

# Role of music in child development :

## A comprehensive review

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### Abstract

*Music is an effective, almost magical medium that can be used to learn and retain information. Music activates three different centers of the brain at the same time: the language centre, the hearing centre and the rhythmic motor control. Through effecting these neural centres, it induces emotions and creates a heightened condition of awareness and mental acuity. It is one of the best medium which helps in proper development of cognitive ability of a child. Introducing proper musical activities in the school curriculum and in daily life is proven to improve child's overall development. The presernt article highlights the impact of music on human brain & overall development of child in the light of various studies and researches done around the world. The aim of this article is to put forward the benefit of music in child development and inculcation of good habits. This article challenges the misconception prevalent in the society which assume music merely as a mode of entertainment and insist students to concentrate on general scholastic subjects. It further provide scientific justifications for including music as one of the core subject in school curriculum.*

### Research Paper

**S**everal studies conducted by the American Association for the Advancement of Science and Brown University explored the effects of art and music education on young children's learning. The finding of these studies support the concept that music instruction can help in building intellectual and emotional skills, facilitate children's learning and strengthen other academic areas such as reading and apptitude. Music positively affects skills like IQ, reasoning, memory, creativity, emotions and values like co-ordination, confidence, etc. Researchers have also found a significant relationship between music instruction and positive performances in areas such as: reading comprehension, spelling, mathematics, listening skills, primary mental abilities (verbal, perceptual, numeric, spatial) and motor skills.[1] Music has proven to provide far greater benefits than only entertainment. It has even proven to help patients recover from diseases or surgery more quickly with less suffering. Nowadays much research is being undertaken to learn the effects of music on human mind and body. From the findings of several of the most prestigious researchers in the field that it

can have very positive effects on child health development. Due to this, music education is demanding need for every child to facilitate proper and overall growth. In this review article, the outcome of music training alongwith case studies is discussed.

### 1. Music makes brain work better & faster

Music has shown the effect on various areas of brain like corpus callosm, sensory cortex, motor cortex, hippocampus and cerebellum [2] When we play or listen music, it is processed in different parts of the brain. Neuroscientists has also been proved that there is more growth in neural activity of people involved in music than people away from music. Several researches also revealed that the brain of a musician works differently than that of a non-musician. Numerous neuroscience research proves that children involved in music have greater growth of neural activity than people not in music training. So on the basis of such researches school academic curriculum should take appropriate steps to include music as one of

the main subjects. Most of the genres of music have the same basic principles and they all are directed towards similar outcome i.e beauty and satisfaction to the listeners. While playing any instrument or vocal recital, these principles must be considered. Simultaneously, various other things like purity of notes, rhythm, lyrics, expressions, gestures and aesthetic principles must be taken care of. During such activities music trains the brain for multi-tasking. A study led by Winner E., Professor of Psychology at Boston College, and Gottfried S., Professor of Neurology at Beth Israel Deaconess Medical Center found changes in the brain images of children who underwent 15 months of weekly music instruction and practice.[3] According to a study conducted by the Dana Foundation, a private philanthropic organization that supports brain research found that the students who received music instruction had improved sound discrimination and fine motor tasks. Brain imaging showed changes to the networks in the brain associated with those abilities.[4]

## 2. Music training can significantly improve our motor and reasoning skills

We generally assume that music can be somewhat beneficial for kids. But it is actually useful in more ways than we might expect. A study shows that children who have three years or more musical instrument training performed better in reasoning and motor skills than those who didn't learn an instrument. They also tested better on reasoning skills, which involved understanding and analyzing visual information, such as identifying relationships, similarities and differences between shapes and patterns.[5] Music training jump starts certain inherent patterns in parts of the brain responsible for reasoning. Music force children to think ahead or visualize, as they play a piece of music.[6] A recent study from the university of California found that music trains the brain for higher forms of thinking. A study conducted by psychologist frances researcher of the university of Wisconsin at oshkosh and physicist Shaw G. of the university of California at Irvine specifically links the study of music to necessary brain development. They demonstrated that preschoolers

who were given early exposure to musical keyboard lessons and group singing, scored higher on tests measuring reasoning.[7] The beneficial effects of learning to play an instrument begin at an early age. A major study involved 78 children from three California preschools. The children were divided into groups. In one group individuals took, 12 to 15 minute piano lessons twice a week. All the students took tests before the lessons began to measure different types of spatial-reasoning skills. After six months, the children who received piano keyboard training had improved their scores by 34 percent on tests measuring spatial-temporal reasoning. Furthermore, the enhancement lasted for days, indicating a substantial change in spatial-temporal function. The other groups, in comparison, had only slight improvement on all tasks. Subsequent studies continue to show a strong relationship between creating music with keyboards and the enhancement of reasoning in young children.[8]

## 3. Music helps in better memory

Numerous studies have shown that musical training improves verbal memory. The newest research on music and the brain has revealed an amazing connection with memory. Music learning offers a huge boost to one's memory faculties. Trained musicians can create, encode and retrieve memories more rapidly and accurately than non-musicians. In fact, children with one to five years of musical training were able to remember 20% more vocabulary words read to them off a list than children without such training. Brain starts working more efficiently when used more in specific patters. In the same way memory increases when we start memorising more and more things. Musicains have to remember lots of thing e.g. notes, scales, different chords, compositions, beats, rhythms, tunes, lyrics of songs. In this way their brain gets trained to retain more things and this lays down a groundwork for better memory.

Music training can help with basic memory recall. Formal training in music is also associated with other cognitive strengths such as verbal recall proficiency. People who have had formal musical training tend to be pretty good at remembering

verbal information stored in memory.[<sup>9</sup>] Researchers in one study administered memory tests to 90 boys between the ages of 6 and 15. Half were a part of music program running in the school from one to five years, while the other half had no musical training. The musically trained students had better verbal memory. Furthermore, the memory benefits of musical training seen in these students were long-lasting.[<sup>10</sup>]

#### 4. Music and creativity

Music itself is an art and it thrives on creativity. So it is certain that music makes a person more creative. For example, in *khayal* singing style an artist makes *aalaps*, *tanas*, *tihayis* and *bol-bant* on the spot without fixing anything in advance. Music students learn to think creatively and to solve problems by imagining various solutions, rejecting outdated rules and assumptions. They try new things, new concepts and go in different directions in search of something new. They try doing different things and use lateral tinkering while doing so. Sometimes they are seen mixing two prevalent music styles and making some new style, some others are found trying something new with their instruments. Indian artists generally make new compositions, new *ragas*, new *talas*, new songs and new instruments. Activities that encourage freedom within a purview of fun, enjoyment and friendly structure provide inspiration and spark creativity. Music apparently gets our creativity flowing and helps in creative thinking.[<sup>11</sup>] Music enhances creativity. Since music appeals to both the left and right part of the brain, it can help spark inspiration that might just be proving to be a little elusive. To most artists, listening music can help them achieve a certain level of creativity or ingenuity that they would not be able to do simply on their own. Koutsoupidou T., and Hargreaves D.J. conducted an experimental study to check development of children's creative thinking through music. Researchers used a quasi-experimental design to examine the effects of improvisation on the development of children's creative thinking in music. The study was conducted in a primary school with two matched classrooms of six-year-old children for a period of six months. the research shows that students involved in musical improvisation exhibit more musical originality, a trait generally considered as

the most distinctive aspect of creative thinking. The study contributes to a growing field of research that investigates specifically how music and art has impact on development of creativity in students.[<sup>12</sup>]

#### 6. Music and IQ level

Intelligence quotient (IQ) is the measure of intelligence of a person. Music is proven to have positive impact on IQ levels of students by stimulating different parts of the brain. A study by Schellenberg E.G. at the University of Toronto of Mississauga found an increase in the IQ of students who were given weekly voice and piano lessons. Schellenberg took some students and divided them into three groups. He provided nine months of piano and voice lessons to first group, drama lessons to a second group of students, and no lessons to a third group. The children's IQs were tested before entering the first grade, then again before entering the second grade. Surprisingly, the children who were given music lessons over the school year tested on average three IQ points higher than the other groups. [<sup>13</sup>] A study by researchers at the university of Wisconsin and the university of California shows that when three and four year old children were given simple piano lessons over a six-month period, they performed 34% better than other children in IQ tests. [<sup>14</sup>] Hence we see that music positively influences the IQ level.

#### 7. Music and development of language skills

Recent studies clearly indicate that musical training physically develops the left side of the brain which is known to be involved with processing language, and can actually wire the brain's network in a specific ways. Linking familiar songs to new information can also help imprint information on young minds. When young children listen to familiar words in songs, their brains build connections to the sounds they are hearing and the words they are singing. Singing songs and reciting poems and rhymes with children helps them develop early literacy skills. Keeping a steady beat develops language. Clapping hands, stamping feet, and using rhythm instruments in time to music develops important pre-reading skills. Young children recognize words, sounds, rhythms, tones and pitches long before they talk, sing or dance. So the more music the children have in their lives,

the better they will be able to speak and read.[15] Growing up in a musically rich environment is often advantageous for a child's language development. This relationship between music and language development is also socially advantageous to young children. The effect of music education on language development can be observed in the brain. Children learn new words through music as music helps brain cells of children to make connections with new words through tune and rhythm. Several studies confirm a strong association between music instruction and standardized tests of reading ability. Studies conducted with 4 and 5-year-old children revealed that the more music skills the children had the greater was their degree of phonological awareness and reading development.[16]

## 8. Music & mathematics

A simple song can include basic math skills such as counting, repeating patterns and sequencing.[17] A study by Christopher J., Professor of music education and music therapy of the University of Kansas revealed that students in elementary schools with superior music education programs scored around 20 percent higher in math scores on standardized tests compared to schools with low-quality music programs regardless of socioeconomic disparities among the schools or school districts. Apart from test score results, Johnson's study highlights the positive effects that a quality music education can be an added benefit to a young child's success.[18] Luehrisen explains this psychological phenomenon in two sentences: Schools that have rigorous programs and high-quality music and arts teachers probably have high-quality teachers than in other areas. If you have an environment where there are a lot of people doing creative, smart and joyful things, even people who aren't doing them have a tendency to go up and do better[19] Music and mathematics also are related through sequences called intervals. This mathematical interval is the difference between two numbers and a musical interval is the ratio of their frequencies and arithmetic progressions in music corresponding to geometric progressions in mathematics. Several imaging studies have shown that musical training activated the same areas of the brain that were also activated during mathematical processing. It appears that early musical training begins to build

the same neural networks that later will be used to complete numerical and mathematical tasks.[20] To study this idea further, researchers sought to determine whether learning to play a piano keyboard would help young students learn specific mathematics skills. One group of 2nd-grade students from Los Angeles neighborhood was given four months of piano keyboard training along with computer training on software designed to teach proportional mathematics. This group scored 166 percent higher on proportional mathematics and fractions subtests than the matched group that received neither music nor specific computer lessons. These findings are significant because proportional mathematics is not usually introduced until 5th or 6th grade and because a grasp of proportional mathematics is essential to understanding science and mathematics at higher grade levels.[21] Another study found that students in California who took music lessons from 8th through 12th grade increased their test scores in mathematics students who were not involved in music. Mathematics scores more than double. A subsequent review of studies involving more than 300,000 secondary school students confirmed the strong association between music instruction and achievement in mathematics of particular significance is an analysis of six experimental studies that revealed a causal relationship between music and mathematics performance and that the relationship had grown stronger in recent years.[22]

## 9. Music: A crucial ingredient for over all development

Playing and Listening music helps to increase concentration. Learning a musical instrument will help a child to develop concentration, as he has to focus on a particular activity over extended periods of time. Developing concentration in this way will also help when they must focus their attention on other subjects at school. Background music in the classroom helps many students stay focused while completing specific learning tasks. These days Mozart's music and other relaxing music is provided to the students while doing their work during school hours so as to help them concentrate on their studies. In India studies are going on and some

ragas like Raga Shivranjini are under observation. In addition to improving brain working, reasoning, creativity, memory, IQ level, language skills, learning music cultivates many skills and values like co-ordination, patience, determination and self-confidence that will continue to be useful to children throughout their lives. The act of learning and playing an instrument, the encouragement of a teacher and the enthusiasm of a proud parent, will build in a child a sense of pride and confidence. Moreover, children who practice self-expression and creativity often become better communicators later in life.[23] Music enhances teamwork skills and discipline. In an orchestra, all players must work together harmoniously towards a single goal, the performance, and must commit to learning music, attending rehearsals, and practicing which helps in co-ordination. Music provides children with a means of self-expression.

## Conclusion

As per discussion in this article it is found that music can be a great boost for our brain, skills, values and character. For Proper development of brain, music is an important ingredient. Introducing music in the early age can work wonders for a child's overall development. Various studies (mentioned throughout the article) indicate that music can positively affect children and adults of all ages. That is why children must be given a proper music training for their overall development.

## Foot Notes

1. [http://www.paulborgese.com/report\\_benefitofmusic.html](http://www.paulborgese.com/report_benefitofmusic.html)
2. <http://blog.bufferapp.com/music-and-the-brain>
3. <http://www.pbs.org/parents/education/music-arts/the-benefits-of-music-education/>
4. Ibid
5. <http://blog.bufferapp.com/music-and-the-brain>
6. [http://www.paulborgese.com/report\\_benefitofmusic.html](http://www.paulborgese.com/report_benefitofmusic.html)
7. <http://www.barnesandnoble.com/u/jackie-silberg-importance-of-music/379002449/>
8. <http://www.aasa.org/SchoolAdministratorArticle.aspx?id=7378>
9. <http://www.pbs.org/parents/education/music-arts/the-benefits-of-music-education/>

10. <http://www.aasa.org/SchoolAdministratorArticle.aspx?id=7378>
11. <http://blog.bufferapp.com/music-and-the-brain>
12. <http://www.artsedsearch.org/summaries/an-experimental-study-of-the-effects-of-improvisation-on-the-development-of-children-s-creative-thinking-in-music>
13. <http://www.pbs.org/parents/education/music-arts/the-benefits-of-music-education/>
14. [http://www.paulborgese.com/report\\_benefitofmusic.html](http://www.paulborgese.com/report_benefitofmusic.html)
15. <http://www.barnesandnoble.com/u/jackie-silberg-importance-of-music/379002449/>
16. <http://www.aasa.org/SchoolAdministratorArticle.aspx?id=7378>
17. <http://www.barnesandnoble.com/u/jackie-silberg-importance-of-music/379002449/>
18. <http://www.pbs.org/parents/education/music-arts/the-benefits-of-music-education/>
19. Ibid
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22. Ibid
23. [http://www.paulborgese.com/report\\_benefitofmusic.html](http://www.paulborgese.com/report_benefitofmusic.html)

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