STUDY OF THE ACQUISITION AND DEVELOPMENT

OF MELODIC NOTATION IN FIRST- TO

THIRD- GRADE CHILDREN

By

Kaylan Rose Wells

Approved:

_____	_____
William R. Lee Professor of Music (Director of Thesis)	Lee D. Harris Head, Music Department (Committee Member)
_____	_____
Joseph Kevin Ford Associate Professor of Music (Committee Member)	Jeffery Elwell Dean, College of Arts and Sciences
_____	
A. Jerald Ainsworth Dean, Graduate School	

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ABSTRACT

The purpose of this study was to examine the cognitive development in music of first- to third-grade children, with particular interest in the mean level of development for each age and the role that gender may play. Participants included 224 students (115 girls and 109 boys) from grades 1-3. Using a developed research protocol, a trained committee of music educators rated children's drawings for cognitive development with respect to melodic line. The study found significant difference among grade levels with $F = 6.9702$, $df = 2, 222$, $p = .0012$ at the .01 level using a three-group ANOVA. However, there were no significant difference between genders, with $F = 0.0487$, $df = 1, 222$, $p = .9008$ at the .05 level using a two-group ANOVA.

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CHAPTER I

INTRODUCTION

We can establish that children's perception and representation of music mature with age based on research. As Cherney (2006) stated in a study conducted with colleagues, "Understanding children's representational development is an essential component for constructing a more complete picture of cognitive development" (p. 136). Pioneers, such as Goodnow and Stambak, who studied cognitive development with drawings, focused on rhythmic representation with little mention of melodic representation. Therefore, the purpose of this study is two-fold: first, to explore how children's perception of melody matures with age; second, to determine if gender plays a role in the maturation process of melodic perception.

It is hypothesized that as children grow older, their ability to notate a heard melody will mature in different stages based on their gender. The null hypothesis will be (1) there is no significant difference in cognitive development in music among children in grades one to three, and (2) there is no significant difference in cognitive development with respect to gender in the three grades.

CHAPTER II

LITERATURE REVIEW

What is cognition? In their textbook *Visualizing Psychology*, Carpenter and Huffman (2008) defined cognition as "mental activities involved in acquiring, storing, retrieving, and using knowledge" (p. 200). Developmental psychologists, especially Jean Piaget, have been influential in providing a larger picture of cognitive development. Piaget's studies led him to believe that children develop cognitively in four stages: sensorimotor (cognitive structures are developed through sensory and motor actions), preoperational (rudimentary language and symbolic skills are used), concrete operational (operations can be performed on objects and conservation is understood), and formal operational (abstract and hypothetical thinking are used). Though his studies have sometimes elicited criticism, his theory is still considered to be crucial to understanding cognitive development in children (p. 242-248).

In order to understand how children develop, cognitive researchers have systematically studied children's drawings. The analysis of children's drawings has evolved into a significant research protocol applicable to several fields of study. Goodnow (1977), whose studies are considered foundational in this area, identified several reasons why a child's drawings would be indicative of cognitive development. Most importantly, the majority of communicating and thinking occur based on visual stimuli. Drawings are representative of a child's understanding of the world around him. In that vein, some regard drawings "as expressions of our search for order in a complex world" and this in turn is reflective of intellectual development. Goodnow (1977)

reasoned that since drawings are often representative of a child's cognitive processes, understanding drawings would provide "a better understanding of children and development in general" (p. 2). Thomas and Silk (1990) agreed in their book and believed that "a child's drawing is directly expressive of his/her concept of the topic concerned" (p. 28).

Around the turn of the 20th century, great strides were made in using children's drawings and many studies were conducted providing a foundation for classifying children's drawings into developmental sequences. However, with the rise in popularity of the Piagetian theory, drawings were considered an archaic way to study development in children. As important as Piaget's tenets are to developmental psychology, there was some opposition among researchers concerning his neglect of children's drawings. "What Piaget's theory does not adequately encompass are the organizational and procedural problems faced by a child trying to make a drawing. Lack of consideration for those performance factors involved in translating conceptual knowledge (or a mental image) into a recognizable representation on paper frequently led Piaget to underestimate children's knowledge" (Thomas, 1990, p. 31).

Despite Piaget's rejection of the importance of children's drawings, many researchers came to the belief that there are unintentional characteristics in children's drawings that can teach us much about their cognitive development. Patterns, whether conceptual or physical, in the world around us provide a context for a drawing. Sequence in a child's drawing aids in problem-solving (concerning drawing) and in ordering aspects of their world. Goodnow's work (1977) concluded that children naturally draw items in a sequence from right to left. Only after beginning to learn how to read and write do children from the Western culture draw items in a sequence from left to right (p. 53). She also realized that the amount of space available affects the sequence. For instance, if a child began drawing without leaving enough space to complete

the drawing, he/she will draw "out of sequence" to include all aspects of the drawing necessary in their mind. The use of sequencing and patterns in drawings is representative of the level of cognitive development in a person (p. 40, 60-61). Goodnow as well as Thomas and Silk acknowledged that many of the results of systematic patterns and sequencing in children's drawing are affected by their cultural upbringing (Goodnow, 1971; Thomas, 1990).

Based upon a study of children's drawings, Thomas and Silk (1990) were able to make observations about the level of development of certain age groups. They observed that around the ages of five to eight, children's drawings become "increasingly visually realistic in terms of scaling and detail." Children in their pre-adolescent years matured so that their drawings contained relationships among objects (p. 38).

These observed relationships are important because perception of musical elements, such as melody, require the organization of sensory impression into purposeful musical entities and relationships (Radocy, 1980, p. 93). Petzold's study (1966) provided some important clues about children's musical perception. First, he found that age is an important factor in children's perceptional development. Second, he realized that the most noticeable perceptional maturation occurred between 1st and 2nd grade (p. 33). As children grow older, their methods of graphically depicting musical perceptions mature. "They seem to learn…that some forms of representation are more probable than others" (Goodnow, 1971, p. 1193).

In his book *The Devlopmental Psychology of Music*, Hargreaves (1986) discussed well-known studies done by Stambak and Goodnow that reflect cognitive development with respect to spatial intervals in rhythmic examples. The older the children were, the more they integrated spaces or gaps to indicate a spatial gap in a rhythm. Stambak determined that from ages six to eight, the understanding of spatial intervals in correspondence with the heard music doubled (p.

95). Brophy's study (1998), which corroborated Stambak's study, found that children seemed to develop more significantly from ages six to nine. Then, as a child approaches adolescence, the development seemed to plateau although there was still some noticeable improvement (p. 87-88). Hargreaves (1986) mentions a study conducted by Bamberger and the Boston Project Zero group in which it was observed that as children progressed in age, their drawings representing musical phrases became more accurate and figurative. This supported Gardner's theory of cognitive development in children (p. 97-99). Observations concerning musical cognition revealed that musical conceptualization and processing increase with increased knowledge and capability (Torff and Gardner, 1999, p. 95). Mehr's study (1985) also determined that various music pedagogical methods used in elementary schools contributed to increased perception of notation (p. 30-31).

In "Developmental Trends and Relationships in Children's Aural Perception and Symbol Use," Gromko and Poorman (1998) reported the research of Adachi and Bradshaw in a paper submitted at the Biennial Meeting of the Society for Research in Child Development in April, 1995. Adachi and Bradshaw found that in groups of lower, middle, and upper elementary, the older children's symbols were more symbolic than the younger children's scribbles and iconic drawings. They established the students' musical representations were "more musically sophisticated" as the grade levels progressed (p. 17).

Many of the major studies concerning musical cognitive development address the rhythmic aspect only (Demorest, 1992; Gardner, 1971; Hargreaves, 1986; Stambak, 1951; Zimmerman, 1985). Demorest (1992) suggested this was probably due to the reality that "far more people engage in dancing on a regular basis than in singing activities. Popular music also strongly emphasizes the rhythmic dimension . . . It is also possible that rhythmic experiences are

more strongly emphasize in early public school music" (p. 137). After discussing a major research study dealing with melodic development, Hargreaves (1986) recommended that studies utilizing other experimental designs examining melodic cognitive development would contribute to understanding of the larger phenomenon (p. 100).

Gromko and Poorman (1998) conducted a study addressing the melodic cognitive development of children, but their study mostly provided children with symbols to help them conceive of melody rather than allowing them to freely create their representations. The researchers found that when invented notations were used that there was a progression in the perception of the contour of the melody. They stated that their results supported "that invented notations reflect children's musical understandings and, as children's perceptions grow in musical detail, their notations grow in sophistication" (p. 20).

There is a possibility that this ability to notate not only matures with age, but matures based on gender as well. Hedden (1982) noted that just as maturity development in the different genders affects other areas of cognitive development, musical cognitive development is affected as well. However, he believed there was more testing to be done to corroborate this view (p. 63-64). Gardner (1971) disagrees however. In a study that required children ages six to eleven to duplicate rhythmic patterns heard, Gardner reported no differences between the genders; the only differences observed were between each age level (p. 358).

Therefore, this study aims to observe if the same cognitive trends concerning rhythmic development will be observed in melodic development.

CHAPTER III

METHODOLOGY

Pilot Study

A pilot study was conducted in September 2007 at a private religious school in Chattanooga, Tennessee. Only one school was involved. It was an experimental study based on a similar studies conducted by Stambak and Goodnow reviewed in a graduate Psychology of Music course at the University of Tennessee at Chattanooga. The participants included 172 students in grades 1 through 3. The instruments and procedure below were based on similar methodologies used by Stambak and Goodnow with adjustments made to target the melodic cognitive development of children rather than the rhythmic cognitive development. Based on a design constructed by Goodnow, each child was given a blank sheet of paper, a pencil, and the following simple instructions: "Listen to the following melody. On your paper, use any symbol (lines, circles, stars, squares, etc.) to write how you think the melody would look if written out. If someone were to look at your paper, they would be able to sing the melody back to you." The opening melodic line from the Christmas carol "Joy to the World" was played.

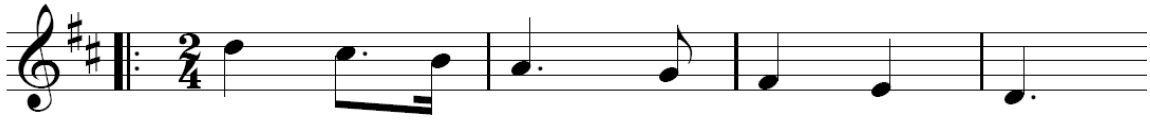

Figure 1 Given Melodic Line

The results were organized into three categories as shown in Table 1. The resulting categories are based on studies done by Goodnow (1971) and Bamberger (1982). Category 1 represents the most mature perception of music at that age while Categories 2 and 3 represent the less and least mature of the results. The 1st grade Category 1 was represented by 1.1, the 2nd grade Category 3 was represented by 2.3 and so forth. If a child in 2nd grade were to draw symbols that correctly match the number of notes and melodic contour of the given melody, that subject would have been placed in the 2.2 category.

Table 1 Pilot Study Rating Rubric

Grade/Category	Description
1.1	Incorrect number of notes/melodic contour OR doodling
1.2	Correct number of notes OR melodic contour
1.3	Correct number of notes AND melodic contour
2.1	Correct number of notes OR melodic contour OR doodling
2.2	Correct number of notes AND melodic contour
2.3	Correct number of notes AND melodic contour WITH notation
3.1	Correct number of notes OR melodic contour OR doodling
3.2	Correct number of notes AND melodic contour
3.3	Correct number of notes AND melodic contour WITH notation

The results of the pilot study were as follows:

Table 2 Pilot Study Results

Category	Percentage of Students
1.1	55%
1.2	36%
1.3	9%
2.1	75%
2.2	19%
2.3	6%
3.1	65%
3.2	31%
3.3	4%

The results from the first grade students ranged from inaccurate doodling to accurate combination of number of notes and melodic contour. There was an obvious increase in notation accuracy in second grade. The majority of the students drew symbols that accurately portrayed the number of notes and melodic contour. The third grade students seemed to hit a plateau—a phenomenon that has been observed in other research. Many correctly notated the number of notes and melodic contour. There was a noted increase in the number of students who correctly notated the melody on a staff.

Based on the pilot study, some aspects of the study needed to be adjusted to provide results that better represented the general population. First, the larger study included participants

in a public school with differing socio-economic settings whereas the participants from the pilot study attended a private school. Their families pay tuition for their attendance indicative of less variety in socio-economic status thus resulting in a possibly inaccurate representation of cognitive development of the targeted ages. Second, some adjustments to the rating rubric were made in an effort to label scores in more definite terms. Third, the larger study relied on the use of a trained committee to prevent possible erroneous categorizing of the results. Finally, an inclusion of the results broken down by gender was added as few research studies have addressed melodic cognitive development according to gender.

Participants

Participants in this thesis study include intact classes representative of area children from the first through third grades at a suburban elementary school in southeast Tennessee as shown in Table 3. University of Tennessee at Chattanooga guidelines involving human subjects were followed as outlined by the Human Subjects Committee shown in Appendix A.

Table 3 Demographic Characteristics of the Participants

Characteristic	Number	Percent
Gender		
Girl	115	51
Boy	109	49
Grade Level		
First	65	29
Second	79	35
Third	80	36

Instrument and Procedures

As in the pilot study, the same instructions were given concerning drawing the opening melody to "Joy to the World." Each child was given a blank sheet of paper, a pencil, and the following simple instructions: "Listen to the following melody. On your paper, use any symbol (lines, circles, stars, squares, etc.) to write how you think the melody would look if written out. If someone were to look at your paper, they would be able to sing the melody back to you."

The rating rubric for the thesis study, as shown in Table 4, was based on Bamberger's research and adjusted to more accurately display the results. Category 1 represents doodling or drawing with no regards to or attempts as recreating the melodic line. Category 2 represents drawings where students used figures or symbols to recreate the melodic line and Category 3 represents drawings that incorporated actual notation to recreate the melody. The rating categories are in ascending order with respect to increased accuracy concerning melody and notation as shown in sample drawings in Figure 2.

Table 4 Thesis Study Rating Rubric

Category	Description
1	Doodling or Drawing
2.1	Figural drawings representing metric aspects of the music
2.2	Figural drawings representing both metric and melodic aspects of music
3.1	Incorrect notational drawings
3.2	Correct notational drawings regarding the melodic aspect of music

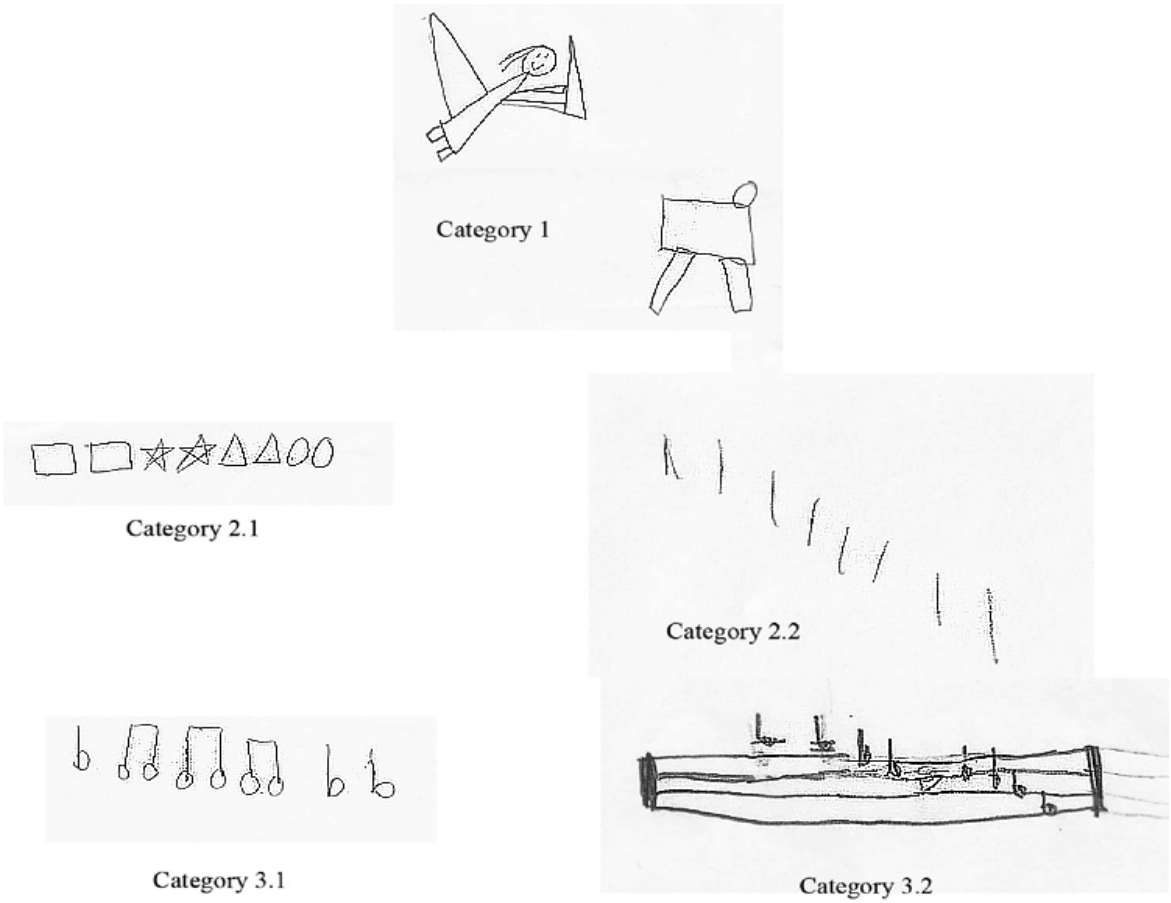

Figure 2 Sample Drawings from Study

The rating committee was made up of three music educators who had a combined 25 years of experience. Once they reviewed the participants' work and placed each drawing into one of the above categories, the numbers in each category were tabulated resulting in a mean score for each drawing. The committee helped ensure unbiased and objective categorization of the drawings.

Students made these drawings during a part of their regular music class. To promote results that were not skewed, notation was not taught during that class period. The class was presented with the question and given a proper allotment of time to complete their "drawings."

Statistical Analysis

The Pearson *r* was used to determine the inter-rater agreement level of those who served on the committee to rate the drawings. Two-group and three-group ANOVA were used to test for significant differences between gender and between grade levels.

CHAPTER IV

RESULTS

The sample consisted of 224 first through third grade children. There were 65 first graders; 32 boys and 33 girls. 79 second graders participated; 35 boys and 44 girls. And there were 80 third graders; 42 boys and 38 girls. Once the committee evaluated the children's responses, the three scores for each participant were averaged together to provide a mean score presented in Table 5. The committee's inter-rater agreement level was tested with the Correlation Coefficient and their mean score was positively correlated with $r = 0.81$.

Table 5 Thesis Study Results

Participant	Grade	Gender	Mean Score
#1	1st	G	1
#2	1st	B	1
#3	1st	G	1
#4	1st	B	1
#5	1st	G	1
#6	1st	B	1.7
#7	1st	B	1
#8	1st	B	1
#9	1st	G	1
#10	1st	G	1
#11	1st	B	1
#12	1st	G	1
#13	1st	B	1
#14	1st	B	2.1
#15	1st	G	2.1

Participant	Grade	Gender	Mean Score
#16	1st	B	2.1
#17	1st	G	1.7
#18	1st	G	2.1
#19	1st	B	1
#20	1st	B	1.4
#21	1st	G	2.2
#22	1st	B	1
#23	1st	B	2.1
#24	1st	B	1
#25	1st	G	2.2
#26	1st	B	1.4
#27	1st	G	1
#28	1st	B	1
#29	1st	B	1
#30	1st	B	1

Participant	Grade	Gender	Mean Score
#31	1st	G	1
#32	1st	B	3.1
#33	1st	B	1
#34	1st	G	1
#35	1st	G	1
#36	1st	G	1
#37	1st	G	2.1
#38	1st	G	3.1
#39	1st	G	2.8
#40	1st	G	1.7
#41	1st	B	1
#42	1st	G	1
#43	1st	G	2.1
#44	1st	B	1
#45	1st	B	1
#46	1st	B	1
#47	1st	G	1
#48	1st	B	1
#49	1st	G	1
#50	1st	B	1.7
#51	1st	B	1
#52	1st	G	1
#53	1st	G	1
#54	1st	B	1
#55	1st	G	1
#56	1st	G	1
#57	1st	B	1.7
#58	1st	G	2.1
#59	1st	B	3.1
#60	1st	G	1.4
#61	1st	G	1.8
#62	1st	B	1
#63	1st	B	2.1
#64	1st	G	1
#65	1st	G	1
#66	2nd	B	3.1
#67	2nd	B	2.1
#68	2nd	G	2.1

Participant	Grade	Gender	Mean Score
#69	2nd	G	1.7
#70	2nd	G	1.7
#71	2nd	B	1
#72	2nd	B	2.1
#73	2nd	G	1.8
#74	2nd	G	2.8
#75	2nd	G	1.7
#76	2nd	G	1
#77	2nd	G	2.1
#78	2nd	B	1
#79	2nd	B	1.7
#80	2nd	B	2.8
#81	2nd	B	1.8
#82	2nd	G	1.4
#83	2nd	G	1
#84	2nd	G	2.8
#85	2nd	B	1.4
#86	2nd	B	1
#87	2nd	G	1.7
#88	2nd	G	2.2
#89	2nd	B	2.5
#90	2nd	G	1
#91	2nd	G	3.1
#92	2nd	G	2.1
#93	2nd	G	1.8
#94	2nd	G	1.4
#95	2nd	B	3.1
#96	2nd	G	2.2
#97	2nd	G	2.1
#98	2nd	G	2.2
#99	2nd	B	2.1
#100	2nd	B	1.7
#101	2nd	G	1
#102	2nd	G	2.2
#103	2nd	G	2.8
#104	2nd	G	3.1
#105	2nd	G	1
#106	2nd	B	1

Participant	Grade	Gender	Mean Score
#107	2nd	B	2.2
#108	2nd	B	1
#109	2nd	B	2.2
#110	2nd	G	2.2
#111	2nd	B	2.1
#112	2nd	G	1
#113	2nd	B	2.1
#114	2nd	B	2.2
#115	2nd	G	1
#116	2nd	B	1.4
#117	2nd	B	1
#118	2nd	B	1
#119	2nd	B	1
#120	2nd	G	1.4
#121	2nd	G	3.1
#122	2nd	B	1
#123	2nd	B	2.1
#124	2nd	B	3.1
#125	2nd	B	2.1
#126	2nd	G	1
#127	2nd	G	3.1
#128	2nd	G	1
#129	2nd	G	1.9
#130	2nd	G	1
#131	2nd	G	2.2
#132	2nd	G	1.7
#133	2nd	G	1.4
#134	2nd	B	1
#135	2nd	G	2.4
#136	2nd	G	1.7
#137	2nd	G	1
#138	2nd	G	3.1
#139	2nd	B	1
#140	2nd	B	1.7
#141	2nd	G	2.2
#142	2nd	G	1.4
#143	2nd	B	1
#144	2nd	B	3.2

Participant	Grade	Gender	Mean Score
#145	3rd	B	1.9
#146	3rd	G	2.2
#147	3rd	B	1
#148	3rd	G	2.8
#149	3rd	B	1
#150	3rd	G	1
#151	3rd	G	1
#152	3rd	B	1
#153	3rd	B	1
#154	3rd	B	3.1
#155	3rd	G	1
#156	3rd	G	1
#157	3rd	B	1
#158	3rd	G	1.7
#159	3rd	B	2.1
#160	3rd	B	2.1
#161	3rd	B	2.1
#162	3rd	B	2.8
#163	3rd	G	1
#164	3rd	B	3.1
#165	3rd	B	1
#166	3rd	B	1.8
#167	3rd	G	2.2
#168	3rd	B	1
#169	3rd	G	3.1
#170	3rd	B	1
#171	3rd	G	1
#172	3rd	B	2.1
#173	3rd	G	1
#174	3rd	G	1.7
#175	3rd	B	1
#176	3rd	B	1.8
#177	3rd	G	2.5
#178	3rd	B	2.1
#179	3rd	B	1
#180	3rd	B	1.4
#181	3rd	B	1.4
#182	3rd	B	1

Participant	Grade	Gender	Mean Score
#183	3rd	G	1
#184	3rd	B	2.1
#185	3rd	B	1.9
#186	3rd	G	1.7
#187	3rd	G	2.4
#188	3rd	G	2.5
#189	3rd	B	1
#190	3rd	G	1.4
#191	3rd	B	1
#192	3rd	B	1
#193	3rd	G	2.2
#194	3rd	G	1
#195	3rd	B	1
#196	3rd	B	3.2
#197	3rd	G	1
#198	3rd	G	1
#199	3rd	B	2.8
#200	3rd	G	2.2
#201	3rd	B	3.1
#202	3rd	B	3.1
#203	3rd	G	1

Participant	Grade	Gender	Mean Score
#204	3rd	B	1
#205	3rd	B	1
#206	3rd	G	3.1
#207	3rd	G	1.4
#208	3rd	B	1
#209	3rd	G	1
#210	3rd	G	1
#211	3rd	B	1
#212	3rd	B	3.1
#213	3rd	G	1
#214	3rd	G	2.5
#215	3rd	B	1
#216	3rd	B	2.2
#217	3rd	G	1
#218	3rd	G	1.8
#219	3rd	B	2.1
#220	3rd	G	1.7
#221	3rd	G	1
#222	3rd	G	1
#223	3rd	G	1.7
#224	3rd	B	2.1

Concerning melodic cognitive development with respect to grade level, the results lead us to reject the null hypothesis as there is a significant difference. Using three-group ANOVA, the results were statistically significant at the .01 level with $F = 6.9702$, $df = 2, 222$, $p = .0012$. The results of the three-group ANOVA along with the mean scores and standard deviations of each grade are presented in Tables 6 and 7 respectively.

Table 6 First- through Third-Grade ANOVA Results

Source	df	SS	MS	F	P-value
Treatments	2	6.670	3.335	6.9702	0.0012
Error	221	105.736	0.478		
Total	223	112.406			

$p < .01$

Table 7 First- through Third-Grade Mean Scores

Grade Levels	Mean Scores	Standard Deviation
First Grade	1.40	0.61
Second Grade	1.83	0.71
Third Grade	1.65	0.74

Using two-group ANOVA to test the significant difference of melodic cognitive development between genders, the null hypothesis is not rejected. The results were not statistically significant at the .05 level with $F = 0.0487$, $df = 1, 222$, $p = .9008$ shown in Table 8.

Table 8 Male versus Female ANOVA Scores

Source	df	SS	MS	F	P-value
Treatments	1	0.025	0.025	0.0487	0.9808
Error	222	112.381	0.506		
Total	223	112.406			

$p < .05$

CHAPTER V

DISCUSSION AND CONCLUSION

The overall result from the analysis of progress in grade levels was expected. However, one aspect of these results that was unexpected was although there was a significant difference, the growth in scores from grade to grade was not as substantial as anticipated. The mean scores of all three grades stayed under 2 despite the fact that the highest possible score was 3.2. The mean score of the 3rd grade was 1.65 with many of the drawings falling under the category of 1 (doodling or drawing) or 2 (figural drawings). Even more surprising was a second aspect of the results: a higher scoring 2nd grade than 3rd grade. It was expected that the 3rd grade participants would score higher than 2nd grade, following a developmental pattern. While research shows that around ages 8 or 9 there seems to be a cognitive plateau, a decrease in scores was unforeseen. This may have been a statistical anomaly or unforeseen, uncontrolled variables may have affected the scores. In any case, the standard deviation of scores in each grade seemed consistent.

The resulting insignificant difference between genders was initially somewhat surprising based on research done by many educators like Hedden (1982) who was previously mentioned. Work by notable researchers such as Howard Gardner (1971) challenges the idea that gender has a bearing on cognitive learning. Thus, this outcome may support Gardner.

Other factors may have influenced the outcome. (1) While rhythmic cognitive development increases in accuracy with age, the melodic aspect of cognitive development may

not follow the same patterns. (2) The size and selection of the sample may have had some bearing. A sample size of 224 children, unselected and comprising an intact group, may not be sufficient to control extraneous variables such as differentiated learning between the grades. This may have made a difference in the rate of melodic cognitive development from grade to grade or affected the level of differentiation between genders. (3) The instrumentation or the selection of the evaluation rubric might possibly have affected the outcome. While these choices were designed to follow the methodology and instrumentation used in studies by Stambak and Goodnow, the combination selected for this study might have not produced as accurate an outcome as hoped.

It is recommended that the sample size be increased if this line of study were to be taken further. An increase in participants from various schools would provide a better representation of the population and control for differentiated learning. Extending the range to fourth-grade might be useful, as this would encompass the theoretical changes in cognition between the ages of eight and nine. Further, the instrumentation and testing procedures should be re-examined for possible adjustments for a more accurate scoring.

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APPENDIX A

IRB APPROVAL LETTER

MEMORANDUM

TO: Kaylan Wells **IRB # 09-151**
Dr. William Lee

FROM: Lindsay Pardue, Director of Research Integrity
Dr. Bart Weathington, IRB Committee Chair

DATE: January 24, 2011

SUBJECT: IRB # 09 - 151: Study of the Acquisition and Development of Notational Skills in Six to Eight Year Olds

The Institutional Review Board has reviewed and approved your application and assigned you the IRB number listed above. You must include the following approval statement on research materials seen by participants and used in research reports:

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project # 09 - 151.

Please remember that you must complete a Certification for Changes, Annual Review, or Project Termination/Completion Form when the project is completed or provide an annual report if the project takes over one year to complete. The IRB Committee will make every effort to remind you prior to your anniversary date; however, it is your responsibility to ensure that this additional step is satisfied.

Please remember to contact the IRB Committee immediately and submit a new project proposal for review if significant changes occur in your research design or in any instruments used in conducting the study. You should also contact the IRB Committee immediately if you encounter any adverse effects during your project that pose a risk to your subjects.

For any additional information, please consult our web page http://www.utc.edu/irb or email instrb@utc.edu

Best wishes for a successful research project.

VITA

Kaylan Rose Seals Wells was born in Merida, Yucatan, Mexico. She moved to the United States at aged five and was raised in Chattanooga, Tennessee. In Chattanooga she graduated from Tennessee Temple Academy and later received her B.S. in Music Education from Tennessee Temple University. She is now pursuing a master's degree in music education from the University of Tennessee at Chattanooga. Kaylan has taught private music lessons for thirteen years and taught music in the classroom for four years before becoming a stay-at-home mother while teaching private lessons out of her home. Her desire is to return to the classroom in the future.