

PRESCRIPTIONS FOR PARENTS -

MAKING SCIENTIFIC RESEARCH PRACTICAL FOR FAMILIES



MUSIC and BRAIN DEVELOPMENT

"Our auditory systems, our nervous systems, are tuned for music" - Oliver Sacks

Anthropologists note that music, especially through singing and dancing, has been used throughout time and in all cultures to bring people together. Now neuroscientists are studying the impact of music on our brains, especially brain development.

This newsletter will provide research demonstrating the impact of music on brain development, with some hints on how to expose your children to the beneficial effects of music.

Our challenge to you this week - consider turning off all screens in your home and turn on classical music for one hour, maybe as you are preparing dinner or just before bedtime.

Another idea - turn on soothing music while driving your children to their activities.

See what happens - and let us know by emailing us at md@physicianscenter.org



PRENATAL

Music affects our body in many ways - including influencing our blood pressure, heart beat, and respiratory rate. Researchers at the Max Planck Institute in Germany found that music seems to have an especially strong influence on pregnant women. They speculated that these responses helped condition the unborn baby to music.

By 28 weeks gestation, the heart rate of the unborn baby changes when he/she hears a familiar song, and by 35 weeks, the unborn baby changes movements when listening to known music. *Fritz TH, Ciupek M, et al. Enhanced response to music in pregnancy. Psychophysiology. 2014;DOI:10.1111/psyp.12228*

INFANTS and TODDLERS

One study of premature infants showed that, even in the noisy environment of the neonatal intensive care unit, babies responded with improved heart rates and breathing when listening to soothing lullabies. Feeding and sucking behaviors also improved. *Loewy J, Stewart K, et al. The Effects of Music Therapy on Vital Signs, Feeding, and Sleep in Premature Infants. Pediatrics. 2014; 133:3 462-268.*

Another study showed that children 5 - 24 months of age were more engaged when there was a steady rhythm heard in addition to language. Researchers postulate that children's attention to rhythm and repetitive lyrics helps prepare them for learning mathematic principles.

PRACTICAL HINTS

Begin now. When driving with your infant or toddler, sing or listen to music on radio or CD.

Give your child "musical instruments" to shake and rattle.



PRESCHOOLERS

Making driving peaceful

A small study of preschool children asked parents to incorporate music activities into their daily routines - to sing, listen to music, or allow children to react to music heard on the car's radio or CD player. The parents reported "joyful, reflective, quiet and sparkling moments of music making".

Koops LH. Songs From the Car Seat: Exploring the Early Childhood Music-Making Place of the Family Vehicle. J of Research in Music Education 2014; 62 (1):52

Enhanced connections between motor and sensory areas of the brain

Researchers at Concordia University studied children between 6 and 8 years of age and found strong evidence that music lessons before or during



ELEMENTARY AGE

Improved Reading

Children who received three years of music (piano) training showed improved reading skills compared to peers who did not have the training.

Piro JM and Ortiz C. The effect of piano lessons on the vocabulary and verbal sequencing skills of primary grade students. J Psychol of Music. Mar 16 2009

Improved Grammar and Language

A study from Vanderbilt showed an association between musical rhythm and grammar - most likely because of the similarities between speech and music, such as rhythm and sequences.

Gordon RL, Shivers CM, et al. Musical rhythm discrimination explains individual differences in grammar skills in children. Devel Science 2014; DOI



ADOLESCENTS

Increased depression with increased "popular" music

Researchers at the University of Pitt adolescents and found there was an association between depression with increased exposure to popular music (There was a decreased risk for those who listened to classical music.) Although this is not a causal relationship, it is an encouragement to explore other positive activities.

Primack BA, et al. Using Ecological Assessment to Determine Media use without Major Depressive Disorder. 2011;165(4):360-365.

Adolescent suicide - music preference and vulnerability

Several studies show that adolescent exposure to heavy metal music are more likely to be depressed and contemplate suicide.

Martin G, et al. Adolescent suicide: an indicator of vulnerability. J Am Acad Child Adolesc Psychiatry. 1993; 32(3):530-5.

PRACTICAL HINTS

Music has wonderful potential to help children but the type of music is important. Hard rock / heavy metal music is not recommended.

The U. S. Department of Education reports that approximately 75% of US high schools

Dance with your infant.

Sing the same song with diaper changes.

Introduce several different kinds of music - classical, jazz, big bands, hymns.

See more ideas at:

<http://www.naeyc.org/files/yc/file/2011003/ParlakianWeb0310.pdf>

these ages help develop nerve connections between the motor and sensory areas of the brain. Dr. Zatorre stated, "...training is more effective at early ages because certain aspects of brain anatomy are more sensitive to changes at those time points."

Steele CJ, Bailey JA, Zatorre RJ, et al. Early Musical Training and White Matter Plasticity in the Corpus Collosum: Evidence for a Sensitive Period. J of Neuroscience 2013; 33(3): 1282.

Improved attention and memory

Even just 1 - 2 years of musical training leads to improved levels of attention and memory. Early childhood music training has also been noted to improve verbal ability and nonverbal reasoning.

PRACTICAL HINTS

Consider having your preschooler start music lessons. Just remember to make them fun and enjoyable - not "drudgery"!

Remember to keep your preschooler away from screens - which inhibit creativity and language development.

Have soft music in the background as your preschooler is playing. Remember to include different genre, especially classical.

10.1111/desc.12230

Another study showed that even brief (30 minutes) of music training caused increased blood flow to areas of the brain involved in language development.

Improved executive functioning

A study from the University of Vermont found that children who studied piano or violin had improved ability to focus their attention, control their emotions, and diminish their anxiety. The researchers were able to relate this to changes seen in the prefrontal cortex, which is the CEO of the brain, helping children strategize and problem solve.

Hudziak J, et al. Cortical thickness Maturation and Duration of Music Training: Health-Promoting Activities Shape Brain Development. J of Am Acad Child Adol Psych. December 2014

Other researchers also found that 9 - 12 year old children who practiced a musical instrument for at least two years had enhanced functioning of their prefrontal cortex.

Zuk J, Benjamin C, et al. Behavioral and Neural Correlates of Executive Functioning in Musicians and non-Musicians. PLoS ONE, 2014; 9(6):e99868

In a longitudinal study of music programs in Los Angeles schools, the Harmony Project found that disadvantaged children had improved academic success when provided with music programs - associated with changes in the brain structures associated with sound processing.

Kraus N, et al. Music Enrichment Programs Improve the Neural Encoding of Speech in At-Risk Children J of Neuroscience. Aug 2014

PRACTICAL HINTS

Consider having your child take musical instrument lessons. This could be "informal" - spending time with a relative or neighbor who

take extracurricular lessons in music

Improvement in depression when music therapy

Researchers in Northern Ireland studied adolescents with depression and found that those treated with music therapy had improved mood and interactive skills as well as less

www.sciencedaily.com/releases/2011/03/

Improved long term memory

The hippocampus is an area of the brain where memories are stored. A study in Florida found that the hippocampus was active while listening to music. Researchers are now investigating whether listening to music can improve memory formation - and even assist

Improved sound recognition

Canadian researchers showed that even a few years of musical training had improved sound recognition. The ability to comprehend speech is one function that diminishes with age, thus the need for research.

Bidelman GM, et al. Musical Training Coordinates Neuroplasticity in Auditory Cortex to Counteract Age-Related Decline in Vowel Perception. J of Neuroscience

PRACTICAL HINTS

By this age, your teen has developed good hearing. It is not too late to introduce new genres.

Can your family watch a musical like Phantom of the Opera, or watch a Broadway musical like Nutcracker? Discuss the movie and

Some teens enjoy seeing "old" movies like Rogers and Hammerstein or other

Have a family sing. Encourage your children to find songs to teach the family

could casually introduce the idea and help the child learn.

Music lessons provide more benefit than just listening to music or singing.

Spend some time after dinner singing together. Ten minutes of singing will likely enhance the rest of your evening!

Can your family create a new song? Make up new verses while driving together?

Ask your children to turn off their computers while in the car. Listen to music instead.

Play a game as a family as you try to identify different genre of music. Can your children recognize a composer? a musical theme? Name a famous composer of marches? You can even have a prize of a musical CD for the winner.

Read a biography together of a famous composer.

Jane E. Anderson, M.D.

000-000-0000
md@physicianscenter.org
www.physicianscenter.org