Chapter 11
Music and the Mind:
How to Have a Brilliant Child

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ABSTRACT

This chapter ponders answers to several questions asked by music listeners not having direct experience with the sounds: How does the brain perceive sounds? How does the harmonic series dominate music? What are consonances and dissonances? Why do octaves sound nearly the same? What is perfect pitch? How do you have a brilliant child by boosting its sensory perception in the perinatal period?

INTRODUCTION

Music can be sensory pleasure. No sound ever reaches the brain though, so sounds are converted into neural impulses by the inner ear. The neural impulses travel to the brain over the auditory nerve bundle. There they can trigger the release of pleasure neurotransmitters depending on programming. Imagining music then allows the memory of sensory pleasure.

The auditory section of the brain receives a great deal of information about the sounds that are heard, such as all the frequencies, periods, wavelengths, amplitudes, attacks, envelopes, etc. As a result, the brain knows a great deal about the sounds that are being heard. The one thing that is absent is the direct experience of the sounds, themselves. In most situations this should not be a problem as there is sufficient knowledge about the sounds to respond to them and work with them. The one situation where not having direct experience with the sounds is a problem is when the sounds invoke emotions or feelings. How can mere descriptions of sounds do this? That is the question this essay hopes to address.

HOW THE BRAIN PERCEIVES SOUNDS

No sound ever reaches the brain. How can that be since that we know very well what we are listening to? You may think that there are little rubber tubes connecting the ear canals to the brain, but it is not so.

DOI: 10.4018/978-1-7998-5753-2.ch011

The inner ear converts sounds into neural impulses that travel up the auditory ganglion or nerve bundle to the brain. There are many nerves in this bundle. Some who have done dissections have suggested that there are between 30,000 to 50,000 nerves in the auditory nerve system. Thus, the brain receives all the information it needs to understand the sounds that are arriving at the ear. But how does it know about subjective aspects of sounds? How does it know how to respond to sounds, which sounds are indicative of safe environments and which ones are dangerous and scary. Which ones are melancholy, happy, sad, terrifying? How does the brain know what an English horn sounds like since it never receives that sound but only a description of it.

The Temporal Theory

The temporal theory has to do with the way the cochlea (the inner ear) works. Specialists have worked on this for many years and now say that we perceive both the frequency and the period of a vibration. The basilar membrane perceives the frequency by the Fourier analysis of an incoming tone, while the period is perceived in the cochlear nucleus by a temporal process that works separately for each bundle of auditory fibers connected to a single inner hair cell. The temporal process involves the autocorrelation of each single frequency with a delayed copy of itself. The big innovation here is that temporal theory is applied separately to each individual frequency rather than to the entire sound wave. This means that there are as many temporal processors as there are inner hair cells.

The Inner Monologue

Some people seem to think that hearing voices is a sign of psychotic behavior. I would say that it is normal. We all hear an inner monolog of voices and sounds going on all the time. This is consciousness. Is it in our own voice? Probably not although it does seem to maintain gender identity. It is the characteristic of consciousness. Consciousness means hearing a continuous dialog of voices, sounds, and music in our heads, even when there is nothing coming in. I can listen to the music being played back in my inner monologue and can make discoveries about it as if it had been independently recorded and I was just listening to it. This is consciousness. It is the constant inner monologue that goes on between the things we hear, things we have learned, and things we think. No computer will ever have consciousness because no computer has an inner monologue.

My theory is that in addition to evolutionarily created genetics and education, or nature and nurture, there is a third middle category. It is genetically programmed critical periods during which the individual imprints environmental phenomena. These can occur at different times in an individual's life but are most prominent in the perinatal period. Starting long before birth, the individual imprints sounds, tastes, smells, movements and even some few visual sensations before birth. This continues in the months immediately after birth. One writer (on Quora, a question-and-answer website, www.quora.com) commented that the baby begins to create memories in the fourth month of development, long before birth. That is what happened to me. Because music is one of the most immaterial things in our lives, it is particularly sensitive for imprinting and can be used to explore the field.

Such things as musical taste or preferences, ancient musical memories, perfect or absolute pitch, and automatic brain responses to musical sounds can all be used to explore this field. The subject of imprinting resembles behavioral psychology in the sense that an imprint, received at the right time in early life, controls one's response for many years after and the responses, in true behavioral fashion, are totally