WHY MUSIC EDUCATION IS GOOD FOR OUR CHILDREN: GUEST POST BY MCMASTER UNIVERSITY'S LAUREL TRAINOR

March 11, 2014 · *by* AmyLeask · *in* Arts Education, Innovators in Education, STEAM Education

Laurel Trainor discusses ways in which the study of music can benefit a child's brain, even at a very early age.

A great deal of your research focuses on music and its impact on a child's brain. Tell us about some of your particular interests in this field of study.

During infancy and childhood, the brain is developing at a rapid rate. New connections

between neurons are being formed and connections that are not useful are being pruned. These processes are highly influenced by the particular experiences the child has. For example, young children learn the particular language(s) to which they are exposed without formal instruction. We have shown that they also learn the structure of the musical system to which they are exposed, again without formal training. In Western culture, most of our music uses Western tonal structure. For example, Western adults, even if they have no formal musical training, find it much easier to detect a wrong note in a melody if it goes outside the key in which the melody is written compared to if it remains within the key. Very young infants, however, detect both types of changes equally well, indicating that they don't yet expect melodies be in musical keys. However, they do develop these expectations during the first couple of years after birth if they are exposed to Western music.

We can then ask whether enriched musical experiences affect brain development and the answer is yes! We have shown that after one year of music lessons at age 4 or 5 years, children show more advanced EEG brain responses related to sound processing, memory and attention, in comparison to children engaged in other activities. We have even shown that 6 months of active parent-and-infant music classes starting at 6 months of age lead to more advanced brain responses to sound compared to a equal amount of simple exposure to music without active participation. These and other studies are available on our website.

Generally speaking, what are the benefits of music lessons for children, cognitively and socially? How do these benefits span into adulthood?

There is some evidence that music lessons can lead to moderate increases in IQ, that the discipline needed to learn an instrument may increase memory and the ability to control one's behavior, and that music lessons might lessen normal decrements in hearing that occur with older age. But I think that one of the most interesting aspects of music is that people normally engage in music making with other people. Recent work shows that moving together in synchrony (as when dancing to music or making music) leads people to feel affiliated with each other and increases their willingness to help each other. Our studies show that even 14-month-old infants are more likely to help an adult (e.g., pick up an object the adult "accidentally" dropped) if they were previously bounced in synchrony with that adult, compared to if they were bounced out of synch. This is likely why group musical activities have traditionally played an important role in kindergarten classrooms. And these social benefits of making music with other people likely extend to adulthood and even old age.

From the brain's perspective, what's the difference between practice and play? Do we react differently depending on how much fun we're having?

The brain probably doesn't really distinguish practice and play, so you might as well have fun while learning! What is really important is motivation. Many studies indicate that learning is better and faster when a person is motivated.

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What advice would you give parents who are thinking of enrolling their children in music lessons? How can they help their budding musician get the most out of their studies?

I think that the most important thing for young children is that they are motivated (e.g., there is a piece they want to play, or they want to play with an older sibling). When motivated, learning is better and the child is more likely to stick with it through difficult times. With infants and young children, I think it is best when the joy of music making can be conveyed from parent to child, and from teacher to child, and when children are actively involved.

What's next on your to do list? What other areas of research intrigue you?

I am very interested in how musicians coordinate when playing together and how they anticipate what each other are going to do, so as to keep together musically. I'm also interested in how audiences experience musical performances; in particular, what they get out of a live performance that is different from experiencing the music through a recording. At McMaster we have a new unique facility, the LIVE Lab (Large Interactive Virtual Environment), which is a 100-seat concert hall equipped with variable acoustics, motion capture and the ability to measure EEG and physiological responses (e.g., heart and breathing rates) from musicians and audience members. We will be investigating these and many other interesting questions in the LIVE Lab.

Laurel Trainor is a professor of psychology and director of the McMaster Institute for Music and the Mind.

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