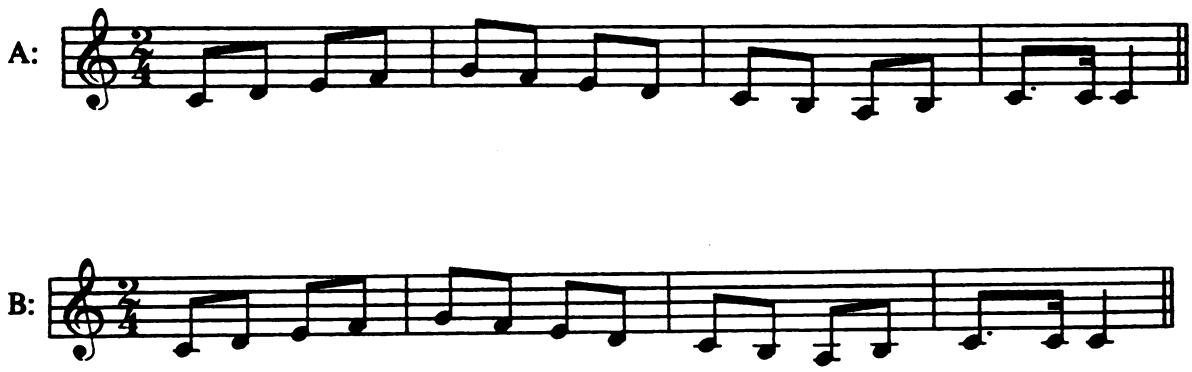


Figure 13. Compositional product rated high for replication.
(A = first performance; B = second performance)

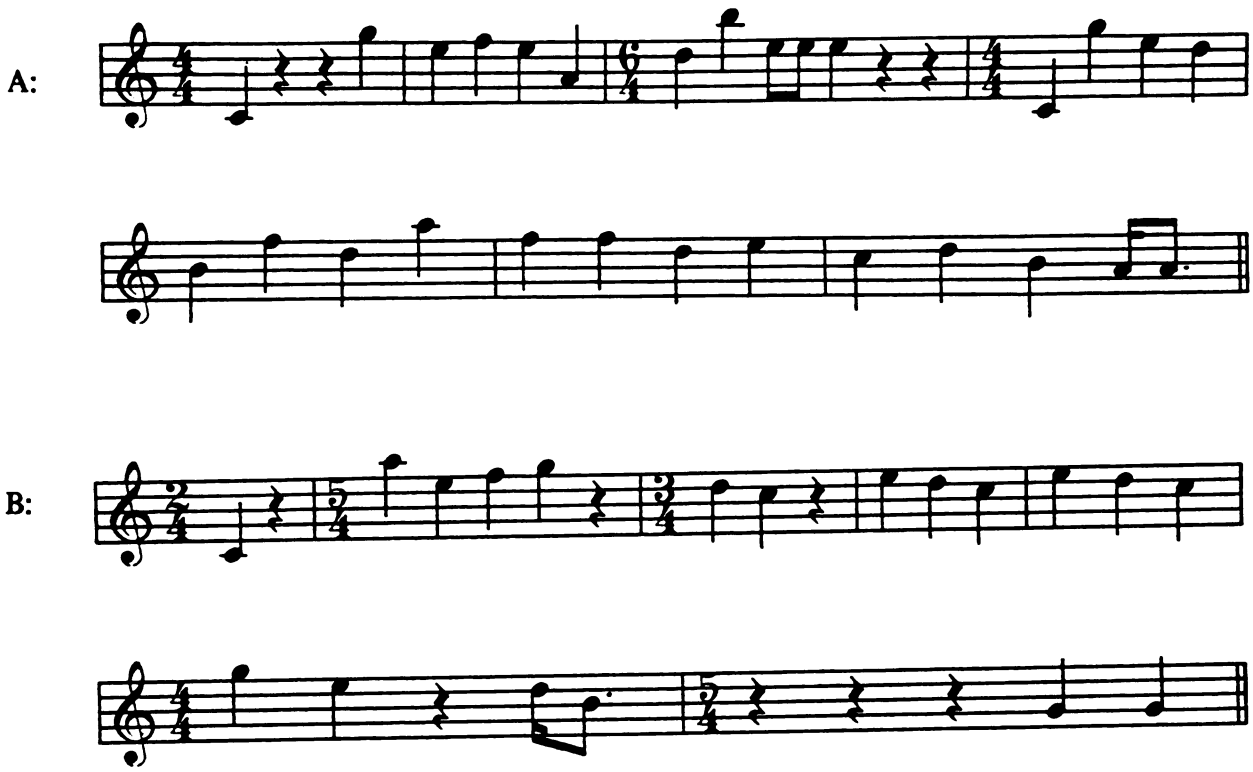


Figure 14. Compositional product rated low for replication.
(A = first performance; B = second performance)

The mean and standard deviation for replication was 4.67 and 1.67, respectively. There was a significant interaction (Table 26) between treatment and aptitude for students' ability to replicate their finished product.

Table 26

ANOVA Table for Replication

	DF	SS	MS	F
Treatment Category	3	24.848	8.283	3.896*
Aptitude Category	1	13.252	13.252	6.233*
Treat. Cat. x Apt. Cat.	3	23.462	7.821	3.679*
Residual	56	119.055	2.126	

* $p < .05$

Because there were significant interactions, it is innapropriate to discuss the main effects individually. Post-hoc analysis revealed the following:

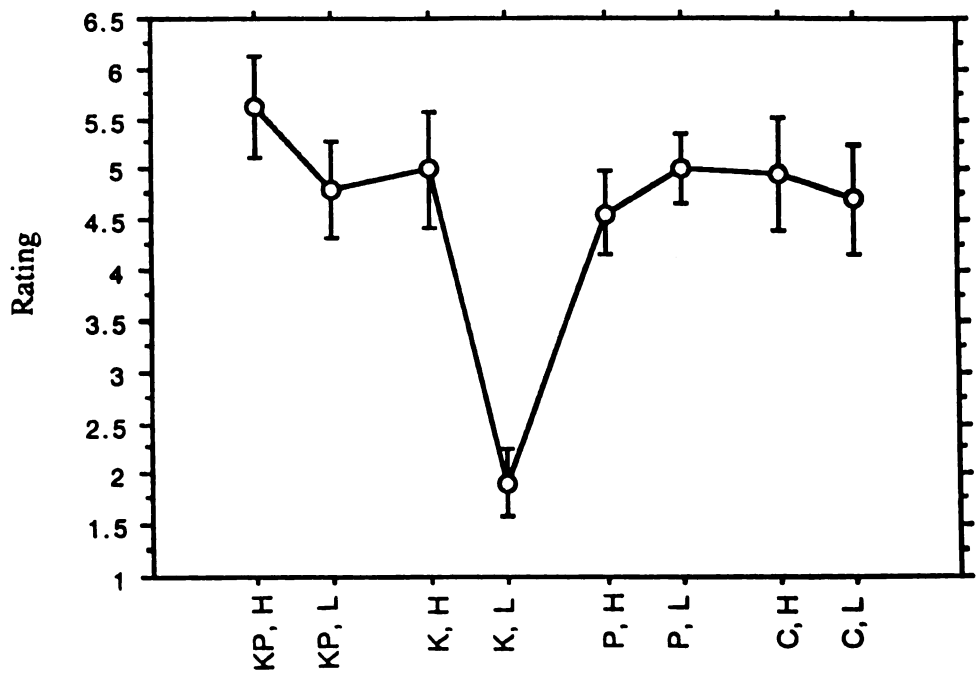
1. The high aptitude students in the class that received repeated keyboard compositional opportunities and pattern instruction were significantly more able to replicate their finished product than the high aptitude students in the class that received pattern instruction.

2. The low aptitude students in the class that received repeated keyboard compositional opportunities were significantly less able to replicate their finished product than all other groups (see Table 27).

Table 27

Cell Line Chart for Replication

Grouping Variables: Treatment Category and Aptitude Category



* $p < .05$

Note: KP = class that received repeated keyboard compositional activities and pattern instruction; K = class that received repeated keyboard compositional activities; P = class that received pattern instruction; C = control group.

Range Results

There was a significant interaction for range between treatment and aptitude (see Table 28).

Table 28

ANOVA Table for Range

	DF	SS	MS	F
Treatment Category	3	328.026	109.342	2.492
Aptitude Category	1	48.515	48.515	1.106
Treat. Cat. x Apt. Cat.	3	736.500	245.500	5.595*
Residuals	56	2413.155	43.876	

* $p < .05$

Post-hoc analysis revealed the following:

1. The low aptitude students in the class that received repeated keyboard compositional opportunities and pattern instruction and the high aptitude students in the class that received repeated keyboard compositional opportunities used a significantly narrower range than all other groups.

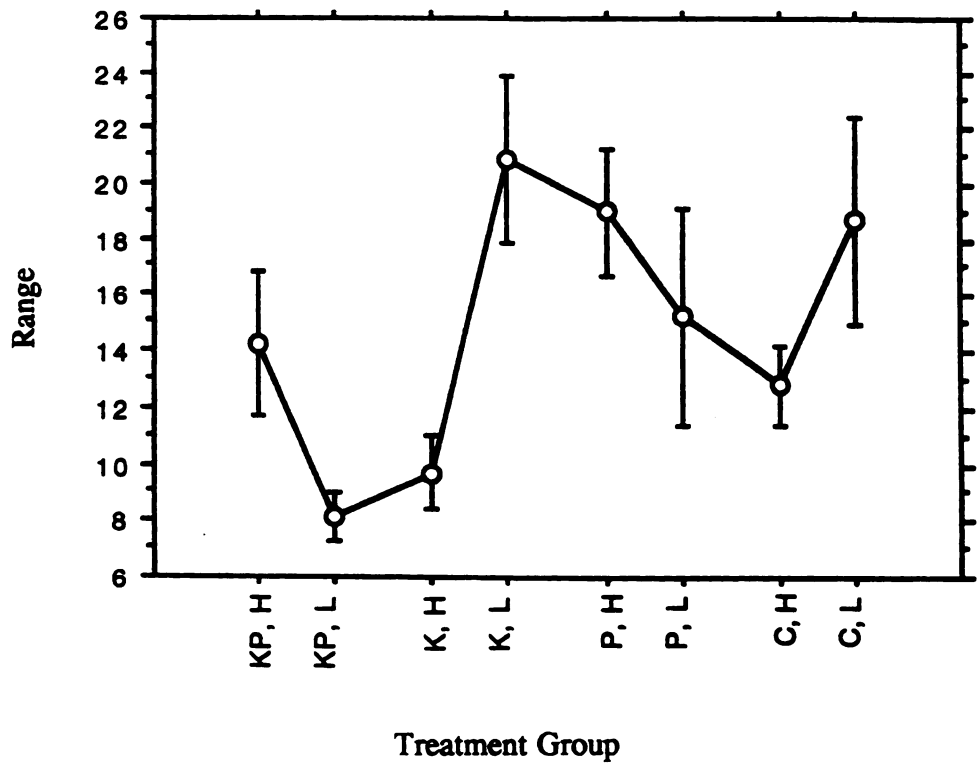
2. The high aptitude students in the control group used a significantly narrower range than low aptitude students who received repeated keyboard compositional opportunities, low aptitude students in the control group, and high aptitude students who received pattern instruction.

3. The high aptitude students in the repeated keyboard compositional activities and pattern instruction used a significantly narrower range than low aptitude students in the class that received repeated keyboard compositional opportunities (see Table 29).

Table 29

Cell Line Chart for Range

Grouping Variables: Treatment Category, Aptitude Category



* $p < .05$

Note: KP = class that received repeated keyboard compositional activities and pattern instruction; K = class that received repeated keyboard compositional activities; P = class that received pattern instruction; C = control group.

Length of Compositional Product Results

The mean and standard deviation for length of compositional product was 27.78 and 38.83, respectively. No significant differences were found for the length of the compositional product (see Table 30).

Table 30

ANOVA for Length of Compositional Product

	DF	SS	MS	F
Treatment Category	3	6320.859	2106.953	.2401
Aptitude Category	1	29.040	.020	.8883
Treat. Cat. x Apt. Cat.	3	6672.308	2224.103	1.524
Residual	55	80282.994	1459.691	

* $p < .05$

Product Interpretations

Three explanations for the results of the study that were discussed in the process interpretations also apply to product interpretations. First, if the treatment period had been longer, the results of the study might have been different. Twelve weeks was enough time to find significant differences, but if more time had been possible, this study might have shown different results for both process and product. Second, the aptitude measure was found to have low reliability when used with this sample; it is difficult to find significance with low reliabilities. Third, some of the students in this study may not have been out of tonal babble, rhythm babble, or both. Students who are still in tonal babble cannot hear the relationships among the sounds they make and cannot use tonal patterns syntactically. Students who are still in rhythm babble cannot keep a consistent tempo and cannot use rhythm patterns syntactically. In both cases, the compositional product would be affected. Therefore, the results in this study might have been different if the treatment period had been longer so that students had had the

opportunity to emerge from tonal or rhythm babble before beginning pattern instruction.

No significant differences were found for metric cohesiveness. Significance may have been found if students in the pattern instruction class had been provided time for pattern instruction on the keyboards. Two of the four groups had extensive keyboard experience as a result of the treatment, whereas two groups did not. This keyboard experience prior to the final composing period may have affected the results. There is also the possibility that those students who were not out of rhythmic babble were unable to produce a metrically cohesive songs, thus obscuring results. Also, using keyboards may have made children focus on tonal rather than rhythmic elements of their songs because it is visually reinforced. This was reflected by tonal ratings that, in general, were higher than rhythm ratings in this study. Perhaps if students had sung rather than played their songs, tonal and rhythmic elements might have received an equal focus.

No significant differences were found for the length of the compositional product. Perhaps this was due to the requirement that students replicate the finished product at the end of the composing period. The students, in general, seemed to create compositional products of similar length, regardless of the length of their composing process. It is possible that the lengths of the finished products did not vary significantly between groups because of the requirement of replication. Students created short compositional products so that they could memorize and replicate their pieces.

Additionally, no significant differences were found for developed melodic pattern, repeated rhythmic pattern, and developed rhythmic pattern. Several reasons might explain this. First, these three components of pattern use had the lowest interjudge reliabilities, making it difficult to find significance. Second, there is concern that the technique to investigate pattern use was not effective for young

composers. Students at this age can produce compositions that repeat and develop rhythmic and melodic patterns. However, it is possible that the students in this study produced songs that were not long enough to exhibit all of the components of pattern-analysis used in this study. Songs may have concentrated only on one of the four pattern-analysis components. Therefore, it would be difficult to find significance for one component when all four individually can produce a cohesive song. Third, judges may not have clearly understood the definitions and perceptions of developed melodic patterns and developed rhythmic patterns, which may have contributed to the low interjudge reliability.

There were significant interactions between treatment and aptitude for tonal cohesiveness, repeated rhythmic pattern, replication, and range. In respect to tonal cohesiveness, the high aptitude students in the class that received repeated keyboard composing opportunities used significantly more tonal cohesiveness than the low aptitude students from the same class. It is possible that the high aptitude students used more tonal cohesiveness because of their high aptitude. Perhaps high aptitude students were able to bring a vocabulary of tonal patterns and an understanding of syntax that they had taught themselves to the experience, whereas the students with low aptitudes needed to be formally taught a vocabulary and syntax because they were unable to teach themselves informally. The high aptitude students in the pattern instruction group composed songs that were significantly less tonally cohesive than the class that received repeated keyboard composing opportunities and pattern instruction; the high aptitude students in the repeated keyboard composing opportunities class. It is possible that these findings were a Type I Errors.

The same reason might also explain why there was a significant difference between high and low aptitude students in the class that received repeated keyboard composing opportunities for repeated rhythmic patterns. One would expect, therefore, that the high aptitude students in the control group would use significantly more

repeated rhythmic patterns than the low aptitude students in the control group. However, results showed that both high and low aptitude students in the control group used little repeated rhythmic patterns.

The low aptitude students in the class that received repeated keyboard opportunities to compose were significantly less able to replicate their finished product than any other group. This may be because these students had deficient rhythm and tonal vocabularies, and they received no guidance during their composing sessions. It is possible that these students need guidance in order to be more successful composers.

The results for range were so random that it was difficult to glean any clear interpretations.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

Summary

Purpose and Problems

The purpose of the study was to gain more information about children's composing processes and products so that it could be used to improve and facilitate the inclusion of creative activities in music education. The problems of the study were as follows:

1. To determine the effect of instruction and music aptitude on the processes of fourth-grade children's composing. Specifically, how long does it take for children to compose a song and how much time is spent in exploration, development, repetition, and silence during their compositional processes?
2. To determine the effect of instruction and music aptitude on the tonal cohesiveness and metric cohesiveness of fourth-grade children's compositions.
3. To determine the effect of instruction and music aptitude on the melodic and rhythmic pattern-use in fourth-grade children's compositions.
4. To determine the effect of instruction and music aptitude on the extensiveness (range and length) of fourth-grade children's compositions.
5. To determine the effect of instruction and music aptitude on the ability of fourth-grade children to replicate their finished compositional product.

Design and Analysis

Eighty-eight fourth-grade students (four, intact classes), from a public elementary school participated in the study. The students received a total of twelve weeks of instruction; each week included two 30-minute classes. All classes were taught by the researcher.

Each class received a different type of instruction during the 12-week treatment period. The treatments were as follows: (a) repeated unguided opportunities to compose on electronic keyboards and tonal and rhythm pattern instruction, (b) repeated unguided opportunities to compose on electronic keyboards, (c) tonal and rhythm pattern instruction, and (d) traditional music instruction (control group). Keyboard composition and pattern instruction experiences were provided to the respective treatment groups during each class period.

During the first week of instruction all students were administered Gordon's *Intermediate Measure of Music Audiation* (IMMA). The test was used to measure the musical aptitude of each student.

Within a week following the completion of instruction, each student met with the researcher for a 10-minute composing session. At the end of the composing period, the students were asked to play their finished product two times. The composing session and the finished product performances were audio-taped and used for data analysis. Students who had received one year or more of private piano instruction did not participate in the final 10-minute composing session. Of the 88 fourth-grade students, 24 were not included because of their piano background. Therefore, the number of students included in the data analysis was 64.

Two independent judges were used to analyze the compositional process. They listened to each student's composing session and labeled every five-second interval as one of four processes: exploration, development, repetition, or silence. Each category was totaled and averaged to represent the total amount of time spent in

each activity. The researcher analyzed each composing period for the length of time students used to compose a song.

Two independent judges analyzed the compositional product. They listened to each student's product and rated it for melodic cohesiveness, metric cohesiveness, and replication using a seven-point Likert-type scale. The use of rhythmic and melodic patterns in the song were also evaluated by the two judges. The means of the two judges' ratings were used for analysis. The composed song's extensiveness (range and length) was measured by the researcher because it did not require subjective rating.

Results

The corrected split-halves reliabilities for IMMA were low compared to the norms sample reported by Gordon (1986). The means and standard deviations were also lower and smaller than the means and standard deviations from Gordon's norms sample.

Interjudge reliability between the process judges ranged between .90 and .99. A two-way analysis of variance (treatment by levels of music aptitude) was used to answer the problems of this study. The group that received repeated keyboard composing opportunities and pattern instruction used significantly less exploration than any other group. The class that received repeated keyboard compositional opportunities and pattern instruction as well as the class that received pattern instruction, used significantly more development than the control group. The pattern instruction group used significantly more repetition than the control group or the group that received repeated keyboard composing opportunities. No significant differences were found in the treatment category for silence. Additionally, no significant differences were found for aptitude as it related to the compositional process. Significance was found for treatment category for length of compositional process. The group that received pattern instruction used significantly more time to compose than any other group.

No significance was found for metric cohesiveness, developed rhythmic pattern, repeated melodic pattern, developed melodic pattern, or length of finished product.

Significant interactions were found for tonal cohesiveness. The low aptitude students in the class that received repeated keyboard compositional opportunities produced significantly less tonally cohesive songs than any other group. The students in the class that received repeated keyboard compositional opportunities and pattern instruction and the high aptitude students in the class that received repeated keyboard compositional opportunities produced significantly more tonally cohesive songs than the high aptitude students in the pattern instruction group.

There was also a significant interaction for replication. The low aptitude students in the class that received repeated keyboard compositional opportunities were significantly less able to replicate their songs than any other group. The high aptitude students in the class that received repeated keyboard compositional opportunities and pattern instruction could replicate their songs significantly better than the high aptitude students in the pattern instruction class.

A significant interaction was found for repeated rhythmic patterns. Students with high aptitude in the class that received repeated keyboard compositional opportunities and low aptitude students in the class that received both repeated keyboard opportunities and pattern instruction used significantly more repeated rhythmic patterns than the students in the control group. Low aptitude students in the class that received repeated keyboard compositional activities and pattern instruction used significantly more repeated rhythmic patterns than the low aptitude students who received repeated keyboard compositional opportunities. High aptitude students in the class that received repeated keyboard compositional opportunities used significantly more repeated rhythmic patterns than high aptitude students in the class that received repeated keyboard compositional opportunities and pattern instruction, low aptitude students who received repeated keyboard compositional opportunities, and the low

aptitude students who received pattern instruction. High and low aptitude students in the class that received pattern instruction used significantly more repeated rhythmic patterns than the high aptitude students in the control group.

There was also a significant interaction for range. The low aptitude students in the class that received repeated keyboard compositional opportunities and pattern instruction and the high aptitude students in the class that received repeated keyboard compositional opportunities used a significantly narrower range than all other groups. The high aptitude students in the control group used a significantly narrower range than low aptitude students who received repeated keyboard compositional opportunities, low aptitude students in the control group, and high aptitude students who received pattern instruction. The high aptitude students in the class that received repeated keyboard compositional opportunities and pattern instruction used a narrower range than low aptitude students in the class that received repeated keyboard compositional opportunities.

Conclusions

Compositional Process

Results of the process analysis from this study suggest that the most effective instruction is repeated keyboard compositional activities combined with pattern instruction. Previous studies (Hedden, 1992; Kratus, 1989) have reported that the most effective compositional products result when less time is spent in exploration and more time is spent in development and repetition. The group that received repeated compositional keyboard opportunities and pattern instruction used significantly less exploration than any of the other groups. Additionally, the treatment groups that received repeated keyboard compositional activities and pattern instruction and the class that received pattern instruction both used significantly more development than the

control group. It appears that pattern instruction provided students with the necessary tools with which to compose; students were able to transfer formal pattern instruction to the composing process. Therefore, pattern instruction alone seems to have a positive effect on the composing process, but not as positive an effect as when combined with repeated composing opportunities. The pattern instruction students may have used more development and more repetition than the control group and the group that received repeated keyboard opportunities because of improved audiation skills resulting from the pattern instruction.

This study supports the work of Hoffman, Hedden, and Mims (1991) who found that their subjects who had received improvisatory and creative activities since kindergarten used less exploration than the subjects in Kratus' (1989) study, who had no previous composing opportunities. The fact that the keyboard treatment group in this study spent over fifty percent of the composing time in exploration, which is more than all other groups, is particularly interesting in light of the fact that low aptitude students in that class were less able to produce a tonally cohesive finished product than any other group.

Data for the length of the compositional period indicate that the keyboard/pattern treatment group used less time to compose than the pattern treatment group. However, the pattern treatment group, although the instructional treatment provided them the necessary tools with which to compose, needed a longer time to compose because they had never had keyboard composing opportunities and thus needed to familiarize themselves with the keyboard. It was necessary for them, therefore, to spend more time in exploration than the keyboard/pattern group.

Aptitude did not affect the composing process of the students in this study. This conflicts with Kratus (1994b), who found a positive correlation between music aptitude and the compositional processes of development and repetition and a negative correlation with exploration. This discrepancy may be explained by the omission of

students with prior keyboard experience from this study. Many of those were high aptitude students. As a result, the means of the aptitude scores used for analysis in this study were lower and the standard deviation was smaller than those reported in the IMMA manual, causing low reliabilities. With a criterion measure with low reliability, it is difficult to find significant differences. It is possible that aptitude would affect the compositional process when measured more reliably.

Compositional Product

Results of product analysis suggest that repeated keyboard compositional activities combined with pattern instruction may be the most effective way to facilitate student composing. The subjects in this treatment group (both high and low aptitude) produced significantly more tonally cohesive compositions than the high aptitude students in the pattern instruction group. Furthermore, the high aptitude subjects in the keyboard/pattern group used significantly more repeated rhythmic patterns than high aptitude students in the control group. It appears that pattern instruction, combined with keyboard composing opportunities, has the strongest effect on high aptitude students.

It is interesting to note that the low aptitude students in the class that received repeated keyboard opportunites used a wide range for their songs, produced the least tonally cohesive songs, and were significantly less able to replicate their songs than any other group. These data strongly suggest that unguided repeated opportunities to compose are less effective than what occurs in a traditional general music classroom for low aptitude students. The time spent during keyboard compositional opportunities takes valuable time away from regular classroom instruction, which seems to be more effective for low aptitude students than unguided compositional opportunities.

Reinhardt (1990) found that students who had received repeated opportunities to compose were better able to replicate their songs. Her results contrast with those of

this study, which found that low aptitude students who were given repeated opportunities to compose on a keyboard were less able to replicate their songs than any other group. Reinhardt did not measure her subjects' music aptitude, and although no significance was found for aptitude in this study, it is possible that aptitude does affect students' ability to replicate their compositional product in certain settings.

Significant interactions were found in several of the product rating categories, indicating that aptitude, when combined with an instructional treatment, affects the compositional product. In this study, the effects of the interactions between aptitude and treatment are so confounding that it is difficult to reach any definitive conclusions or practical implications, particularly in respect to the range of the final composition.

Implications

Several implications about the compositional processes and products of fourth-grade children can be reached as a result of the present study. Instructional treatment can affect the compositional processes of children. Teachers should provide repeated keyboard compositional opportunities combined with pattern instruction in order to enable fourth-grade children to use their composing time more productively. This will also help students efficiently explore and formulate melodic and rhythmic material and spend more time developing and repeating their compositional ideas. Pattern instruction combined with repeated keyboard compositional opportunities appears to have provided the subjects in this study musical tools with which to create.

If keyboards are not available for classroom instruction, teachers should consider pattern instruction as a possibility to facilitate student composing. In this study, pattern instruction alone allowed fourth-grade children to spend more time developing their keyboard compositional ideas. The pattern instruction group and the group that received repeated keyboard compositional opportunities and pattern instruction used more development than the control group. Pattern instruction alone,

therefore, appears to have a positive effect on the compositional process, but not as positive as when combined with repeated composing opportunities.

This study revealed that unguided repeated keyboard compositional opportunites are less effective than what occurs in a traditional general music classroom for students with low aptitude. The class that received only repeated keyboard compositional opportunities showed no significant differences in exploration or development because they were not provided the necessary tools (pattern instruction) to facilitate musical development. The low aptitude students in this treatment group also produced significantly less tonally cohesive songs than any other group, and they were less able to replicate their songs than any other group. The low aptitude students must be taught a music vocabulary by rote, because they will not be able to glean it without guidance. Teachers should be cognizant of the limitations of low aptitude students and take extra care to see that these students have every opportunity for success.

The many interactions that were found in the analysis of the compositional product suggest that while instructional treatment alone seemed to effect the compositional process, it is not the only factor that affects the compositional product. Although no significant differences for process were found in respect to aptitude, many interactions occurred in the product analysis, suggesting that aptitude, in conjunction with instruction, does affect what children compose. Therefore, teachers should consider the aptitude levels of students when planning compositional instruction for children.

Recommendations for Future Research

The review of literature in Chapter 2 indicated a recent increase of research investigating children's compositional processes and products. Collective data reveal that there are many factors that can affect composition. The present study has shown that instructional treatments and aptitude can affect the ways in which children

compose, and that instructional treatment in combination with music aptitude can affect the resulting product. These can now serve as a basis for further curricular and pedagogical research.

Music education could benefit from another study that replicates this study with a more reliable aptitude measure. A replication of this study with a reliable aptitude measure might show different results as they relate to aptitude; this study did not, perhaps because of low reliability

Music education could benefit from another study that replicates this study with a longer treatment period. A longer treatment period would allow students to spend more time with keyboards, and it would allow the students who received pattern instruction to cover more rhythm and tonal units, possibly showing different results than what was found in this study. Or, this study could be replicated comparing students in a school where Gordon's music learning theory has been well established in the curriculum with equivalent students in a school without a learning theory-based curriculum. This would provide possibly more conclusive data showing the effects of pattern instruction and aptitude on the composing process and product. Because music learning theory has been identified by MENC as one of six major approaches to music education, more research is needed to ascertain how pattern instruction as a part of music learning theory affects the creative processes and products of children's compositions.

It would also be beneficial to replicate this study with other age-groups. Comparing data from this study with data from different age-groups would provide deeper insight on how aptitude and pattern instruction affect children's compositional processes and products.

Additionally, more research is needed to investigate how structured compositional guidance can affect children's compositional processes and products. If composition is to become an integral part of music education, more knowledge is

needed to improve how music educators should structure and sequence compositional activities. Teachers must always strive to become more aware of the effects of their instruction. Learning more about how instructional techniques and approaches affect musical development will not only improve student learning, but it will also impact how universities and colleges train prospective teachers.

Continued research in creativity will enlighten music educators to the profound effect creative experiences can have on a child's musical development. Presently, creative activities are given superficial recognition as worthy endeavors, and consequently, as the review of literature indicated in Chapter 2, little creative activity actually happens.

Education has been moving, and will continue to move, in directions where critical thinking, problem-solving, and creativity are fostered. Music must move in *tandem* with the directions of education rather than *follow* the directions of education. Children need to learn more than just the rules of music; they must become actively engaged in the creative process in order to enhance musical understanding and reinforce conceptual thinking.

APPENDIX A

Parental Letter and Permission Slip

Administration Center
Assistant Superintendent for Instruction: Lee Gerard

Dear Parent:

This is to advise parents of a research project which will soon be conducted in the Okemos Public Schools that could involve your child. A description of the project follows. Additional information regarding the project, as well as a copy of any measuring instrument which might be used, will be available in the office of your child's school. Please sign either the Consent To Project Participation form or Refusal For Project Participation form and return to the office of your child's school. If you agree to have your child participate in the research described here but later change your mind, you have the option of withdrawing your child from the project by signing the Withdrawal From Project form, which also accompanies the project description, and returning the signed form promptly to the school principal.

If you have further questions please feel free to contact your school principal or me.

Sincerely,

Lee Gerard
Assistant Superintendent
for Instruction

LG/mq

CONSENT TO PROJECT PARTICIPATION
Okemos Public Schools

I hereby give my consent to the participation of _____(Child's name) in the research project described above. I understand that neither the researcher and/or his/her approved assistants nor any other group or individual will use the material gathered in any way that would invade the privacy of this child or his/her family. I understand that the rights of this child with regard to confidentiality will be paramount.

_____
(Parent/Legal Guardian Signature)

_____
(Date)

REFUSAL FOR PROJECT PARTICIPATION
Okemos Public Schools

I do not consent to the participation of _____(Child's name) in any way in the research project described above.

_____
(Parent/Legal Guardian Signature)

_____
(Date)

WITHDRAWAL FROM PROJECT

I wish to withdraw my child_____
from the _____ Project.
I do not want him/her to participate in any way in this project.

_____
(Parent/Legal Guardian Signature)

_____
(Date)

APPENDIX B

Human Subjects Approval Form

MICHIGAN STATE
UNIVERSITY

June 1, 1994

TO: Warren Henry
5891 Edson St. #4
Haslett, MI 48840

RE: IRB#: 94-257
TITLE: THE EFFECTS OF PATTERN INSTRUCTION ON THE COMPOSITIONAL PROCESSES AND PRODUCTS OF ORIGINAL COMPOSITIONS OF FOURTH GRADE STUDENTS
REVISION REQUESTED: N/A
CATEGORY: 1-A,B
APPROVAL DATE: 06/01/94

The University Committee on Research Involving Human Subjects'(UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project including any revision listed above.

RENEWAL: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/ CHANGES: Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517)355-2180 or FAX (517)336-1171.

Sincerely,

David E. Wright, Ph.D
UCRIHS Chair

DEW:pjm

cc: Cynthia Taggart Dr

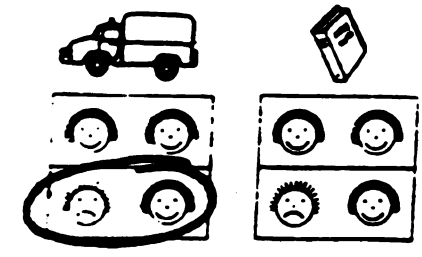
OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES

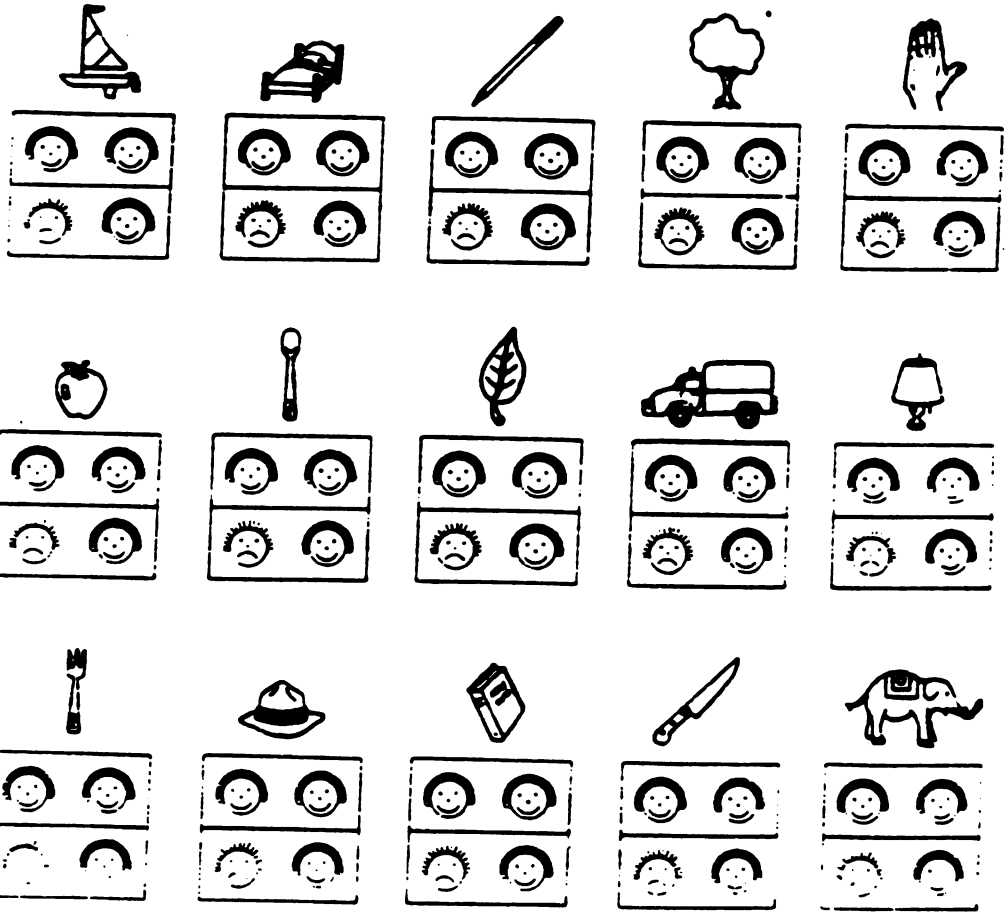
University Committee on Research Involving Human Subjects (UCRIHS)
Michigan State University
225 Administration Building
East Lansing, Michigan
48824-1046
517/355-2180
FAX 517/336-1171

APPENDIX C

Intermediate Measures of Music Aptitude Test Sheet

R





APPENDIX D

Rhythm Seating Chart

RHYTHM UNIT 1 SECTION A CRITERION 1

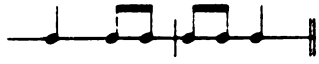
Grade ____ Teacher _____ Date _____ Test ____

Chant rhythm sequence in usual duple using "bah."
Chant class patterns in usual duple using "bah."

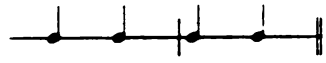
Teacher chants patterns using "bah."
Students chant patterns using "bah."

Usual duple E

M



D



Seating/Evaluation Chart

APPENDIX E

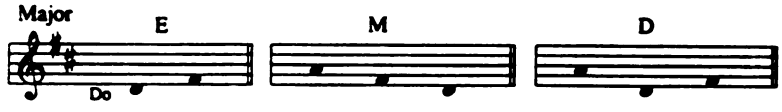
Tonal Seating Chart

TONAL UNIT 1 SECTION A CRITERION 1

Grade _____ Teacher _____ Date _____ Test _____

Sing tonal sequence in D major using "bum."
Sing class patterns in D major using "bum."

Teacher sings pattern using "bum."
Students sing only first pitch using "bum."



Seating/Evaluation Chart

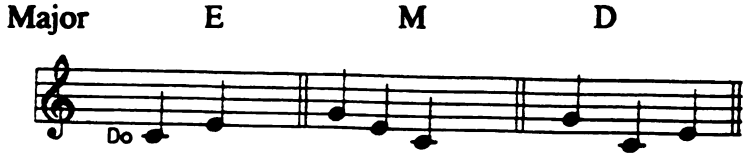
APPENDIX F

Tonal Unit 1

Tonal Unit 1 Section A

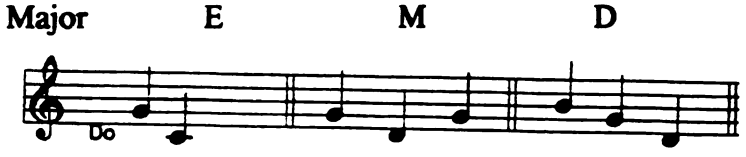
Criterion 1: Sing tonal sequence in C major using "bum."
Sing class patterns in C major using "bum."

Student Evaluation: Teacher sings pattern using "bum."
Students sing only first pitch using "bum."



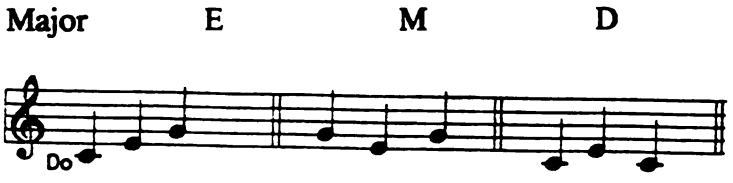
Criterion 2: Sing tonal sequence in C major using "bum."
Sing class patterns in C major using "bum."

Student Evaluation: Teacher sing pattern using "bum."
Students sing only resting tone using "bum."



Criterion 3: Sing tonal sequence in C major using "bum."
Sing class patterns in C major using "bum."

Student Evaluation: Teacher sings pattern using "bum."
Students sing pattern using "bum."

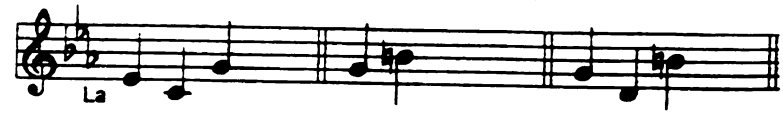


Tonal Unit 1 Section B

Criterion 1: Sing tonal sequence in C major using "bum."
Sing class patterns in C major using "bum."

Student Evaluation: Teacher sing pattern using "bum."
Students sing only first pitch using "bum."

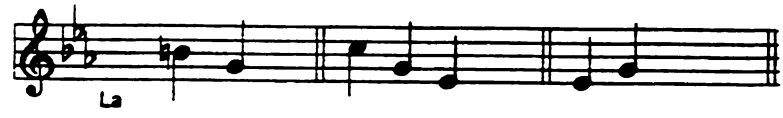
Minor E M D



Criterion 2: Sing tonal sequence in C minor using "bum."
Sing class patterns in C minor using "bum."

Student Evaluation: Teacher sings pattern using "bum."
Students sing only resting tone using "bum."

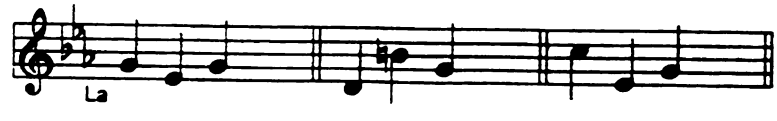
Minor E M D



Criterion 3: Sing tonal sequence in C minor using "bum."
Sing class patterns in C minor using "bum."

Student Evaluation: Teacher sing pattern using "bum."
Students sing pattern using "bum."

Minor E M D



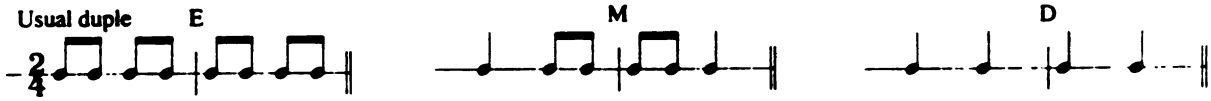
APPENDIX G

Rhythm Unit 1

Rhythm Unit 1 Section A

Criterion 1: Chant rhythm sequence in usual duple using "bah."
Chant class patterns in usual duple using "bah."

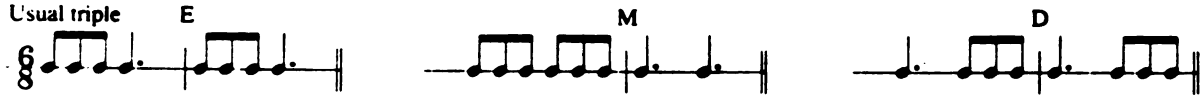
Student Evaluation: Teacher chants patterns using "bah."
Students chant patterns using "bah."



Rhythm Unit 1 Section B

Criterion 1: Chant rhythm sequence in usual triple using "bah."
Chant class patterns in usual triple using "bah."

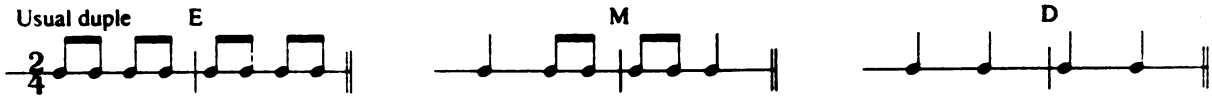
Student Evaluation: Teacher chant patterns using "bah."
Students chant patterns using "bah."



Rhythm Unit 2 Section A

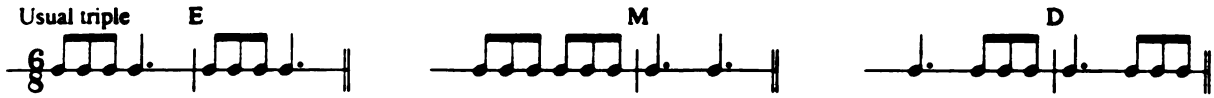
Criterion 1: Chant rhythm sequence in usual duple using rhythm syllables.
Chant class patterns in usual duple using rhythm syllables.

Student Evaluation: Teacher chants patterns using rhythm syllables.
Students name the meter and functions of the patterns.



Criterion 2: Chant rhythm sequence in usual triple using rhythm syllables.
Chant class patterns in usual triple using rhythm syllables.

Student Evaluation: Teacher chants patterns using rhythm syllables.
Students name the meter and functions of the patterns.



APPENDIX H
Compositional Process Evaluation Sheet

Subject Name _____ **Judge** _____

COMPOSITIONAL PROCESSES

E=Exploration, D=Development, R=Repetition, S=Silence

0:05 ____	2:05 ____	4:05 ____	6:05 ____	8:05 ____
0:10 ____	2:10 ____	4:10 ____	6:10 ____	8:10 ____
0:15 ____	2:15 ____	4:15 ____	6:15 ____	8:15 ____
0:20 ____	2:20 ____	4:20 ____	6:20 ____	8:20 ____
0:25 ____	2:25 ____	4:25 ____	6:25 ____	8:25 ____
0:30 ____	2:30 ____	4:30 ____	6:30 ____	8:30 ____
0:35 ____	2:35 ____	4:35 ____	6:35 ____	8:35 ____
0:40 ____	2:40 ____	4:40 ____	6:40 ____	8:40 ____
0:45 ____	2:45 ____	4:45 ____	6:45 ____	8:45 ____
0:50 ____	2:50 ____	4:50 ____	6:50 ____	8:50 ____
0:55 ____	2:55 ____	4:55 ____	6:55 ____	8:55 ____
1:00 ____	3:00 ____	5:00 ____	7:00 ____	9:00 ____
1:05 ____	3:05 ____	5:05 ____	7:05 ____	9:05 ____
1:10 ____	3:10 ____	5:10 ____	7:10 ____	9:10 ____
1:15 ____	3:15 ____	5:15 ____	7:15 ____	9:15 ____
1:20 ____	3:20 ____	5:20 ____	7:20 ____	9:20 ____
1:25 ____	3:25 ____	5:25 ____	7:25 ____	9:25 ____
1:30 ____	3:30 ____	5:30 ____	7:30 ____	9:30 ____
1:35 ____	3:35 ____	5:35 ____	7:35 ____	9:35 ____
1:40 ____	3:40 ____	5:40 ____	7:40 ____	9:40 ____
1:45 ____	3:45 ____	5:45 ____	7:45 ____	9:45 ____
1:50 ____	3:50 ____	5:50 ____	7:50 ____	9:50 ____
1:55 ____	3:55 ____	5:55 ____	7:55 ____	9:55 ____
2:00 ____	4:00 ____	6:00 ____	8:00 ____	10:00 ____

APPENDIX I
Compositional Product Evaluation Sheet

Subject No. _____ **Judge _____**

COMPOSITION PRODUCT RATINGS

Cohesiveness

Tonal Cohesiveness	1	2	3	4	5	6	7
Metric Cohesiveness	1	2	3	4	5	6	7

% of Composition Using Patterns

Repeated Melodic Patterns	0	10	20	30	40	50	60	70	80	90	100
Developed Melodic Patterns	0	10	20	30	40	50	60	70	80	90	100
Repeated Rhythmic Pats.	0	10	20	30	40	50	60	70	80	90	100
Developed Rhythmic Pats.	0	10	20	30	40	50	60	70	80	90	100

Replication	1	2	3	4	5	6	7

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