Your Mind on Music: Muffins, Magic, Mozart, Myth

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ABSTRACT

This article[1] begins with questions that arose during my experiences as a young musician touring with a band. I explore answers to these questions through examining the difference between the mind and the brain and describing selected research on the effects of music on the brain. I then review the literature on the presence and power of music in adolescent and young adult life. Lastly, I apply these findings to learning.

Muffins/Magic

In my younger days I toured as a pianist/vocalist with a new wave band, *Martha and the Muffins*, travelling across Canada and the northern United States singing *Echo Beach*:

I know it's out of fashion and a trifle uncool
But I can't help it I'm a romantic fool
It's a habit of mine to watch the sun go down
On Echo Beach I watch the sun go down
From nine to five I have to spend my time at work
My job is very boring—I'm an office clerk
The only thing that helps me pass the time away
Is knowing I'll be back at Echo Beach some day
On silent summer evenings the sky's alive with lights
A building in the distance, surrealistic sight
On Echo Beach waves make the only sound
On Echo Beach there's not a soul around

Echo Beach, far away in time, Echo Beach far away in time
(Gane, 1980)
Echo Beach 30th Anniversary Version/Martha and the Muffins—YouTube

By day we were on the road or were interviewed by local media. By night we played. Those were magical nights; nights of sound and light, nights of merging with a sea of faces singing along with songs first heard on obscure college radio stations, nights of weaving a spell from a place *far away in time*, far away from the drudgery of a summer job.

I wondered, why is music so potent? What moved our audience to learn the lyrics by heart? What is known about the mind, the brain, and learning that might explain the potency and significance of music?

Mind/Brain

First, to differentiate mind from brain: Russell (2008), a philosopher and futurist, observed that the brain is a physical substance inside the head, whereas the mind is what we know. We experience the mind every moment through our thoughts and feelings; we know we have a brain, but do not sense it. What happens in the brain affects the mind. Thus, the brain is physical matter; the mind is subjective experience. Music affects both.

Zatorre (2003) of the Montreal Neurological Institute at McGill University reported on the correlation of the experience of music in the mind with activity in the brain: "The chills effect is experienced as a very positive emotion and is sometimes described as ecstatic or euphoric by many individuals. Thus it seems to capture one of the most intense aspects of the affective response to music" (p. 11). Zatorre used positron emission tomography (PET) to measure the neural basis for this response. Research participants selected a passage of instrumental music that gave them chills. Once inside the brain scanner, they reported feeling the sensation during 77% of the trials—a fair percentage, Zatorre said, given the lack of comfort of undergoing a PET scan compared to sitting on a sofa at home. Respiration, heart rate, and muscle tension were also measured, and significant increases during the shivers sensation occurred in all three of these variables. At the point of feeling chills, a pattern of activity similar to that found in other brain imaging studies of euphoria or pleasant emotion was present. Simultaneously, a decrease in activity occurred in a portion of the amygdala responsible for fear and negative emotion. Activities necessary for evolution such as eating and reproduction also involve these reward mechanisms, and Zatorre questioned why music recruits the same brain systems.

There are contrary hypotheses. In *This is Your Brain on Music*, Levitin (2007), a music producer and neuroscientist at McGill University in Montreal, quoted Pinker, author and cognitive psychologist, who said that music lacks an evolutionary basis and is merely "auditory cheesecake" (p. 248). Levitin also cited Darwin (1871), who had a different opinion:

> I conclude that musical notes and rhythm were first acquired by the male or female progenitors of mankind for the sake of charming the opposite sex. Thus musical tones became firmly associated with some of the strongest passions an animal is capable of feeling and are consequently used instinctively … (p. 251)

Levitin noted that tribal singing and dancing embody natural selection, since the performers display stamina and good health. He believed that the popularity of rock groups with youth parallels an evolutionary function of song and dance in mating and sexual selection. Perhaps this is why music is so potent. It seems plausible to me, after many nights of playing for frenzied, passionate crowds on the dance floor. Music offered them an opportunity to try on new roles: the lover, the loony, the leaping lizard (operating from his reptilian brain after one too many drinks). Sometimes, people in the audience seemed to idolize us; we were where they wanted to be, in the spotlight, creating a synergy, an indelible moment. Levitin postulated that music not only has an evolutionary basis, but can also affect memory:

> Music's evolutionary origin is established because it is present across all humans … it involves specialized brain structures, including dedicated memory systems that can remain functional when other memory systems fail (when a physical brain system develops across all humans, we assume that it has an evolutionary basis); and it is analogous to music making in other species … (pp. 265–266)

Perhaps these dedicated memory systems explain the ability of the youth on the dance floor to remember our song lyrics. Or perhaps some of these youth had a background in music; there appear to be shared neural areas for music and language processing (Besson, Schön, Moreno, Santos & Magne, 2007). Much current research interest in music is connected to the relationship between music training and increased brain development and plasticity (see, for example, Schlaug, Altenmüller, & Thaut, 2010; Trainor, Shahin, & Roberts, 2009). Studies using magnetic resonance imaging (MRI) have found more developed brain structures in musicians than non-musicians, i.e., the corpus callosum (Schlaug et al., 2010), planum temporale, inferior

frontal gyrus, cerebellum, and Heschl gyrus gray matter volume (Besson et al., 2007; Trainor et al., 2009). These studies have stimulated investigations into transfer effects, in which learning in one area reinforces another.

Mozart/Myth

The *Mozart Effect*, a phenomenon based on a University of California study (Rauscher, Shaw & Ky, 1993) has resulted in a common perception that "music makes you smarter" (Demorest & Morrison, 2000, p. 33). In the Rauscher et al. study, students did better on a test of spatial ability after listening to Mozart. Soon, websites promoting music-enhanced learning mushroomed. Parents, eager to boost their children's intelligence, bought *Baby Mozart* CDs. A repeat study two years later with a larger cohort placed students into three groups:

- Group 1: 27 students listened to 10 minutes of Mozart
- Group 2: 26 students listened to 10 minutes of silence
- Group 3: 26 students listened to 10 minutes of minimalist music/spoken word

After listening, the students did 16 exercises on a Stanford Binet IQ spatial subtest, which involved visualizing the designs from drawings of paper that had been folded and cut, much like a schoolchild's paper snowflake. Over the next four days, the students again did the subtest. The results were as follows:

- Group 1: improved from day 1-2 and again from day 2-3
- Group 2: improved from day 2-3
- Group 3: did not improve

The researchers concluded that the *Mozart* group improved due to listening to the music, while the silence group improved due to a normal learning curve. These results were not replicated by other researchers; it was found that if the *silence* group were given any task to do, such as reading a book, it would have similar subtest scores to the music group (Levitin, 2007). Research has since suggested that the *Mozart Effect* was not attributable to Mozart, but to elevated mood and arousal levels promoted by lively music in a major key, which in turn promoted capability on a spatial test (Thompson, Schellenberg, & Husain, 2004). Perhaps the lively *Muffins* music elevated audience mood and arousal levels, promoting lyric learning?

Your Mind on Music

While the Rauscher et al. (1993, 1995) research concerned the short-term benefits of listening to music, other research has focused on the longer-term effects of music training on learning. In a review of quantitative and qualitative educational and psychological studies regarding the effects of music on the personal, social, and intellectual development of children and youth, Hallam (2010) presented strong support for the advantages of active musical engagement, especially in early childhood, on language development, literacy, numeracy, intelligence, creativity, concentration, confidence, sensitivity, social skills, relaxation, and coordination. Adolescents were also found to have gained health, social, and personal development benefits through music.

Music is an important part of life for many adolescents and young adults worldwide. In a study on American adolescents' use of music in their daily lives, Larson (1995) found that many youth used music to help develop their identity: to demarcate separation from parents, establish solidarity and belonging with peers, regulate emotions, and facilitate exploration of possible selves. In the Netherlands, music is central in adolescence—both socially and personally—and peers often share music preferences (Selfhout, Branje, Ter Bogt, & Meeus, 2009). In research on the benefits of music to Finnish adolescents, Saarikallio and Erkkila (2007) provided exploratory and theoretical clarification of the role of music in adolescent mood regulation. They found that music allowed for the release of negativity, provided entertainment, revival, diversion, discharge, sensation, solace, and promoted mental work. In particular, controlling one's feelings and feeling good—or better—were important. "Music seemed to have an outstandingly strong effect on mood improvement: as long as the musical activity was self-selected, it always seemed to make the adolescents feel better and change their mood in a positive direction" (p. 95). Favourite songs and singers seemed to affect the youth most intensely, and they experienced pleasure when singing or playing. Drumming discharged emotions; listening to lyrics helped clarify feelings and thoughts, gain new insights, and comfort youth in times of trouble; and writing their own songs was an effective way to deal with personal issues. In the United Kingdom, group singing was found to increase positive feelings in young adults: self-reported benefits included a sense of well-being, improved breathing, relaxation, social connections, and emotional uplift. One participant's explanation of the benefits of music was, "If your physical side is related to your spiritual side, then it can do only good. Healthy mind, healthy body, etc." (Clift & Hancox, 2001, p. 252).

Music seems to appeal to adolescents because it addresses developmental issues, including establishing emotional independence from parents, creating peer

relationships, becoming socially responsible, acquiring new beliefs and values, and facilitating identity development (Tarrant, North, & Hargreaves, 2002). Most people form their tastes in music by late adolescence or early adulthood (North & Hargreaves, 2008). This is partly because our brains are still developing during adolescence, and also because we become less open to experience as we age. During our teens, we experiment with new ideas, sounds, and social groups, and are initiated into adult activities. We often form our musical preferences based on those of our peers, and future music tastes are based on our musical experiences in this critical period. Favourite songs reflect youths' feelings, and many young people seek moral and social guidance in music: apparently the average adolescent listens to 10,500 hours of music between grades 7 and 12 (North & Hargreaves, 2008). These factors show the significance of music for adolescents and young adults.

Music/Learning

Educators can support adolescent learners by incorporating some of the findings from these studies into their teaching practices. Possible strategies include: basing music experiences on adolescents' music preferences, abilities, and needs; developing trust, group identification, and cohesion through cooperative music activities; accommodating individuals of varying ability; using songwriting as a form of self-expression; facilitating group interaction through music; and using music-listening to facilitate stress management (Duerksen & Darrow, 1991). The curriculum could be expanded through activities such as drumming and percussion (perhaps with the assistance of a community drum teacher), analyzing and singing favourite popular songs, and writing songs in small groups. Working with a school counsellor could provide therapeutic support for adolescent learners facing developmental challenges. A team-teaching strategy with a counsellor could model collaborative values and mentorship through lyric writing, music listening, and discussion of favourite songs. Another possibility is the development of student rock bands. A program in the United Kingdom called *Musical Futures* (Green, 2008) experimented with youth forming rock bands in school. Or perhaps existing bands—formed outside of school—could perform in class. Young rock musicians could teach other students basic skills or parts on their instruments. In my youth, a music instructor invited student rock bands to perform and added vocal and band arrangements to their songs. This motivated me to move from playing classical music to rock and jazz, and led to work with the Muffins and other bands.

Muffins and magic, Mozart and myth, music and the mind, bands and the brain. The potency and significance of music for youth can partially be explained

through brain imaging results indicating feelings of euphoria and reduced fear and negative emotion while listening to music. Evolutionary theory suggests that the popularity of rock groups with youth corresponds to the function of song and dance in mating and sexual selection. Further, music's evolutionary origin involves specific memory systems that can remain functional when other memory systems fail. Musical experiences in the critical period of adolescence result in the formation of music tastes by early adulthood. Through music, many youth discover social guidance, address developmental issues, express themselves, release emotions, feel increased self-worth and belonging, and find entertainment, diversion, and solace. Based on the literature and on my experience, it is unsurprising that music is so pivotal for youth.

And perhaps it is unsurprising that music is so potent that youth are moved to learn lyrics by heart. The lyrics in *Echo Beach* focus on the romantic, the surreal, where waves make the only sound, and reality becomes bearable. And now, three decades later—as seen in the flashback video clip—*Echo beach* echoes back to yet another reality, far away in time.

Notes

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