

The social neuroscience of music

As a researcher, I must admit that as the COVID 19 pandemic unfolded, I did wonder about the wealth of research that could come from such a unique, difficult and worldwide event. The human race has been thrust into situations where our creativity, adaptability and flexibility are being tested, and through 2020 and 2021, we are beginning to seek to understand how we dealt with the social isolation created by COVID.

One such study, titled The Social Neuroscience of Music, has just been released by a team of researchers at Bar-Ilan University, Israel and the University of Chicago, USA. They observed the phenomenon of people using music to connect while in isolation and saw it as an opportunity to understand why. I'll let them explain what was so interesting to them.

“During the COVID 19 pandemic, we have seen that people can adapt quickly to ensure that their social needs are met after being forced to isolate and socially distance.”

“Many individuals turned immediately to music, as evidenced by people singing from balconies, watching live concerts on social media, and group singing online. In this article, we show how these musical adaptations can be understood through the latest advances in the social neuroscience of music – an area that, to date, has been largely overlooked.”

What is the social neuroscience of music?

Social neuroscience is an interdisciplinary field devoted to understanding the relationship between social experiences and biological systems. Put another way, the social neuroscience of music is the study of the social processes related to music and the human brain.

The social neuroscience of music is an attempt to connect the interdisciplinary field of social neuroscience with the well-established field of the cognitive neuroscience of music, or as we know it, neuromusical research.

The social neuroscience of music – the next big thing?

Understanding ourselves as social beings is a very tricky area of research. This is because it involves a series of intersections between cognitive processes, emotional networks and hormone and neurotransmitter interactions. Through the emerging models of the social neuroscience of music, it may be possible to truly understand “the human experience” which is not a single interaction but rather a cascade of incredibly rapid interdependent responses in our brains.

The social brain and music model

The impositions that the COVID pandemic have placed on our typical social behaviours has been considerable and the researchers posed a very timely question – “One might wonder how our herding instincts and social needs can be met with current social distancing.” As they watched people singing from balconies, watching live concerts

on social media, and group singing online, they felt that they saw the answer to this wondering. “The solution is simple: with a tool that has been around for at least 40,000 years - music.” (p.6).

The model that Greenberg, Decety, And Gordon suggest is just that, a model. It is a convergence of many different discoveries and connections into the various brain functions that we know to be related to our social or herd behaviour. The sections of the paper on the social cognition of music and neurobiological candidates are a fascinating read if you are interested.

However, the model itself is what caught my eye. The reason for this is probably because out of the four pillars of neuromusical research – neural, language, executive function and social development – I always found the social development category harder to explain.

This is probably because the connection between music-making and social development are both more obvious as well as less defined in the neuromusical research. Researchers have been able to measure the social outcomes of music-making but until now, unable to clearly define separate the neural mechanisms that may be at work.

As I studied the model I wanted to keep in mind how I could use it in two ways; to explain both how music-making utilised these important mechanisms in the brain and; to support how unique and indeed primal music-making is for brain development, connectivity and synchronicity.

The social neuroscience of music model ... in plain terms!

The social brain and music model outlined five mechanisms. Two of these are cognitive structures, language and empathy while the remaining three are hormone and neurotransmitter responses. Let's start with the two cognitive structures.

Empathy Circuits control the ability to understand and share the feelings of another. Music-making promotes interpersonal music coordination and this increased empathy can transfer to the classroom or playground with increased cooperation.

Language Structures control our communication through speech, writing and gesture. Music-making has been closely linked to language making through a share neural network and musical calls and responses are processed by the brain using the same structures as language. Highly developed language systems are the foundation of effective learning, communication and development across all subject areas.

The next three areas are related to hormone and neurotransmitter activation. Remember that all five mechanisms would be activated close to simultaneously and will also respond to each other continually as music-making is occurring. Let's look at the final three mechanisms.

“Music seems to provide a remarkably effective means of social connection in a time of social distancing, [and] it may allow our brains to feel connected even without traditional face-to-face interactions.”

Greenberg, D. M., Decety, J., & Gordon, I. (2021). The social neuroscience of music: Understanding the social brain through human song. *American Psychologist*.



Oxytocin is sometimes called the love hormone, probably because it is associated with empathy, trust, sexual activity, and relationship-building. At its very core music-making creates a feeling of being, achieving and striving together.



Music is a fundamental part of our evolution, allowing for unique expressions of social ties. It can strengthen cohesion and mutual trust between people by signaling shared values.

Jean Decety, the Irving B. Harris Distinguished Service Professor in Psychology and Psychiatry and director of Child Neurosuite at the University of Chicago



This sits at the very heart of human connection and in the worst times of COVID, was something that the human race as a whole was lacking. It is no wonder we sang together to try to re-establish the feeling of being together.

Cortisol is sometimes called the stress hormone. It is often blamed for inflammation, anxiety, high blood pressure, stroke which it does contribute to, but it is also a necessary hormone for our survival instincts. The fight or flight instinct is incredibly important for our survival, and the management of cortisol balance is a daily experience for every human. All types of music experience – whether it is listening, making or learning – has been

associated with cortisol reduction and balanced management and has been identified as one of the faster working interventions for high cortisol levels.

Reward is a fundamental network in the human brain. It is the network in charge of the release of the neurotransmitter dopamine, which is a chemical that lubricates and supercharges the neural synapses (messages) around the brain.

Dopamine is also a great feel-good brain chemical that activates motivation and the desire to communicate. Music-making can stimulate the brain to reengage with difficult tasks and help us find multiple solutions to a problem.

The social neuroscience of music model ... in a nutshell!

While it is important to be able to explain in some detail how music-making activates different functions and structures of the brain that are involved in social engagement, sometimes we just need an “in a nutshell” statement.

I often begin talking about a concept by saying “in a nutshell ...” because it tweaks the interest of the audience, gets them sitting forward in their seat, and then I hit them with the detail and the importance. My “in a nutshell” statement for the social engagement that music-making elicits in our brains would be something like this,



“In a nutshell, when we make music together our brains are talking to each other and feeling with each other while our positive brain chemicals are going up and our stress chemicals are going down. That’s why we feel connected so quickly when we make music together and why music-making calms our worries and anxiety in difficult situations.”



In one simple, deeply human and totally accessible way, we have a tool that can reconnect us with our own and our shared humanity. Whether it be a worldwide pandemic, an ongoing national conflict or a family feud, music-making can help heal wounds and bring us closer like no other activity.

As we emerge from this particularly difficult situation we should look to ways of re-establishing social ties and effectively managing the stress that the COVID 19 isolation has created. Music-making together may be the logical and effective answer to life after COVID.

Read More

Greenberg, D. M., Decety, J., & Gordon, I. (2021). The social neuroscience of music: Understanding the social brain through human song. *American Psychologist*.

Researcher to Follow

Dr David M. Greenberg Bar-Ilan University



BRAINS ARE TALKING TOGETHER

Music-making has been closely linked to language making through a shared neural network, and musical call and response is processed by the brain, using the same structures as language.



BRAINS LOVE THE LOVE HORMONE

Music-making creates a feeling of being, achieving and striving together. This sits at the very heart of human connection.



BRAINS ARE MOTIVATED TOGETHER

Dopamine is also a great feel-good brain chemical which activates motivation and the desire to communicate..



BRAINS GET EXCITED WITH THE DOPAMINE HORMONE

Music-making can stimulate the brain to reengage with difficult tasks and help us find multiple solutions to a problem.



BRAINS ARE FEELING TOGETHER

Music-making promotes interpersonal music co-ordination and this increased empathy can transfer to the classroom.



BRAINS ARE LOVE TO REDUCE STRESS

All types of music experience has been associated with cortisol reduction & balanced management & has been identified as one of the faster working interventions on high cortisol levels.

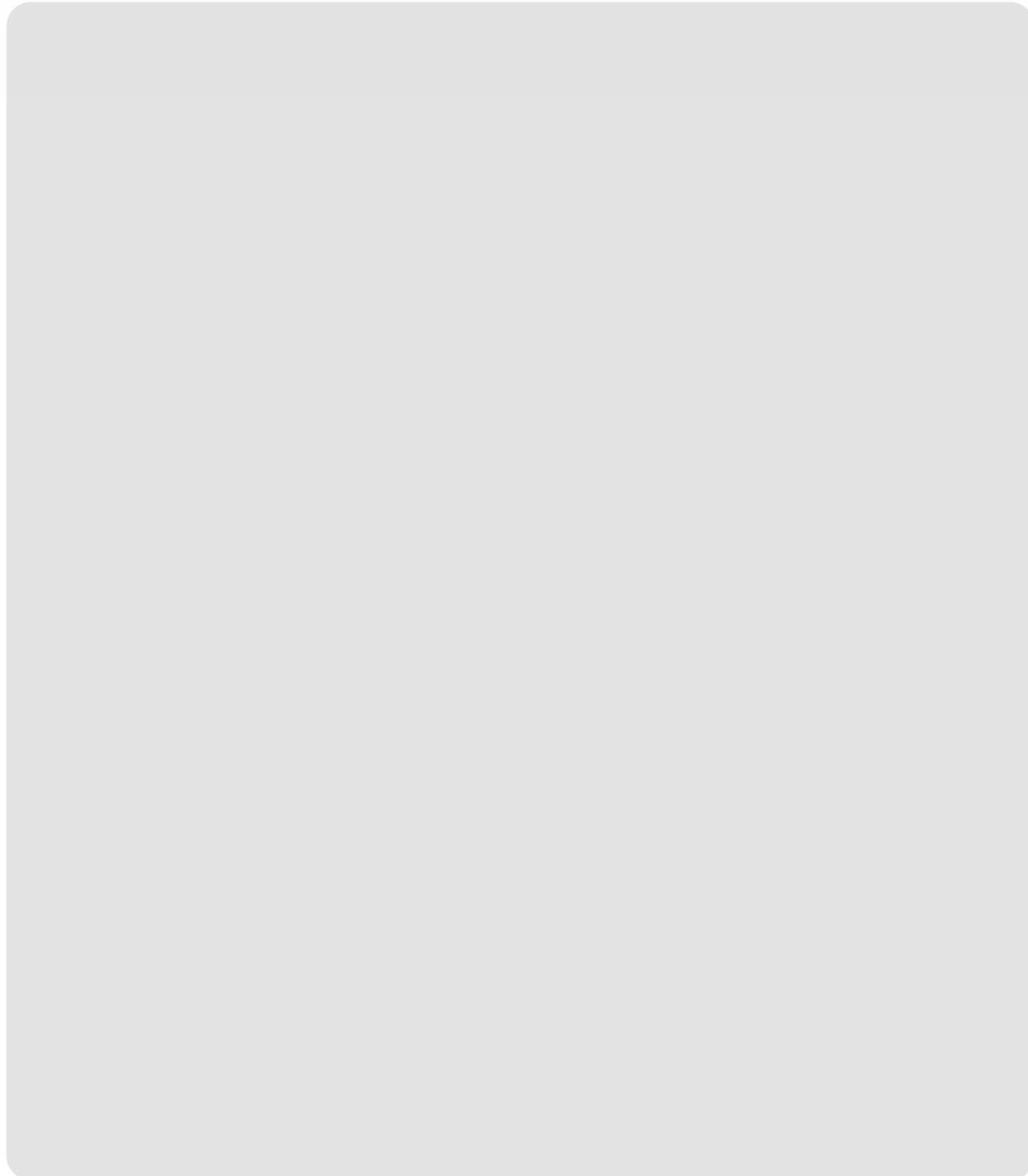
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Professional Reflection • Part 1

Personal Brain Buzz

From your own experience of music making with others, do you agree with the five brain mechanisms – language structures, empathy circuits, reward network, cortisol and oxytocin, that the research team have described?

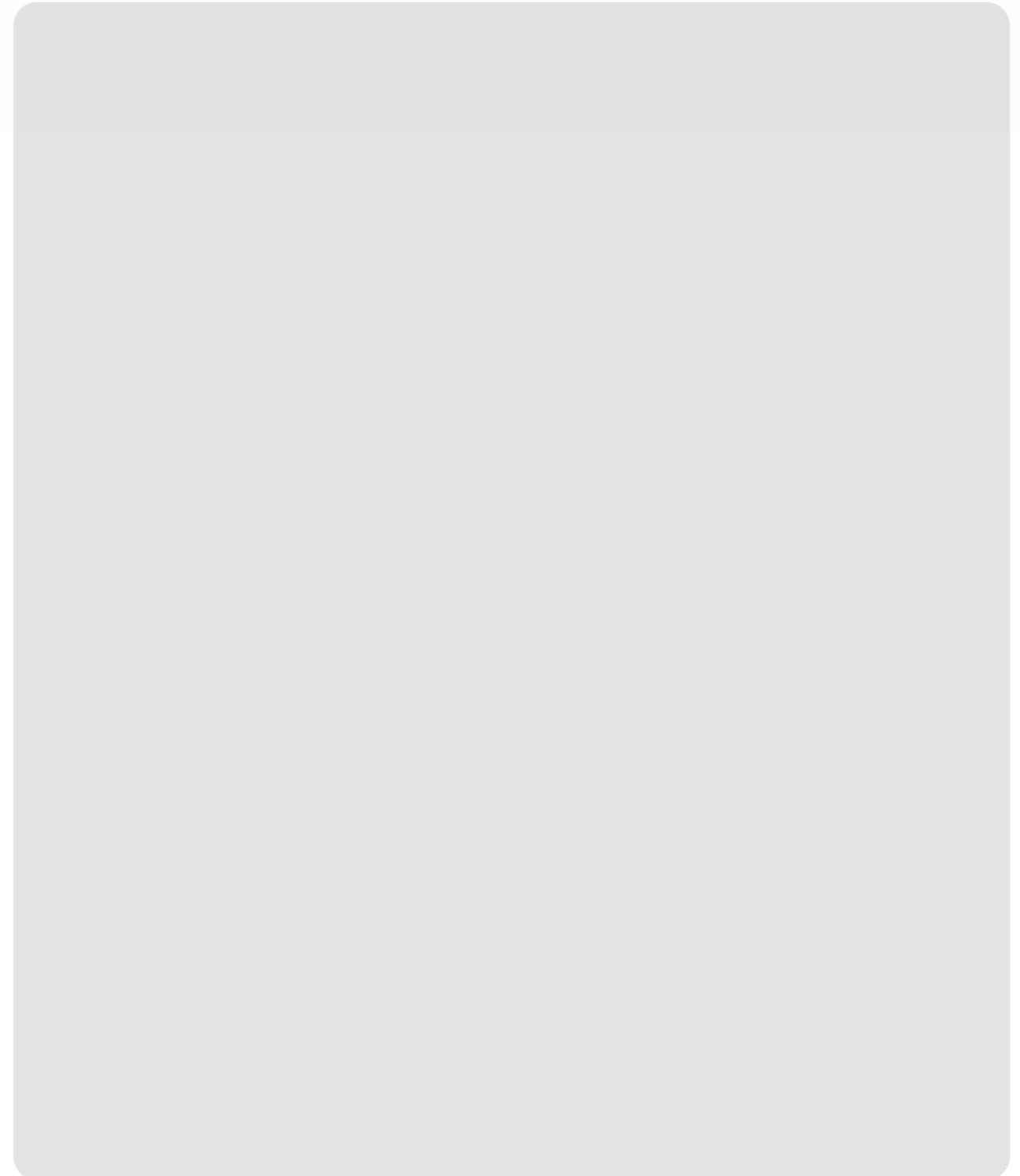
Do you feel like they have missed any? Do you feel like these mechanisms work simultaneously or in a particular order?



Experiment Time

Next time you make music with your students or other musicians, keep the five brain mechanisms in mind.

Can you identify when one or more of them may be activated during a rehearsal or performance?



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Professional Reflection • Part 2

Personal Brain Buzz

Which one, or more, of the five brain mechanisms do you think your students would identify as being activated by making music together?

Which of the five mechanisms do you think they would find surprising or disagree with?

Experiment Time

Test out these very questions with your students, allow them to answer freely and with no “correct” answer in mind. This may reveal to you how they internally experience making music together.

What did you learn about your students through this experiment?

Questioning Brain Buzz

After completing this professional reflection, write at least two questions you have about this topic.