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The relationships among first grade students' tonal aptitude, singing vocal development, and developmental age

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THE RELATIONSHIPS AMONG FIRST GRADE STUDENTS'

TONAL APTITUDE, SINGING VOCAL DEVELOPMENT,

AND DEVELOPMENTAL AGE

by
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A THESIS

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ABSTRACT

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Thesis Advisor: Dr. Lili Levinowitz

Master of Arts: Subject Matter, Teaching Music

Graduate Division of Rowan University of New Jersey

The purpose of this study was to determine if there was a correlation between developmental age and scores achieved on music ability tests.

The problem of this study was to determine the relationships among the *Primary Measure of Music Audiation* and the *Singing Voice Development Measure* and the *Gesell School Readiness Test*.

Sixty-three students in grade one of the Indian Mills Elementary school took part in this study. All of these students had been tested with the *Gesell School Readiness Test* prior to entering first grade. This test consisted of eight subtests requiring such tasks as cube stacking, verbal interview with the child, pencil/paper skills in which the child was asked to write his/her name and

numbers and copy shapes, drawing and naming the parts of a man, visual discrimination of shapes and drawing a pattern of the same, and naming animals and personal interests. This was used as a screening device for readiness for first grade. Children who performed in the younger range were recommended for transitional first or for an extra year in kindergarten.

In October, 1997, the students were administered the tonal section of the *Primary Measure of Music Audiation.* This paper/pencil task evaluated the audiation ability of each child in retaining tonal patterns.

Next, all students were audio taped singing *Bow-Wow-Wow.* Two independent judges then evaluated each child's performance using the five-point rating scale of the *Singing Voice Development Measure .*

In addition, each child's chronological age was computed in months and measured against the three other data sources. Finally, these data were correlated through the use of a Pearson product moment.

The researcher did establish a relationship between the developmental age of the child and the use of his/her singing voice.

MINI-ABSTRACT

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ACKNOWLEDGMENTS

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CHAPTER ONE

INTRODUCTION

The relationship between developmental age, chronological age, and school readiness has long been understood. Although school entrance is based upon chronological age, the mere fact of having reached a fifth or sixth birthday does not guarantee success in school. Throughout the country, schools assume that the attainment of a certain age indicates readiness for the work and demands of a given grade. However, for children in school to be expected to maximize their potential, consideration must be given to their behavioral or developmental age.

Since 1911, the work of Dr. Arnold Gesell and his co-workers at the first Yale Clinic of Child Development and later at the Gesell Institute of Human Development has been based upon the concept that behavior is a function of structure. That is, all humans develop in a patterned, predictable way. Dr. Gesell's investigation led to the theory of developmental age descriptions. Each developmental age has characteristic patterns of social and emotional behavior, of mental and physical organization, and of play interests and activities. The developmental sequences are consistent from child to child and from culture to culture.[1]

The Gesell Institute has held the position that children should start school

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[1]. Dr. Francis Ilg, "Scoring Notes: The Developmental Examination," Gesell Institute of Human Development, (Connecticut: Gesell Institute of Human Development, 1983): 1-3.

and be promoted to the next grade level based upon their developmental age, not chronological age. Researchers for Gesell estimate that fifty percent of the school problems would be prevented by correct placement. They define developmental age as the age at which the child functions as a total organism.[2] Although chronological age is used as a criteria for school readiness, it merely represents an average age when children may enter school. The developmental age, however, respects the individuality of each child and his or her individual growth physically, mentally, and emotionally. Each child has a unique rate and pattern of growth which, when analyzed, permits parents and teachers to understand their individuality.

Developmental age is a qualitative, not quantitative concept.[3] It cannot be numerically determined in the same manner as an intelligence or as an achievement score. Cycles of development, each having their own individuality, are divided into six phases which keep repeating throughout life. In order to assess a developmental age and stage, the *Gesell School Readiness Tests* are administered to children between the ages of four and nine. Scores are obtained through such tasks as cube stacking, verbal interview with the child, pencil/paper tasks in which the child writes his/her name and numbers and copies shapes, the drawing and naming the parts of a man, visual discrimination of shapes and drawing a pattern of the same, and naming animals and personal interests. Attention is given as much to the answers the child gives as to the method in which they are given. The examiner must be observant of the child's behavior and movement as each task is performed. There are no right or wrong answers on the test. Scores are merely related to a set of norms derived through the examination of hundreds of children. Research

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[2]   Ibid
[3]   Ibid

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utilizing the *Gesell Readiness Test* has shown that children who are developmentally ready perform better in school.[456]

However, although music development has been reported in chronological age, it, too, also develops in successive, developmental phases ranking in order of specificity and complexity of skills. Moog noted that the infant first demonstrates reaction to music in relationship to the rhythm, responding by rocking or nodding.[7] Between the fourth and sixth months of age, the baby listens to music and can find and turn to the source of music. Next, the child begins to move in an organized way to the music he hears. Music babble, the next stage of vocalization to music, is different from the earlier spontaneous sounds reflecting speech. Music babble, the state in which the child can sing his earliest song before his first word is spoken, occurs around the age of six months. Rudimentary songs are constructed by the age of twelve months.[8] At the age of two, songs consist of brief, repeated phrases and by three, the child has mastered the outline of a song. At five years of age, the child can perform nursery songs, with words being learned first, followed by the rhythm, contour, and intervals. A relationship exists between the increase in chronological age and a gradual improvement in performance.

A tool used to assess the development of the singing voice in elementary school children, the *Singing Voice Development Measure (SVDM)* was

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[4]   Madhabi Banerji, "Predictive Properties of the Gesell School Readiness Screening Test Within Samples from Two Treatment Contexts." *American Educational Research Association,* 22 (1991): 3-27.

[5]   Laura Freberg, "Relationships Between Chronological Age, Developmental Age, and Standardized Achievement Tests in Kindergarten," *Psychology in the Schools,* 28 (1991): 77-81.

[6]   Chip Wood; Powell, Sarah; Knight, R. Chris. "Predicting School Readiness: The Validity of Developmental Age," *Journal of Learning Disabilities,* 17, 1 (1984), 8-11.

[7]   H. Moog, *The Musical Experience of the Pre-school Child.* Trans. C. Clarke. (London: Schott, 1976).

[8]   David J. Hargreaves, *The Developmental Psychology of Music,* (London and New York: Cambridge University Press, 1986).

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developed by Joanne Rutkowski in 1990.[9] According to Rutkowski, five categories of singers are suggested in developmental order: pre-singers, speaking-range singers, uncertain singers, initial-range singers, and singers. Chronological age does not determine in which stage of development the child will fall. Nor should a less skilled singer be considered lacking in music ability.

Singing ability is considered something of which all children are capable. It is believed that without proper help, children in the early stages cannot become confident, accurate singers. However, with keen assessment of and appropriate prescriptive measures, it is possible for the child to move through each of the developmental phases to achieve singing accuracy.

Another tool used in the evaluation of music development, the *Primary Measure of Music Aptitude* (*PMMA*), is a pencil-paper test which was developed to identify musically gifted children. This test consists of recorded tonal and rhythmic patterns. It was designed for use with children from kindergarten through third grade, thus testing children ages five through eight. Through the use of the *PMMA*, Gordon[10] has suggested that music aptitude is developmental in children ages five through eight and is influenced by both environment and the quality of instruction. Unlike physical and mental development, which continues throughout childhood, music aptitude stabilizes at nine years of age. The level at which music aptitude stabilizes is determined by instruction and environment.

Although a correlation exists between higher developmental and chronological age and school success, no such relationship has been proven between the results on the *Primary Measure of Musical Audiation* and the *Singing Voice Development Measure*. Are both tests results dependent upon

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[9]   Kenneth H. Phillips, *Teaching Kids to Sing,* (New York: Maxwell Macmillan International, 1992).
[10]   Ibid., 74.

chronological or developmental age? Both tests do require appropriate attention span which increases in length as the child matures. Furthermore, both tests require the ability to discriminate between sounds. However, Gesell and other researchers have found that these same skills stagnate and become confusing in spoken language, in that the average first grade child confuses blends. Are the test results of the *PMMA* influenced by the child's abilities in pencil/paper tasks? Does the fact that some first grade children still confuse left to right progression on reading assignments affect the test results? Does the social and emotional developmental age of the child have any effect upon his/her scores in both the *PMMA* and the *SVDM* ?

Purpose of the Study

The purpose of this study was to determine if there was a correlation between developmental age and scores achieved on music ability tests.

The problem of the study was to determine the relationships among the *Primary Measure of Music Audiation* and the *Singing Voice Development Measure* and the *Gesell School Readiness Test.*.

CHAPTER TWO

RELATED RESEARCH

Banerji Study[11]

This study was conducted in Florida in a mid-size school district, with a population of thirty-three thousand. All students entering the school system in kindergarten were required to be chronologically five years old on September one. In this school district, *The Gesell School Readiness Screening Test (GSRST)* was used as a tool to identify students at risk of school failure. Such identification of at-risk students at the kindergarten level was legislated in the public schools of Florida by means of the Florida Primary Education Program legislation passed in nineteen seventy-nine. Several school systems incorporated the use of the Gesell developmental tests in their kindergarten and first grade programs to meet the requirements of the Florida Department of Education.

The *GSRST* recommends specific placement related to test outcomes. Students who show low performance on the test are considered developmentally delayed for their age and are recommended for the two-year kindergarten placement prior to commencing first grade. The extra year provided to the child in either kindergarten, a pre-first grade, or at home enables initially delayed students to attain the required level of maturity to cope successfully with the academic pressures and demands in latter grades.

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[11]   Madhabi Banerji, "Predictive Properties of the Gesell School Readiness Test Within Samples from Two Treatment Contexts," The American Educational Research Association, 22 (1991); 3-27.

Schools employing the Gesell tests follow the two-year tracking recommendation suggested by the test developers. However, no specific curriculum for this two-year program is suggested by the Gesell Institute.

The *Gesell School Readiness Screening Test (GSRST)* represents a screening portion of a larger battery of tasks designed to measure readiness in children ranging in age from two to six years of age. It is individually administered, requiring twenty to thirty minutes, and contains the following eight subtests:

Cubes: This consists of a block building task using ten one-inch wooden cubes. The child is encouraged to use the blocks for spontaneous play, after which he/she builds with the blocks following the examiner's demonstration, thus completing a vertical tower, a train, and a bridge.

Copy forms: This is a paper-pencil task requiring the child to copy lines and progressively complex geometric shapes entailing a square, triangle, diamond, and cube.

Incomplete man: This is also a paper-pencil task requiring the child to complete the stick figure of a man by filling in the missing parts.

Writing name: The child is asked to write his/her name and address.

Writing numbers: The child is asked to write the numbers one to twenty.

Animals: The child is asked to name as many animals as possible in one minute.

Interview: Eight personal questions regarding the child's family members and his/her chronological age are asked.

Interest: The child is asked four open-ended questions about what he/she likes to do at school and at home, both indoors and outdoors.

Developmental age is assigned in years and determined using norms.

DAs attained on the subtests are used to determine a developmental age for each child. The examiner must consider the child's responses as well as how the child performs the tasks. Facial expressions, body activity, and factors such as left-to-right progression are also noted.

The purpose of the study was to examine the predictive properties of the GSRST, the programmatic context of the test use, and actions related to the test. The study was conducted on two samples taken from educational programs where the test was in use. The control sample included students who, although considered immature by the GSRST results, were placed with no differential program for mature and immature students. This control sample was taken from three schools during the academic year of nineteen eighty-four to nineteen eighty-five and consisted of fifty-five children chosen non randomly. Each child had entered kindergarten the previous year, being placed in the same level of kindergarten irrespective of measured differences in DA. Each child then moved on to first grade the following year. Such characteristics as CA (chronological age) and DA (developmental age) at the time of school entrance, gender, and socioeconomic status (SES) were noted.

The second group, noted as the treatment group, included seventy children from four pilot schools and contained those students deemed immature by the test. These children were then placed in the two-year program during the school term of nineteen eighty-five to nineteen eighty-six. This treatment program provided three levels of kindergarten, one with the two-year program for delayed students(K1), while the other two were one-year programs for students assessed as ready(K2, K3). K3 students were those who initially started with the highest DAs and were given enrichment activities if the teacher judged it necessary. The sample from the treatment group was drawn randomly

from each level(K1, K2, K3) of the pilot schools. The curriculum in K1 focused on social and motor development, while there was an increasing emphasis on academic readiness in K1 and K3 levels.

Considering the Gesell philosophy, the critical treatment variable to consider in the two programs was the different amounts of time given to students assessed as mature and immature before first grade. Assessment of such other factors as staff development programs given to teachers in the treatment and control schools, the kindergarten curriculum guides used, the recommended classroom strategies, and the report cards used in the two programs indicated that the curriculum content of the two programs was similar.

Student achievement was tested at the end of first grade through the use of the *Total Reading and Total Mathematics Batteries* of the *Stanford Achievement Test (SAT)*. Results indicated that the low DAs in both the one and two-year programs did not score statistically differently in math or reading. Despite an extra year in kindergarten, children with the lowest DAs remained the lowest achievers in first grade. An analysis on the treatment validity suggested that students with initially high DAs do better on achievement measures than students with initially low DAs. The extra year of treatment in the two-year program was not effective in enabling students with the lowest DAs to catch up with their first- grade peers, even though they were a year older than the latter group.

Although the *GSRST* was found to be a positive, but modest predictor of achievement measure in first grade, it was more reliable than chronological age in predicting school success. This study failed to prove the merits of the use of the *GSRST* as a placement tool for extra-year programs. The *GSRST* should be used only as a screening, not placement, test in early childhood. Results of

the screening could be used by the teacher for instructional planning for the entering kindergarten. Such screening may also determine whether a child should undergo further assessment and thus be placed in special education programs.

<center>Freberg Study[12]</center>

For many years, educators have sought ways to determine the appropriate age for a child to enter kindergarten. Two approaches have been routinely applied, chronological age and developmental age.

Studies have documented the theory that the younger the child is when he/she enters kindergarten, the more he/she will experience both academic and social problems. Most states have addressed this problem by establishing a legal age at which the child may enter kindergarten. However, these legal age minimums often vary by six months in schools throughout the nation. Little research has been done to support the choice of chronological age for school entrance or for cut-off dates for when the child must reach that age.

The Gesell Institute has long promoted the use of the developmental age as criteria for entrance to kindergarten. The Gesell Developmental Schedules (DA) were developed on the basis of observations of hundreds of children over a period of more than fifty years. These schedules represent the maturational sequence of child development and were used to develop the *Gesell School Readiness Screening Test (GSRST)*, an increasingly popular tool for determining school readiness. However, the majority of research done on the value of this screening device has been done by the Gesell Institute itself, with the recommendation that children screened as immature for school wait one year before entrance. These criteria may cause one-third to one-half of

[12] Laura Freberg, "Relationships Between Chronological Age, Developmental Age, and Standardized Achievement Tests in Kindergarten," *Psychology in the Schools*, 28 (1991) : 77-81.

chronologically eligible children to be labeled as developmentally unready for kindergarten.

The purpose of this study was to make a comparison between chronological age and developmental age as predictors of kindergarten success. The subjects of the study were two hundred and eighty-four children attending the San Luis Coastal School District in California. Students in the district came from predominantly white, middle-class homes. Prior to kindergarten entrance, each child's developmental age was assessed through the use of the *Gesell School Readiness Screening Test.*. Academic achievement was determined through the use of the complete battery of the *Stanford Achievement Test (SAT).* Chronological age in years and months was noted as part of the *SAT* administration.

The *GSRST* was administered as an individual interview during the May preceding school entrance. District kindergarten teachers who were trained by the Gesell Institute administered the test, usually with one parent present. The *SAT* was administered during the following April to groups by kindergarten teachers according to guidelines established in the *SAT* manual.

To analyze the data, the children were divided into the following two age groups: 1 young(five years zero months or younger at the time of kindergarten entrance) or 2 old (five years one month or older at the time of kindergarten entrance). Although California law permitted the child to enter kindergarten at four years nine months of age, the San Luis Coastal District had a proposal to raise the entrance age to five years. The chronological age groups were made for the purpose of isolating children who would be ineligible for school entrance under the new age proposal. Furthermore, children were divided into high and low scores at the 60th percentile of the *SAT* test. A non parametric statistic was

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calculated on the proportions and it was found that both chronological and developmental age was in agreement with the researcher's expectations. That is, older children performed better on the *SAT* test as did children who were developmentally older.

Results failed to establish a significant correlation(.09) between chronological age and *SAT* score. However, the largest amount of variability did occur in the youngest age group. Indications of the study were that entrance to kindergarten be limited to children in the older age group. Therefore, both developmental age and chronological age are good predictors of *Stanford Achievement Test* performance in kindergarten and latter school success in children.

<div align="center">Wood, Powell, Knight Study[13]</div>

School readiness has been an issue that continues to be debated by educators. A question arises over whether children labeled as learning disabled are in actuality merely over placed due to the failure to evaluate their developmental age. School districts set arbitrarily drawn ages for school entrance to kindergarten with no meaningful pattern. Procedures for determining such entrance vary from district to district. Also, while some districts use the *Gesell School Readiness Screening Test,* other districts rely on intelligence testing as a measure of readiness.

Furthermore, parents often receive one message from the school while encountering conflicting advice from pediatricians, relatives, and friends as to their child's readiness for school. Meanwhile, the child is caught in the middle of the turmoil.

There is little research on the topic of readiness or even an agreement

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[13]   Chip Wood, Sarah Powell, Chris Knight, "Predicting School Readiness: The Validity of Developmental Age," *Journal of Learning Disabilities,* 17, 1 (1984), 8-11.

upon the definition of readiness. Many studies measure readiness in academic achievement tests. However, the concept of developmental readiness considers both the cognitive functioning and the potential. In addition, the whole child is considered in his/her physical, social, emotional, and general language development. The ability to cope with the school environment is considered of more importance than the cognitive abilities.

One purpose of this study was to determine whether there was a correlation between failure in school and the developmental age at kindergarten entry as measured by Gesell. The second purpose of the study was to determine whether the Gesell more accurately predicted special needs than chronological age at kindergarten entrance.

The evaluation of this study was conducted by the second and third authors based upon data collected by the principal author and funded by the Title IV C demonstration project in Massachusetts School Union #18. The validity study was conducted in a neighboring school district where no kindergarten screening or placement policy was used. In this school system, all children were admitted who were chronologically eligible for kindergarten and were given only a standard battery of vision, hearing, speech, and gross motor tests. Both school districts were semi-rural, lower-middle class, and predominantly white.

The test sample was comprised of eighty-four children, all eligible for kindergarten. The children were given the *Gesell School Readiness Screening Test* in December by certified examiners who were aware of the educational status of the children. Children who had any kind of difficulty adjusting to kindergarten between September and December were referred for a special needs evaluation and an Individualized Educational Plan was written for them.

This was done independently of the researchers.

The mean chronological age in months for children who were failing in kindergarten was 65.2 vs. the mean chronological age of 66.2 months for those children who were not failing. The difference was not statistically significant. Conversely, however, the mean difference in developmental ages for children who were failing vs. children who were not failing was statistically significant (F= 18.21, p<.01). That is children who have a higher developmental age perform better in kindergarten than do children with a lower developmental age.

A discriminant analysis of special needs versus non-special needs, using the information from the Gesell results and chronological age as the predictors, was performed. It was found that the developmental age alone was predictive of success/failure (x2=16.3, p<.01), whereas the chronological age was not found to be a significant predictor. Moreover, when both chronological age and developmental age were both used as predictors, no more variation is accounted for by the addition of chronological age.

Results suggested that developmentally ready children have less learning problems than the mean of the chronologically ready children. Children who are both developmentally older and chronologically older are more successful than the younger children. In addition, the less developmentally mature the child, the more likely that the child will have serious difficulties in kindergarten. The *GSRST* is effective for predicting success or failure in kindergarten. The chronological age of children four to six years of age who are entering kindergarten is not related to school success or failure. However, the *GSRST* is useful as a predictive measurement of school success in latter years.

Children who are labeled with special needs because of developmental

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youngness risk a school life of unnecessary failure. Teachers and other professionals who assess children for kindergarten entrance should be aware of developmental stages in order to not mislabel a child as having learning disabilities. Careful attention to the developmental differences in children of the same chronological age is recommended as a tool to guarantee a successful school experience for every child.

Comparison to Present Study

The previous studies have all correlated school success with the age of the child. The aforementioned studies related both kindergarten performance on the *SAT* and first grade performance with both chronologically and developmentally older children.

However, no such correlation has been made between the age of the child and his/her performance on the *SVDM.*. It is the intent of the writer to correlate the developmentally and chronologically older child with a more developed singing voice.

CHAPTER THREE

METHOD AND DESIGN

The subjects used in this investigation were first grade students enrolled in four separate classes at Indian Mills School. This school system consists of two schools serving nine hundred and sixty students. The township is located in the pine barrens of Burlington County in southern New Jersey. All first grade children were tested using the Gesell prior to first grade entrance.

Cubes: This consists of a block building task using ten one-inch wooden cubes. The child is encouraged to use the blocks for spontaneous play, after which he/she builds with the blocks following the examiner's demonstration, thus completing a vertical tower, a train, and a bridge.

Copy forms: This is a paper-pencil task requiring the child to copy lines and progressively complex geometric shapes entailing a square, triangle, diamond, and cube.

Incomplete man: This is also a paper-pencil task requiring the child to complete the stick figure of a man by filling in the missing parts.

Writing name: The child is asked to write his/her name and address.

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Animals: The child is asked to name as many animals as possible in one minute.

Interview: Eight personal questions regarding the child's family members and his/her chronological age are asked.

Interest: The child is asked four open-ended questions about what he/she likes to do at school and at home, both indoors and outdoors.

Although all of the four classes contained average to above average learners, two classes contained children grouped for extra instruction in basic skills. The other two classes contained children who had special needs which had been assessed by testing done by the child study team.

All first grade students received a forty-minute general music lesson twice a week in the school's music room. This room had been designed to give each child optimal space for movement, for playing instruments, and for proper seating position to encourage correct posture for singing activities. Seating on bleacher- type equipment permitted easy movement from activity to activity.

Each lesson consisted of a twenty minute introductory period and was taught in like manner to all classes from kindergarten to third grade. This introductory period helped the children adapt to the music room atmosphere and encouraged them to become involved in music for fun through singing, movement in singing games, playing both barred, pitched instruments and unpitched rhythm instruments, and through listening lessons focusing on the composer of the month.

Each child was encouraged to perform individually through the use of question-answer songs and tonal pattern exercises in which he/she repeated a pattern sung by the teacher. Rhythm patterns were also clapped by the teacher and repeated by the child. Songs were dramatized, with the child responding in character with the voice of the character he/she represented.

Basic musical concepts were presented developmentally through sequenced lessons in the first grade music series *Music and You* .[14] This series focuses on the child, with songs, listening selections, poetry, games, and

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[14] *Music and You* . New York, N.Y. Macmillan Publishing Company, 1988.

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dances chosen from children's favorites throughout the country. The series consists of eight units each containing six to ten lessons. One large textbook or *Big Book* was used by the teacher for instruction in whole-group style. Such elements of music as dynamics, tone color, tempo, duration/rhythm, pitch, texture, form, or style were emphasized in each lesson. The children were introduced to each new song through both the teacher singing the selection and then hearing it played on one of the compact discs which accompany the series.

Since all children entering kindergarten must be five by September thirty, the chronological ages of children in grade one ranged from six years two months to seven years six months. A transitional first grade also served the needs of eighteen children who were tested with the *Gesell School Readiness Test* and deemed developmentally immature for first grade.

The students in the four first grade classes had been tested during the month of October with the tonal section of the *Primary Measure of Musical Aptitude(PMMA).* This test consisted of forty questions in which the student had to decide whether two musical patterns were the same or different. If the musical patterns were the same, the student circled a pair of faces which were also the same on the answer sheet. However, if the patterns were different, the student circled a pair of faces which were also different. These scores were then used as criterion two.

Of the eighty-five students enrolled in first grade, sixty-three took the thirty minute test in their respective classrooms. During January 1998, these same children were tested in the music room, with each child individually singing *Bow Wow Wow* in the key of F. The song had been reviewed during each general music class. Since each child was to be taken from his respective classroom

during regular first grade lessons, the examiner tried to eliminate apprehension in the students through reviewing the song verbally and then singing the song with the child prior to taping each child's individual response. The procedure was explained to each child and the pitch pipe, a tool used by musicians, was demonstrated to appease the child's curiosity. All responses were audio-taped. The taped performances were evaluated by two independent judges using the five-point rating scale of the *SVDM* developed by Joanne Rutkowski. The combined ratings of both judges served as criterion three.

1. Pre-singers: Children who do not sustain tones; their singing response resembles chanting in the speaking voice range.

2. Speaking-range singers: Children who sustain tones and exhibit some sensitivity to pitch but remain within the speaking voice range....

3. Uncertain singers: Children who sustain tones but often waver between a speaking-voice range and a singing -voice range. When in singing voice, they utilize a range up to approximately ...{F#1}.

4. Initial-range singers: Children who have use of the singing-voice range up to the register lift, usually to...{A1}.

5. Singers: Children who are able to sing over the register lift, Bb {Bb} and above, and have full use of their singing voices {Rutkowski, 1990}.[15]

An attempt to establish a relationship among chronological age, developmental age assessed through *The Gesell School Readiness Test*, and the scores on both the *PMMA* and the *SVDM* was made by calculating a Pearson Product-Moment correlation coefficient and was calculated on the three criterion.

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[15]   Kenneth H. Phillips, Teaching Kids to Sing, (New York: Maxwell Macmillan International. 1992) 73.

CHAPTER FOUR

RESULTS AND INTERPRETATIONS

Interjudge Reliability

The interjudge reliability between the two judges was .679. This demonstrated an agreement between the judges of 46%.

Relationships Among Criterion measures

Means and standard deviations for developmental age category, singing voice use, tonal music aptitude, and chronological age are presented in Table 1. The mean developmental age was 5.5. The mean of the *PMMA* tonal test was 31.746 as compared with national raw score mean of 32 which represents the 71st percentile.

Table 1

Descriptive Statistics for Developmental Age, Music Aptitude, Chronological

Age in Months, and Singing Voice Use

	Developmental age	PMMA	Months	Singing Voice Use
	63	63	63	63
Mean	2.746	31.746	83.841	6.603
Standard Deviation	0.915	4.769	4.820	2.152

Pearson product moment correlation coefficients among developmental age category, singing voice use, tonal music aptitude and chronological age

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are presented in Table 2. The correlation between chronological age and singing was .120. The correlation between developmental age and singing was .325. The difference between the magnitude of the chronological age/singing and developmental age/singing was statistically significant at the .10 level.(Hotelling's t=1.789). The relationship between tonal aptitude and singing voice use was .078.

Table 2

Relationships Among Tonal Aptitude, Singing Voice Use,

and Developmental Age

	Developmental Age	PMMA	Months	Total
PMMA	-.026			
Months	.557	.081		
Total	.325**	.078	.120	1.000

p<.05

Interpretations

The interjudge reliability was moderate and therefore it seems reasonable to suggest that the scale functioned adequately. It seems relevant that the correlation between developmental age and singing voice development is higher than chronological age and singing voice development. That is, perhaps maturation is not that which is solely responsible for singing voice use. Singing accuracy is affected by both physiological and psychological maturity. Children who are developmentally more mature have a longer attention span and thus, when asked to match a pitch, these children may lend more attention to the given pitch than their developmentally younger peers. Also, children who

are at certain developmental levels may actually confuse a pitch much as they do in regular speech when attempting blends. To reproduce a pitch, a child must be able to hear the pitch, audiate it, and reproduce it. If the child is found deficient in any of these procedures, the final result is flawed.

The type of learner the child is may also influence the way he/she reproduces the pitch. Perhaps auditory learners, with their preference for aural stimuli, performed the task more accurately than did visual or kinesthetic learners.

The study was done by combining results regardless of sex. Another theory for the developmental age matching the singing voice development would be the maturation of the male child. Since there is often a maturational difference of six months between male and female children, could there also be a greater gap between the sexes in the use of the singing voice? Would this account for the fact that more boys sing inaccurately than girls.

In conclusion, many of the developmentally older children have been in the school environment longer than their chronologically older peers. Some parents choose to wait an extra year before enrolling their developmentally younger child in school, usually at the chronological age of six. However, the developmentally older child may have repeated kindergarten, first grade, or may have spent an extra year in the transitional first grade. Thus, he/she would have been exposed to music instruction twice a week in a developmentally structured music program. This fact alone would lead to better results in tone/pitch accuracy.

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

Purpose and Problem of the Study

The purpose of this study was to determine if there was a correlation between developmental age and scores achieved on music ability tests.

The problem of the study was to determine the relationships among the *Primary Measure of Music Audiation* and the*Singing Voice Development Measure* and the *Gesell School Readiness Test.*

Design and Analysis

Sixty-three students in grade one in Indian Mills School participated in this study. The children were tested in May, 1997, with the *Gesell School Readiness Test* for entrance into first grade. Children were assigned a developmental age based on the combined results of the eight subtests. The tonal test of the *PMMA* was administered in October, 1997. All students were also tested in January, 1998, on the use of the singing voice with the *SVDM* and were assigned a score by each of two judges. The chronological age of each child was assigned in months up to February, 1998.

The scores were examined for any relationships between developmental

age and the use of the singing voice and chronological age and the use of the singing voice.

Results of the Study

The researcher did establish a relationship between developmental age and use of the singing voice. Developmental age was shown to be a more accurate predictor of the child's ability to use his/her singing voice than mere chronological age.

Conclusions and Recommendations

Based on the data acquired from this study, it can be concluded that knowing the developmental age of children in first grade may aid the teacher in predicting a child's use of his singing voice. Singing is an acquired psychomotor/physiological skill which is learned through use and through exposure to a rich, singing environment. Inaccurate singers can be taught through various auditory, visual, and kinesthetic methods.

Young children love to sing and freely do so at play. As they mature they may become self-conscious of the fact that they are not singing accurately. It is the music specialist's job to ensure that all children be taught how to find their singing voice and that they not become an adult who proclaims he/she cannot sing. This job must begin as early as possible through exposing the children to how a child's voice should sound. The children need to be taught how to discriminate the speaking voice from the singing voice. They need many opportunities to hear themselves singing through singing alone and with a

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group in question/answer songs. Such factors as proper breathing, vowel pronunciation, and posture may be stressed at an early age as methods to ensure beautiful singing.

Through guidance and knowledge, the child may grow into a musically developed person who derives great pleasure through the use of his/her singing voice, be it as a hobby in a choir, as a professional, or merely to enjoy his/her own singing voice.

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