

# Music and Movement - Instrumental in Language Development

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"**A** B C D E F G." Even before the brain research findings, teachers and parents have taught the alphabet to children with the help of a song. Now, based on the research, we understand why. With the help of cat scans, we have been able to see what happens to the brain when listening to music. Each component of music affects a different part of the brain, e.g. a familiar song activates the left frontal lobe, timbre the right frontal lobe, and pitch the left posterior. One side of the brain processes the word while the other processes the music - activating the whole brain ensures better retention. Short-term memory has the ability to hold only seven bits of information. If bits of information are bonded together, as in a song, it can be processed as one piece. By condensing the information, the brain is able to receive and process more. In this article, we will discuss brain research findings and explore how music and movement can be used to enhance memory skills and retention and language development.

## Language Begins Early

The ability to speak and hear language begins before birth. At 23 days of gestation, a fetus can feel sound and, at around four months, hear. At twelve weeks the fetus moves spontaneously. At five months the fetus responds to phonemes (the smallest unit of a word/letter that has sound) it hears through the amniotic fluid, spoken by the mother. A fetus will respond to music by blinking or moving to the beat. Dr. Alfred Tomatis, who will be discussed in the next paragraph, used fiber optic cameras to observe the movement of the fetus in regard to sound. Though the particular muscle moved varied in each child, each time the same phoneme was sounded, the same muscle responded! This sensory-motor response allows the fetus to begin learning language in utero. This information suggests that prenatal exposure to music can be used to enhance a baby's development, and perhaps alleviate or minimize some developmental delays (Campbell, 2000).

In Dr. Carla Hannaford's book, *Smart Moves: Why Learning is Not All in Your Head* (1995), she outlines the development of the ear and its role in language development. Once the amniotic fluid has dried out of the Eustachian tubes and outer ear canals, the sense of hearing becomes pretty accurate. The ear is the most fully developed of the sense organs at birth and the last sense to stop at death. Much of the previous information is a result of the work of Dr. Alfred Tomatis who is credited with 'discovering' that the voice only represents what the ear can hear, also known as the Tomatis Effect. His research has done much to help with developmental delays and disabilities including autism. A person's ability to hear affects abilities and emotion. Damage to hearing can cause depression. In patients

with Alzheimer's Disease, the playing of a song that has emotional memory causes periods of clarity. It is believed it is because the music stimulates a part of the brain related to memory. There have also been many anecdotes of people remembering melodies that had been played while they were in utero. This is not only fascinating, but also functional. Having this information, we need to implement it in early childhood by providing activities that encourage active listening skills. These activities can include rhythm stick activities, imitating vocal sounds, and marching.

Time should be taken to note the window of opportunity to learn sounds and words. Children will make sounds that are common to humans universally. Over the first year, they begin to produce only the sounds heard in their own culture. Newborns can perceive any phoneme they hear, but this ability is lost within the first year. The ability to learn languages is during these first years. The opportunity to learn foreign language is believed to end at about the end of the twelfth year, but the phonemes must have been presented to them in the first year. This is the reason why music from many countries using different languages should be played for children in the early years. This prepares the brain for the ability to use these words later in life should it be necessary. It also exposes the children to the sounds of different cultures. Think of it as inputting data in long-term storage. It's there if you need it.

According to Howard Gardner there are at least eight different types of intelligence. He cites music as the first of the multiple intelligences to become functional in a person. "The single most important thing in education is for each person to find at least one thing that he/she connects to, gets excited by, feels motivated to spend more time with" (Gardner, 1992). For many children, music is that thing.

### **Keeping the Beat**

Studies by Phyllis Weikert reveal the importance of the ability to keep a steady beat and its link to adequate linguistic development. In 1981, 80 - 85 percent of female high school students could keep a steady beat and 60 - 66 percent of males. In 1991, the percentages dropped to 48 percent and 30 percent respectively. Less than 50 percent of adults have the ability to keep a steady beat. Only 10 percent of kindergarten students could keep a steady beat. This ability should be in place by two to three years of age. The prime time to teach it is up until the age of seven. Older students and adults without this in place will find deficiencies in different skills that they will not be able to overcome. Being able to keep a steady beat helps a person to feel the cadence (rhythm) of language and involves the vestibular system.

While working with very young children, I began to notice how syncopated rhythms were absent from their vocabularies, e.g. Winnie the Pooh becomes WinPoo! Although the ear is the most fully developed of the senses at birth, children were not sounding the syncopated rhythms. I wondered if they were not hearing them as well as the accented sounds because they moved so quickly. I wondered if by tapping out these words in straight rhythms it might help them hear the entire word better. Using rhythm sticks or hands, the child (alone or with adult help) says each sound of the word - Wi Ni the Pooh. If the child wanted to tap

the sticks by themselves, parents were encouraged to tap the rhythm on the child's back thus internalizing the rhythms. After hearing it that way several times, the adult can then say the word with the proper cadence. It seems to work. Parents are reporting to me that children are speaking words they were having difficulty with after sounding them out in this fashion. Of course, the fact that with maturation vocabulary was going to improve is a factor; however, there was noticeable increase also with children who were having problems with language. Simplification of the words has had a definite impact on these children. (This idea is used in "For the Love of Language" an article in the special edition of Newsweek: Your Child, Fall/Winter, 2000.) This activity can be used to introduce new vocabulary. Talk with babies and tap out rhythms. Research is showing that infants who have mothers who talk a lot have 131 more words at twenty months than other toddlers and 295 more at twenty-four months.

This article begins with the alphabet. Using the above information, the ABCs are recited with a straight rhythm, giving each letter its own sound and not running the LMNOP together, but spacing them out as L M N O P. There have been several children's recordings made now with the alphabet recited in this fashion. Teachers and parents have had favorable responses and the children are realizing the letters are separate sounds. Tapping rhythms is also important because when the hands are activated, there is more effective learning, thus encouraging the "hands-on" approach to learning. Movement and rhythm stimulate the frontal lobes and enrich language and motor development (Brewer & Campbell, 1991).

Although these activities are helpful in preparing the brain for language, it should be noted that children should not be pushed to read early. Reading too early puts stress on the eyes and causes other potential damage. In Chris Brewer and Don Campbell's book, *Rhythms of Learning*, they state that emphasis on early acquisition of reading, writing, math and other symbol systems may actually cause children to develop awkward and inappropriate methods of understanding these symbols. If this information is given to a child before they are neurologically ready, it may just result in meaningless memorization. If this is done prematurely, it may process in the wrong region of the brain, which is not as beneficial as processing in the proper region. In Denmark, reading is not taught until the age of eight and their literacy rate is 100 percent.

A wonderful, easy music tool for young children is the kazoo. In Music with Mar. classes, children as young as 10 months of age are producing sound from the kazoo. Kazoos activate bone structure because of the vibrations. This activates the vestibular system. Using a pun, I'd like to state that playing kazoo is instrumental in language development. As a child plays kazoo, they are developing self-esteem, internalizing rhythms, having fun and establishing the beginning of inner voice, a skill necessary for higher-level thinking. Inner speech is the process through which we hear ourselves think and listen internally. Inner-speech should be in place by the age of 7 1/2 or 8. Children without inner voice need to hear something to understand it. These are the children who walk up to the teacher's desk to ask questions about problems they're trying to work out. These children may have impulse control problems because they need to move to think and may act before thinking it all the way

through. To further enhance these skills, at about the age of seven or eight, children should be introduced to singing in rounds or singing songs like "B I N G O", where they need to think the words and leave a space thus using inner voice.

*Beginning at the age of four, games can be played with the kazoos. One game to play is "Guess what song this is". Someone plays a melody and another person has to guess what song they're playing. Then that person gets to play a song and have someone else guess. Children will play this game for quite a while. It's fun, challenging and brain exercise. Repeating patterns is also fun to do with kazoos. You play a rhythm pattern and the children echo. Kazoos can also be used for marching or just playing along. One of my most requested songs is "The Clean-up Blues". After children get their things put away, they get out their kazoos and play along. When the song is over, everyone is in one spot ready for the next activity and the room is clean! Another benefit is the exposure to the style of music known as the blues.*

### **Moving to the Music**

A natural partner to music is movement. Movement is a nonverbal response for children who do not yet have language ability. The vestibular system (part of the ear related to balance and movement) must be activated for learning to take place (Hannaford, 1995). The eighth cranial nerve is the Vestibulo-cochlear. It comes from the inner ear mechanism, the semicircular canals and cochlea. The eighth cranial nerve pair carries auditory information from the ear to the brain. These connect through the vestibular system to all the muscles of the body. All learning in the first fifteen months of life is centered on the vestibular system development (Hannaford, p.157). Disturbance to the vestibular system can cause learning difficulties. This highlights the importance of movement in the beginning years to strengthen the vestibular system and ready the brain for learning.

Don Campbell, author of *The Mozart Effect and The Mozart Effect for Children*, states, "Movement is an absolute necessity for a toddler, and music stimulates the best kinds of movement." (Campbell, p. 102). The brain works by electrical current thereby needing oxygen and water to function well. Movement helps to provide one of these two elements, oxygen. Another wonderful thing happens with movement. The brain produces a neuro-chemical called endorphins. This chemical causes a feeling of energy and makes the brain more conducive to learning. Movement and rhythm stimulate the frontal lobes, important in language development. This portion of the brain grows between the ages of two and six. It has another growth spurt at around the age of twenty-two.

A specific type of movement, cross lateral, is necessary for the brain to be ready to learn to read. This type of movement can be done while dancing or moving to other activities to accompany music or by tapping rhythm sticks and using different tapping patterns. It is also done while crawling and that is why it is important for babies to crawl. Cross lateral movement enables the brain to cross the mid-section (going from the right side of your body, across the center to the other side). This ability is necessary for reading and writing because in order to read and write one must go from one side of the paper to the other. There are many wonderful ways to cross one's midsection. Dancing with scarves, as they

flow from one side of the body to the other or walking like elephants, swaying arms as if they were trunks from side to side are just two examples. Exercising to music and doing cross crawls or windmills is not only great for the cardio-vascular system, but it is readying the brain for reading and is fun as well. These activities also help with balancing. A child, who cannot stand on one foot, probably can't read and write because standing on one foot demonstrates the ability to balance and being able to balance is the result of a strong vestibular system. (Hannaford, 1995). The vestibular system is strongly related to language abilities. Being able to stand on one foot is an accomplishment that could be greeted with "Wow! Look at you standing on one foot!" This makes the child feel good which gets them trying to do more activities to balance. Balancing strengthens the vestibular system. One activity is directly related to another.

### **Involve the Senses**

What makes the above activities so successful is the use of more than one of the senses. The more senses involved in an activity, the better the success rate of learning the lesson. With rhythm sticks, we are activating speaking, hearing and feeling. We are also using both hemispheres of the brain. The real magic of music is that it not only uses both hemispheres, but each quadrant of the brain processes a different component of music. Human beings learn 10 percent of what they read, 20 percent of what they hear, 30 percent of what they see, 50 percent of what they see and hear, 70 percent of what is discussed, 80 percent of what is experienced and 95% of what you actively teach (Hannaford, 1995). Early childhood experiences that get the child involved in the total process will yield the greatest results. It is important to note that only live learning boosts vocabulary - meaning television viewing does not stimulate learning. Because of the massive amount of time American children spend in front of TV sets, the term 'sitcom vocabulary' is now being used. In the 1950s, the average fourteen-year-old had a 25,000-word vocabulary. In 1999, that number was down to 10,000! (Healy & Pearce)

To activate more senses, one could blow bubbles while music is playing. Encourage children to catch the bubbles with their pincer grips. (This fine motor skill exercises a muscle in the brain used for higher-level thinking.) Some bubbles have odor and or flavor to them. These bubbles can be caught with the mouth. Although I would not suggest using the flavored bubbles with the youngest children, I would use them once they are old enough to realize the difference between bubbles you can catch with your mouth and those you can't. Now all five senses are being used - hearing (as the music plays), touching (as they use their pincer grips), seeing (as they watch the bubbles), smelling (as they smell the fragrance) and tasting (as they catch them with their mouths). This active learning stimulates and involves more parts of the cerebral cortex, producing stronger long-term memory. After an experience like this, the entire brain is awake and waiting to be filled! A wonderful resource for information and activities to awaken the senses is Dr. Pam Schiller's book, *Start Smart* (Schiller, 1999).

### **Using the Arts**

A new study from Harvard Graduate School of Education's Project Zero found demonstrable links between experiences with music and drama and increases in certain cognitive skills.

The three-year-study (directed by Project Zero researchers Ellen Winner and Lois Hetland and funded by the Bauman Family Foundation) reviewed 50 years of arts education research, analyzing 188 relevant studies. Based on 45 reports, researchers found evidence that spatial-temporal reasoning improves when children learn to make music, and this kind of reasoning improves temporarily when adults listen to certain kinds of music, including Mozart. The finding suggests that music and spatial reasoning are related psychologically (i.e. they may rely on some of the same underlying skills) and perhaps neurologically as well (i.e. they may rely on some of the same, or proximal, brain areas). However, the existing reports do not reveal conclusively why listening to music affects spatial-temporal thinking.

Music also has a natural connection to drama. Children are natural actors and love to act out their favorite stories. Comprehension is increased when there is active participation. The ability to learn and retain is increased after a dramatic activity. Sound stories are a great way to incorporate music and drama. Put a variety of instruments out, get out a book and have the children insert sound to the story. Children will want to do the story over again. Repetition is important. (When learning a new concept, it takes 1500 times before that concept becomes concrete.) (Bailey/Sprinkle, 1998). You may want to record your work or even include a "recording studio" as part of your listening center. Here children can record their work. Language development can be enhanced verbally and in written form. Children can design covers for their recordings. One creative teacher had the children record a book for Mothers' Day, design a cover and sent it home as a gift. The moms loved it!

### **The Mozart Effect - Repetition is Key**

Drs. Frances Rauscher and Gordon Shaw conducted studies at The University of California, Irvine to determine the effects of piano keyboard instruction on the spatial-temporal reasoning of kindergarten children. It was this research that the media coined the "Mozart Effect". This research sparked much interest in music and learning, particularly Mozart's music. Because the media gave it so much play, negative and positive, doubt was thrown on the original research. A second study was conducted at the University of Wisconsin Oshkosh by Dr. Rauscher to see if the same results would occur. They did. It was found that children, who were exposed to keyboard instruction on a weekly basis for a period of at least six months, had better spatial-temporal reasoning. Unfortunately, Dr. Rauscher's work also showed that if the music lessons were discontinued, the connections made from the music lessons would die off. Music must be an ongoing part of the curriculum. One should note, however, that habituation (having something become too familiar) and overuse would make the music ineffective. For this reason, it is suggested that music be used 22 minutes for each hour.

Part of the reason this research was coined the "Mozart Effect" is because it was discovered that listening to Mozart produced activity in both hemispheres of the brain. This activity is not produced with spoken text. It is hypothesized that music strengthens neural firing patterns and enhances spatial-temporal tasks. Music is processed separately. Lessons do not need to be private for the benefits. This is why school music programs are important. It should not be concluded that playing Mozart will make children smarter. It will

not. Playing Mozart activates both hemispheres of the brain making it more conducive to learning. Activities must accompany the music.

### **Conclusion**

Putting all the information together, one must acknowledge the importance of music in the classroom. Music gets the whole child involved in the process of learning. Learning style researchers, Rita and Kenneth Dunn, have found that as many as 85 percent of people are kinesthetic learners. (Einstein was a kinesthetic learner.) Combining this with the fact that 99 percent of what is learned is unconscious, we must realize the impact of music and movement activities. While marching or singing, one is usually not thinking about what they are learning. Music activities prepare the brain for more difficult tasks needed later by preparing the brain to work from both hemispheres. For example, though printing uses one side of the brain, cursive uses both. Music helps the brain to process higher-level thinking. Half the population does not reach the Piagetian stage of formal thinking. Evidence shows that one-third does not reach concrete thinking. Music is a tool to help wire the brain to reach this higher level of thinking. When we put instruments in a child's hands in the early years, we are teaching them an activity that is positive and will last them a lifetime. What a wonderful gift to give our children!

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- Music Programs for Children and Adults**  
Kindermusik - Greensboro, NC. (800)628-5687  
Music for Young Children - Ottawa, ON (800)561-1MYC  
Music Together - Princeton, NJ (800)728-2692  
Music with Mar. - Palm Harbor, FL (727)545-4MAR  
Musikgarten - Sherman, TX (903)893-0607