

**ARTICLES**  
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**NATURE, SOURCE, MEASUREMENT, AND EVALUATION  
OF MUSIC APTITUDES\***

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**Summary.** The article points at the differences between music achievements and music aptitudes claiming that music achievements are intellectual, while music aptitudes are spontaneous and occur in the entire body. The author also shows the importance of testing the music aptitude and presents tests useful for this purpose (e.g. PMMA, IMMA, MAP and AMMA). He says that music aptitude tests may be used to identify students with high overall music aptitude, but they may also be administered to focus on tonal and rhythm aptitudes.

We are born with equal rights under the law, but that is not to say we are born equal. Every unborn child has the potential to become a child, but once born, differences among children become readily apparent. One such difference lies among children in their potential to learn and understand music. Nonetheless, they share the same right to achieve whatever they are capable of in music.

More than two thousand years ago, Plato said there is nothing more devastating and unequal than equal treatment of students with unequal aptitudes. More recently, Felix Emanuel Schelling (1858-1945), American educator and scholar, had this to say: "True education makes for inequality; the inequality of individuality, the inequality of success; the glorious inequality of talent, of genius; for inequality, not mediocrity, individual superiority, not standardization, is the measure of the progress of the world".

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As educators and parents, we have an obligation to be sure children with low music aptitude do not become frustrated and children with high music aptitude do not become bored. Some children will naturally learn more than others, and yet when instruction is based on clear understanding of children's musical differences, it can be expected all children will develop feelings of satisfaction and confidence because they have experienced success.

Music aptitude is a measure of one's potential or capacity to learn music. It points beyond itself. Music achievement is a measure of what has been learned in music. For example, a person is not born knowing how to compose music in a given style. This must be learned, and once learned, it is considered music achievement. However, technical proficiency by itself is not music achievement. It is simply skill for demonstrating music achievement, ideally embedded in audiation and applied to instrumental and vocal performance. On the other hand, a person is born with more or less potential to learn how to compose music in a given style, and that potential is considered music aptitude. Audiation is fundamental to music aptitude and consequently, to music achievement. Leaving instinct aside, consider intuition to be associated with music aptitude and insight with music achievement. Music aptitude is a hunger. Music achievement is satisfaction of that hunger.

Just as no person is void of some intelligence, no person is void of some music aptitude. To that extent, everyone is musical. No one is incapable of at least learning to listen to and perform music with some degree of success. More than two-thirds of us are average. That is, we have average music aptitude. The remainder have above or below average music aptitude and very few have exceptionally high or low music aptitude. The results of valid music aptitude tests suggest approximately one or two in a hundred have exceptionally high music aptitude, and only one in thousands has the potential to achieve as a genius. It is not a pleasant commentary on our society so few with genius potential ever actually achieve at that level, and a substantial number of the few who do, may never be given proper recognition.

Most of us have become accustomed to hearing and using words such as ability, talented, gifted, and musical. However, these words confuse the issue by obscuring an important distinction between music aptitude and music achievement. Music achievement is intellectual and primarily in the brain, whereas music aptitude is spontaneous and occurs primarily in cells and genes, that is, in the entire body. Although students who have a high level of music achievement must also have a high level of music aptitude, it is not necessarily true students who have a low level of music achievement must also have a low level of music aptitude. There are students with high music aptitude who never achieve at the level of their potential because they have not had appropriate guidance or instruction in music. Thus, they do not have readiness or motivation to begin or continue to achieve in music. Given appropriate guidance and instruction, in time those students may be as successful as students who have high levels of music achievement and high music aptitude. On the other hand, students with low music aptitude may, with appropriate instruction, achieve more than students who have average levels of music aptitude and receive inappropriate instruction.

Although genetic makeup is a determining factor in one's level of music aptitude, it is important not to confuse innateness with heredity. There is sufficient evidence to suggest innate factors and interaction of unique combinations and connections of genes and neurons influence one's level of music aptitude. However, there is no evidence to suggest heredity plays a role in determining those factors. Although physical characteristics may be hereditary, ancestry will not reliably predict one's level of music aptitude after birth. Regardless of parents', grandparents', or great grandparents' level of music aptitude, a child may be born with high, average, or low music aptitude. Unequivocally, a child is born with a particular level of music aptitude. That level changes in accordance with quality of the child's informal and formal music environment until about age nine. Thus, neither nature nor nurture is solely responsible for a child's level of music aptitude. Music aptitude is a product of both innate potential and environmental influences. Regardless of quality of music environment after age nine, it will no longer have much, if any, effect on one's level of music aptitude. Throughout life, a person's potential to achieve in music remains ostensibly what it was at approximately nine years old.

That a child's level of music aptitude cannot be predicted accurately on the basis of ancestry should encourage realistic thinking. Time and time again parents say, "Well, we can't expect our children to become accomplished in music because neither of us are musical and no one in the family is musical." Unfortunately, some teachers reinforce that belief. It is nonsense. The fact is children, regardless of what anyone else in their immediate or extended family has accomplished in music, may surpass expectations.

Parents who have distinguished themselves in music may not have children with high music aptitude, and parents who have never shown any inclination of exceptional music achievement may not have children with high music aptitude.

Before music aptitude stabilizes at about age nine it is ever changing, it moves up and down as it develops in association with environmental influences. Some neurologists believe there is a possible relation between myelination of great cerebral commissures and more complex activation of frontal lobes of the brain with stabilization of music aptitude. Frontal lobes are associated largely with ability to anticipate and predict coming events, and music aptitude, as well as general intelligence, is based on how well a person can draw generalizations from specific information or experiences. To generalize enables one to make inferences and judgments that foretell and possibly influence future events.

Children are in the developmental music aptitude stage from birth to approximately age nine and in the stabilized music aptitude stage from approximately age nine onward. It is essential children receive the highest quality of informal music guidance and formal music instruction while they are in the developmental music aptitude stage, because not only will their immediate level of achievement increase, their overall level of music aptitude, their lifetime potential for music achievement, will be increased. Moreover, the younger children are, the more quickly they may

profit from that kind of music environment. Interestingly, Charles Spearman, after intensive research in cognitive acquisition completed as long ago as the turn of the last century, stated in the *American Journal of Psychology* "the function [overall intellection] appears to become fully developed in children by about their ninth year, and possibly even much earlier. From this moment, there normally occurs no further change even in extreme old age. The function ... is nine parts out of ten responsible for success in such a simple act as discrimination of pitch".

With appropriate early informal music guidance and formal music instruction, there is reason to believe every child's level of developmental music aptitude can be brought back toward its birth level, though it is rare, perhaps impossible, to bring it back to its exact birth level. Most children, for whatever specific reason or reasons, experience levels of developmental music aptitude that continually fluctuate and, without appropriate guidance and instruction, generally decrease. The extent to which their developmental music aptitude increases or decreases will, of course, ultimately have a profound effect on their music achievement in and out of school. It is important to remember the informal music guidance children receive at home and preschool and formal music instruction they receive in kindergarten and early grades will directly influence their levels of developmental music aptitude and indirectly their levels of stabilized music aptitude. Most likely, this early guidance and instruction will have a direct influence on their music achievement, far more influence than formal music instruction they receive in the upper elementary grades, middle and high school, and even in colleges and universities.

For their music aptitude to flourish in a positive manner, children need to be nurtured in a rich musical environment. It is important children grow accustomed to hearing the same songs and chants consistently performed by adults in the same keyality and tonality and in the same meter and tempo. However, that is not to say they should be exposed to only one tonality, keyality, meter, and tempo to the exclusion of others. Quite the contrary. Children hear a variety of songs and chants within varied music contexts. Ideally, songs and chants are short, with much repetition and sequential phrases. Above all, when performed without words, children beneficially focus on music. Records designed specifically for children, with or without stories, usually are bereft of these qualities.

All indications are a child will never have a higher level of music aptitude than at the instant of birth. Moments after children are born, their levels of music aptitude appear to decrease because sounds, including voices, in the immediate environment are not automatically conducive to reinforcing senses of pitch and duration. Nature supplies children with an abundance of neurons and synapses during gestation, again immediately after birth. If the environment does not cause a child to make use of these genetic indicators at one or both of these periods of early development, they are soon lost, not to be regained. It is believed that some or most of unused the neurons and synapses that might have been used for developing sensitivity to music move to support another sense or medium, such as the visual or linguistic, compensating for lack of musical development.

Learning sequence activities based on music learning theory are not adapted to students' individual musical differences by altering music skills (such as singing, chanting, reading, writing, creating, and improvising) or music context (such as major and harmonic minor tonalities and duple and triple meters) students are taught. Rather, all students, regardless of levels of music aptitude, learn the same music skills and are exposed to the same music contexts. Only difficulty of content (tonal patterns, rhythm patterns, and harmonic patterns), the musical foundation of what students are learning, is altered. When teaching to students' individual musical differences in learning sequence activities, all students are taught in the same group, regardless of levels of music aptitude. No separate groups are established according to so-called talent. Students of lower music aptitude are taught by using simpler, more readily accessible patterns than those used with students of higher music aptitude. One reward of keeping a group intact is students learn a great deal from one another, in time often more than they learn from a teacher. Only when students receive instruction adapted to their individual musical needs in a group including high to low levels of music aptitude will they achieve in music as much as their music aptitudes will allow. When a group of students is taught as if all students in the group have average, or worse, minimal music aptitude, mediocrity is the inevitable result, and this is often the case.

As children phase through early vocalization in preparation for speech, the speech sounds they make are not recognizable words to those around them. Similarly, as children phase through music vocalization, either tonal, rhythm, or both, music sounds they make are not recognizable tonal patterns and rhythm patterns. Depending on whether children are still in or have emerged from one or both music vocalization stages, they may or may not audiate what musical adults audiate.

When children are in the music preparatory vocalization stage, they audiate subjectively. The content and context of tonal patterns or rhythm patterns they are audiating is unique because it is not influenced by adult culture. For example, intervallic distances between pitches are inconsistent among themselves and culturally established standards, and ongoing pitches are connected, as in whining speech. With regard to rhythm, tempo is inconsistent, meter fluctuates, and relative length of durations and silence is of little concern. However, when children have emerged from the preparatory vocalization stage, they audiate objectively. Content and context of tonal patterns and rhythm patterns children are audiating are not exceptional because they are influenced by adult culture. For sure, context of tonality and meter are rather easily recognized and tempo necessarily becomes more uniform. Unfortunately, for a variety of reasons, some children with high music aptitude never grow out of preparatory vocalization, remaining there throughout their lives. As adults they cannot distinguish among tonalities or sing with acceptable intonation, nor can they distinguish among meters or perform with appropriate rhythm in a consistent tempo.

When a teacher or parent has knowledge of a child's music aptitude and uses that knowledge in conjunction with informal guidance and formal instruction based on music learning theory, the child may be expected to emerge from both tonal and

rhythm preparatory vocalization stages at an early age. Of course, some children will emerge from preparatory vocalization sooner than others because of higher levels of developmental music aptitude. With appropriate guidance and instruction in music, children who have higher tonal than rhythm developmental music aptitude will grow out of preparatory tonal vocalization sooner than preparatory rhythm vocalization, and vice versa. Also, children with higher developmental music aptitude will tend to retain an advantage over children with lower developmental music aptitude when preparatory vocalization has ceased, and even if given similar guidance and instruction, differences in levels of developmental music aptitude will continually become greater as children grow older.

Music aptitude is a general term that includes more than one music aptitude. There are at least two stabilized tonal aptitudes: melody and harmony; two stabilized rhythm aptitudes: tempo and meter; and three stabilized preference aptitudes: phrasing, balance, and style. Rarely is an individual high or low in all or the majority of those music aptitudes. Usually a profile of a student's stabilized music aptitudes includes high and low points. Even when considering only two developmental music aptitudes have been identified, tonal and rhythm, it is unusual for a child to be very high or low in both. Meanwhile, most young children seem to be more preoccupied with how music is made than with how it is expressed. Perhaps the reason only two developmental music aptitudes have been discovered is children are so little interested in music preference.

There are students who have exceptionally high levels of music aptitude who go unnoticed by parents, teachers, and administrators. It has been shown almost half the number of students who score in the upper 20 percent on a valid music aptitude test never receive any special instruction in school music, nor do they participate in music activities. In a typical school there are almost as many students with high overall music aptitude who are not members of music performance groups as there are students with high overall music aptitude who do belong to such groups.

To guide and teach children music in an artistic and a professional manner, it is prudent parents and teachers be aware of all levels of each student's various music aptitudes. Obviously, measurement of music aptitude must be objective. Some music teachers and professional performers do not know or believe there is a difference between music aptitude and music achievement. In some languages, such as German, there is not even a word for aptitude. Other teachers and performers are unable or fail to recognize the difference between music aptitude and music achievement when they are evaluating what they refer to as musical talent, musical ability, or musical giftedness. Surely, a valid, standardized music aptitude test is a necessity for objective and complete evaluation. A music aptitude test is designed to measure personal inferential processes by which each student synthesizes what is being heard as music, rather than with analytical descriptions and notational definitions of a finished musical product. Of course, the latter is representative of a music achievement test. Poetically put, a music aptitude test hears what a teacher cannot see.



Music aptitude test results have little value if a society does not value what the tests represent. Music aptitude comes to highest fruition in accepting and encouraging surroundings. As Albert Schweitzer pointed out, what would J. S. Bach have achieved had he been born in Geneva? Think for a moment about nineteenth-century society in Vienna and twentieth-century society in New York and Paris. Both gave rise to exceptional groups of musicians and artists. Is that happening today anywhere in the world? Certainly there is at least one child in the world born each year with the musical potential of Mozart, yet none seem to have emerged and come to our attention in two hundred years. Why? What has changed?

Some persons automatically confuse entrenched political ideas with intelligence testing. Regardless of whether such thoughts are positive or negative, they must be put aside when learning about the value of music aptitude tests. Music aptitude and intelligence, as well as the purpose of tests associated with both, have nothing whatsoever to do with each other. As will be explained, the primary aim of a music aptitude test is to improve instruction, not to deny instruction to low scoring students while identifying high scoring students who would profit greatly from music instruction.

A developmental music aptitude test is designed specifically to measure music aptitudes of children and students from three to nine years of age. Examples are *Audie* for children three and four years old, the *Primary Measures of Music Audiation* (PMMA) for students in kindergarten through third grade, and the *Intermediate Measures of Music Audiation* (IMMA) for students in first through sixth grades. Because both are developmental music aptitude tests, the choice of using either PMMA or IMMA in a given grade depends on desired complexity of test content. A stabilized music aptitude test is designed to assess music aptitudes of students nine years of age and older. Examples are the *Musical Aptitude Profile* (MAP) for students in fourth through twelfth grades and the *Advanced Measures of Music Audiation* (AMMA) for students in fifth grade through adulthood. MAP provides eleven test scores, whereas AMMA provides three test scores. MAP takes more time to administer but offers a broader diagnostic appraisal than AMMA. The tests are published by GIA, Chicago, Illinois, USA. ([www.giamusic.com](http://www.giamusic.com))

All music aptitude tests, except *Audie*, may be administered to students individually or in groups. *Audie* is administered to children individually. Teachers should expect the rationale and longitudinal predictive validity of a professionally developed music aptitude test to be reported in an accompanying test manual along with other pertinent information, including directions for administering and scoring the test and guidance in interpreting test results. To make best use of test results, it is important to be knowledgeable about validity of the test and to be in philosophical agreement with what is being measured and how it is being measured.

Although IMMA is a developmental music aptitude test, it may be used with students ten and eleven years old in the fifth and sixth grades, even though their music aptitudes have stabilized. However, when it has been decided which students will pursue special music studies, it is prudent to administer MAP to those students to secure more complete diagnostic analyses. Similarly, when AMMA is administered to

students in fifth grade and above, it is recommended MAP be administered at a later time to students who are participating in music activities to gather additional specific information about their individual musical strengths and weaknesses.

Historically, test means (average scores) have been found to increase with chronological age for developmental and stabilized music aptitude tests as well as for music achievement tests. This might seem to contradict the concept that music aptitude stabilizes at approximately nine-years of age. However, though there are slight raw-score mean increments on MAP from year-to-year, students, with slight variations, maintain their relative positions from one test administration to another. The magnitude of percentile rank differences rarely correspond to more than one standard error, and the majority of differences are minimal. And, as students increase in chronological age, normative means become more and more similar. This is the case with the *Advanced Measures of Music Audiation*. In fact, because differences are so small and unsystematic, there is no need for separate norms for high school students of different ages nor adults of different ages.

It is true on average, students with a music background score higher than those without, but some non-music students score very high and some music students score low on AMMA. Thus, only one set of combined norms for music participants and non-participants is necessary for middle-school students. It may be middle-school represents the period of a pronounced borderline between developmental and stabilized music aptitude stages, and MAP is more appropriate for students just entering the stabilized stage and AMMA for students who have gone beyond middle-ground and already settled into that stage. However, that music students as a group score higher than non-music students does not invalidate AMMA as an aptitude test, nor does it indicate AMMA is an achievement test. Common sense explains more students with above average than below average music aptitude volunteer to be members of music ensembles. Further, results of validity studies discount attributes of achievement. For example, when students practice taking AMMA and/or receive formal music instruction over a semester or more, there are no practical and rarely significant differences observed in their AMMA scores when retested.

A final philosophical question must be addressed. There are pundits who contend developmental music aptitude tests are actually music achievement tests. They base their opinion on scores on a developmental music aptitude test fluctuate up and down, and such fluctuation is a result of music achievement. Critics fail to recognize or understand the following actualities: 1) Uniqueness of expected responses by students to test questions is not taught or even addressed in informal guidance or formal music instruction. Students do not practice nor are they taught to compare sameness and difference of isolated pairs of patterns in rapid succession. Also, although music theory as it pertains to reading music notation is a mainstay of music instruction, such knowledge is not measured in developmental or stabilized music aptitude tests. 2) In typical music activities, students are not expected to identify by themselves tonality or meter of isolated patterns they may hear. Potential to audiate subjectively music context is the bedrock of a music aptitude test. 3) Correlations among students' scores on



the same test from one semester or year to another is alarmingly low, even though all are receiving quality classroom music instruction. It seems students' immediate impressions and intuitive responses to environmental influences have more impact on developmental music aptitude than does systematic instruction in music. 4) Correlation between students' developmental music aptitude test scores with scores and teachers' subjective ratings of their music achievement is virtually zero. 5) It is not unusual for kindergarten children with no prior informal music guidance or formal music instruction to obtain perfect scores on a valid developmental music aptitude test.

Music aptitude tests are used for several purposes. One is to identify students with high overall music aptitude so they may be encouraged to participate in special music activities. However, all students benefit when tests are used to diagnose musical strengths and weaknesses so music guidance and instruction may be adapted to each student's individual musical needs in classroom music, in performance groups, at home, and in private lessons. A parent or teacher should know, for example, whether a student's tonal aptitude or rhythm aptitude is higher or lower than the other and, regardless of which is higher, how the child's tonal and rhythm aptitudes compare with the tonal and rhythm aptitudes of other children in the same grade or of the same age across the country. Just as what a child with high music aptitude learns provides a foundation for learning more, so effects of biological limitations of a child with low music aptitude can be lessened with instruction adapted to the child's specific musical needs. In addition to assisting parents and teachers in distinguishing between music aptitude and music achievement, a valid music aptitude test provides both parents and teachers with specific information about students' various music aptitudes. Many parents and teachers who do not make a distinction between music aptitude and music achievement think only in terms of overall music aptitude and thus, make it impossible to teach most effectively to different music aptitudes of each student or to specific music aptitude differences among students.

Perhaps greatest value of a music aptitude test is not when scores confirm a parent or teacher's judgment about a child or student, but when scores disagree with established beliefs. It is not unusual for a parent or teacher to be surprised by the high score a child earns on a music aptitude test when they are convinced the child lacks musical talent. Similarly, a parent or teacher should certainly take notice of a child who is believed to have high musical achievement but nevertheless scores low on a music aptitude test.

Discovering the nature of discrepancy can prove to be of enormous educational value in helping parents and teachers better understand the nature of a child's music aptitude and establish reasonable goals based on a child's individual needs. All become beneficiaries when contradictions are resolved because success is easily shared. When it is assumed a child is highly musical but scores low on a valid music aptitude test, often the reason may be a result of exceptionally good approaches taken by teachers and parents. Or, the child's achievement may appear to be outstanding because it is being compared to, among others, those with high music aptitude who, for whatever reasons, have not been motivated to achieve. Meanwhile, recognizing

and accepting the child's lower music aptitude, parents and teachers will understand and respond to the child's possible future frustration. Although objective music aptitude scores are more valid than parents' and teachers' subjective observations, neither is free of error. However, in most cases, parents and teachers can expect unique knowledge of test scores will help them stay informed of their children's educational progress with a far greater degree of objectivity, intelligence, and sensitivity.

Regardless of a test's strength, it may be misused to deny children opportunities or stigmatize them as slow or disabled learners, incapable of meeting ordinary classroom demands. Regrettable as that is, there are more compelling reasons for using tests than for not using them. Music aptitude tests are used to great benefit by teachers and parents in identifying objectively children's various music aptitudes, and thus pointing the way to helping children achieve their potential. It goes without saying only those in positions to contribute to children's education by adapting music instruction to their individual needs should have the privilege of examining or being made aware of test results. When used with judgment and wisdom and treated with sensitivity and confidentiality, test results serve as valuable objective aids to parents' and teachers' subjective opinions and observations.

There is a difference between a test and a contest. In a contest, students compete against one another. In a test, competition is of no concern. Tests are used positively, not negatively, to improve instruction by diagnosing individual student's strengths and weaknesses. Thus, results of a music aptitude test are not used to exclude children from music activities. On the contrary, whatever the results, scores are used to guide parents and teachers in helping children participate more fully in all aspects of music learning and enjoyment.

One of the more common and unfortunate misunderstandings about music aptitude, one often evidenced in programs designed for so-called talented and gifted students, is based on the belief all students with high overall music aptitude also have high intelligence. The fact is a gifted student, one with high intelligence, is not necessarily a talented student, one with high overall music aptitude. Music aptitude, on the one hand, and intelligence, or any other human trait—including normal and abnormal personalities, other artistic aptitudes, and academic achievement, especially mathematical ability—on the other, have almost nothing in common. Only by chance might one be predicted accurately by the other. At most, there is only a 5 to 10 percent relation between music aptitude and any type of intelligence test score. A person with high music aptitude may be expected to have any level of intelligence, and a person with high intelligence may be expected to have any level of music aptitude.

In gifted and talented programs based on IQ or academic test scores, there will be as many students found in a class with below average music aptitude as there are students with above average music aptitude. The distribution of music aptitude scores will be normal even though it erroneously may be expected all students, when compared to typical students, will demonstrate above average music achievement. Intelligent students with any level of overall music aptitude can learn to read music notation, but not all of them, depending on their levels of music aptitudes and back-

grounds, will audiate or perform what they read with impressive musical sensitivity. There is a higher relation between music achievement, which includes reading music notation, and academic intelligence than between music aptitude and academic intelligence.

As a test author, I have often asked myself whether tests I have created may do more harm than good. I know of the great value of tests, but I also know they can be misused. On more than one occasion I have had teachers tell me they are grateful for my tests, because the tests identify students who will learn music quickly and thus will be able to contribute most to school music performance groups with the least amount of time and effort on the part of teachers. For example, those who score highest are given preferential treatment and are lent musical instruments, while others may be, if not ignored, discouraged altogether from participating in school music activities. In these instances, it is unfortunate entertainment needs of the school supersede education. Even so, I trust the majority of teachers will use tests wisely and in a professional manner. Just as no one would responsibly suggest medical practitioners not be allowed to use life-saving drugs because some doctors misuse them, to suggest music aptitude tests be disallowed because some teachers do not understand their use and value would be irresponsible and unconscionable.

In testing for music aptitude, advantages far outweigh limitations. When a valid music aptitude test is administered in preparation for guiding and teaching children and students in accordance with principles of *music* learning theory, their music aptitudes will no longer be concealed. Instead, music aptitudes will be revealed to everyone sincerely concerned with guidance and instruction. That is as it should be.