

Music and its role in mental health and illness



Stacey Perlin Foundation May 18 2022

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First some music



Bach *Brandenburg Concerto #3*
(Il Giardino Armonico)

Outline

1. Mental health and mental illness
2. General thoughts about music
3. A little neuroscience
4. Music in Medicine

Scope of this talk

My focus will be on Western music. No disrespect is intended to other music. Indeed gamelan music is said to be the most technically complex music of all. Also I was reading that it takes decades to master the rajas of India.

I will not include the wonderful, but different (I think), world of animal music. Lots has been written about this, especially regarding bird and whale songs

I will venture outside classical music

Javanese gamelan ensemble





Mental Health and Mental Illness

WHO Definition of Health:

“a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”... the ability to lead a “socially and economically productive life.” (WHO 2001)

Mental Illnesses..

Disorders of the brain “characterized by alterations in thinking, mood or behavior – or some combination thereof – associated with significant distress and impaired functioning” (The Human Face of MH and MI in Canada 2006)

Mood Disorders



Major depression- at least 2 weeks of depressed mood and/or loss of interest in usual activities + 3/7 symptoms

Dysthymia-at least 2 years of mild depression (now Persistent Depressive Disorder)

Bipolar disorder - episodes of mania or hypomania often with major depressive episodes

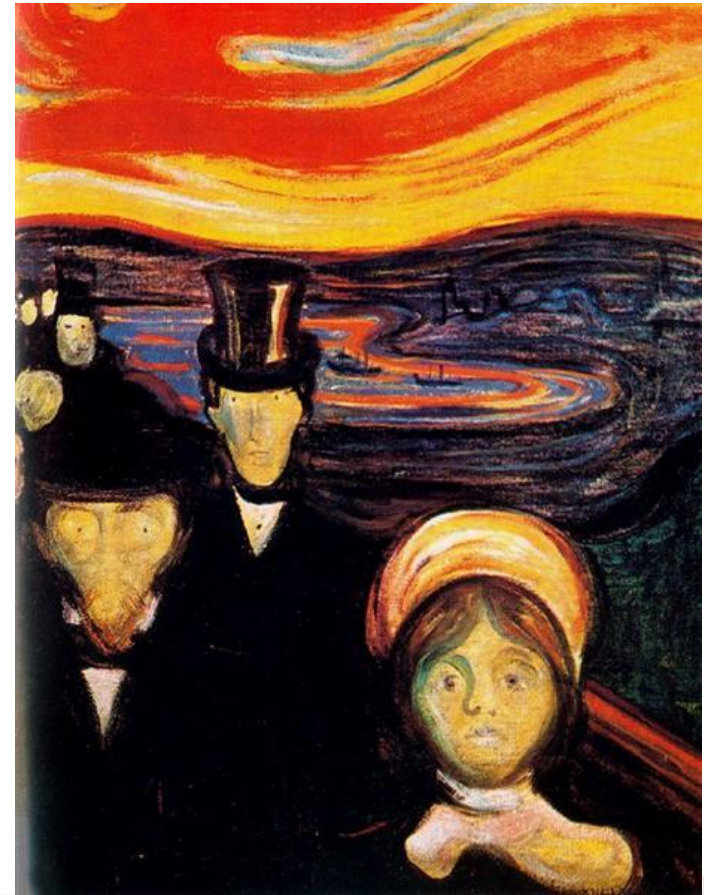
Paul Gauguin, Faaturama, 1891

Anxiety Disorders

Intense and prolonged feelings of fear and distress that occur out of proportion to the actual threat or danger and that interfere with normal daily functioning

Generalized Anxiety Disorder
Specific Phobias eg arachnophobia
Post-traumatic stress disorder
(PTSD)
Social anxiety disorder
Panic disorder

Anxiety, 1892-Edvard Munch





Schizophrenia

Psychotic Disorders

It is not the “split Brain” of older movies

- **Positive symptoms:**
- Delusions (false or irrational beliefs)
- Hallucinations (seeing or hearing things that do not exist)
- **Negative symptoms**
- Lack of motivation
- Lack of insight
- Social withdrawal

Bryan Charnley-Broach Schizophrenie-1986, Bethlem Royal Hospital



Most
important
features of
mental
illness

Mental illnesses are common (estimates vary greatly but 20% annual prevalence seems reasonable, including addictions)

They are usually episodic (in bipolar manic episodes usually last weeks and depressive ones last months)

Typically first manifest themselves in youth/young adulthood are life-long (for example for bipolar depression appears at about age 12 and mania at about 20 or later and both are life-long)

Definition of music

Definitions struggle to deal with music and in some African cultures the word music is synonymous with “dance”

The composer Edgar Varese defined it as “organized sound”

The theorist Leonard Meyer defined it as “a form of emotional communication”

Many other definitions and ideas exist



Music as a group function

Religious context*:



Work songs:



War context (soldiers singing before the Juno beach landing)

Amazonian Indians singing in groups each morning (to stay awake in case of enemy attack?)

Protest songs

Football chants

All these issues speak to music creating **social cohesion**, having survival value, and adaptive benefits

* *a Ramadan song and dance festival, Jakarta*

Evolution of music

Music is old: jaw harps, percussion instruments and bone flutes go back at least 40,000 years.

Music is universal and uses universal principles

Infants show musical preferences from as young as 2 months

Music activates the emotional brain and more

Has music enhanced survival by aiding courtship or by promoting social cohesion or is it “auditory cheesecake”



Other thoughts about music

Universality: it is thought that all societies have, and have had, some form of music

Whether language or music came first is controversial, but an intriguing idea postulates co-evolution and subsequent separation. This is supported by:

1. idea of “musilanguage”: Bolivian tribe that uses short musical phrases to identify individuals; Ecuadorian tribes that use song-speech when strangers meet and by groups of men to promote courage and
2. early sensitivity to music by infants and preference for music heard *in utero*; also singing precedes language (at about 12 months)

Musilanguage and evolution

“Musilanguage” as a single precursor of music and language: use by eg the Neanderthals

a communication system that later differentiated into music and language, capable of communications emotions with gestures

Supported by examples of music-like expressions by non-human primates eg “chattering” among baboons, “duets” by gibbons

Such expressions use *pitch, rhythm and melody*

As do non-linguistic stages of infant directed speech



Music and infants

Before language acquisition babies as young as 2 months react to music-----this is thought to explain “Motherese” (a universal phenomenon) since babies are particularly sensitive to contour.

Babies can detect changes of a semitone, in rhythm, tempo & key

They prefer consonant over dissonant sounds

They show preference for music heard in utero: how is this done?

Ben Heppner’s anecdote

The Experience of Music

HOW SHOSTAKOVICH CHANGED MY MIND

*'I sensed the glimmering of
a possibility. If Shostakovich
could find the 'method',
the thread of logic, in his
teeming, cascading thoughts,
then perhaps I could too.'*

Stephen Johnson



From a 2006 interview with Viktor Kozlov, survivor of the orchestra that first performed the Leningrad Symphony (#7) in 1942 in the besieged city of Leningrad (pp 15-16).....

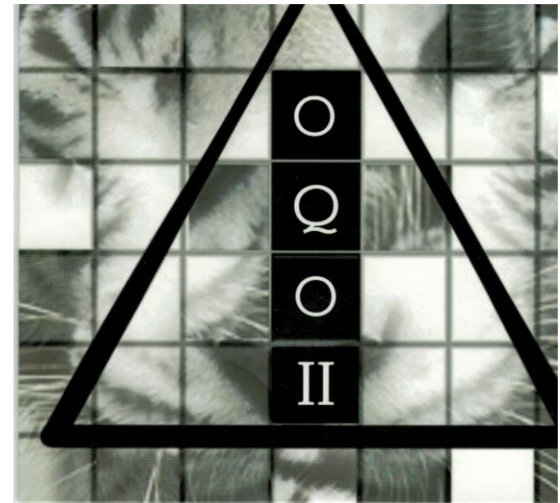


The quote

The Raptors anecdote

June 13 2019

A musical interlude



Cambodian Song: OQO

Some neuroscience

Williams syndrome

A “hypermusical species” (Sachs) with “elfish” features

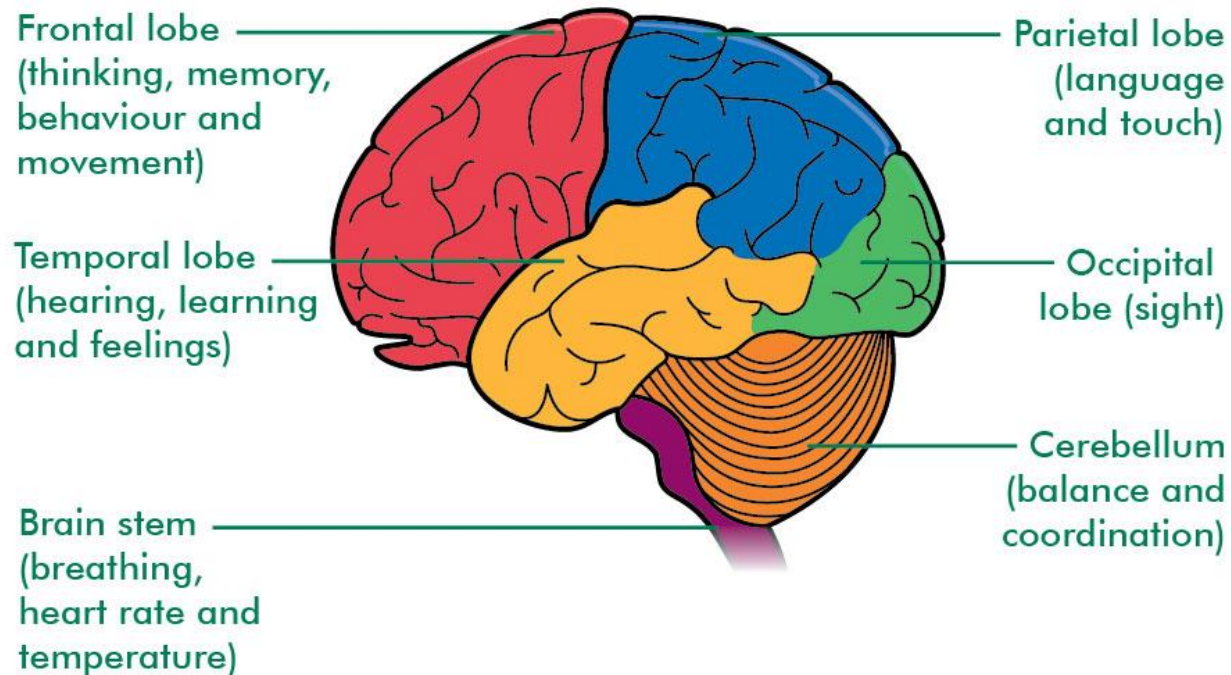
Average IQ is less than 60, but above average language, musical and social skills

Sachs describes many remarkable individual including one that could sing operatic arias in 30 languages and another with a repertoire of over 2,000 songs

Associated issues include sound hypersensitivity, poor co-ordination and cardiovascular abnormalities



The human brain



Williams syndrome and the brain

MRI shows: decreased brain size by 20%

Decreased parietal and occipital lobe volume

Normal or enlarged temporal and frontal lobes

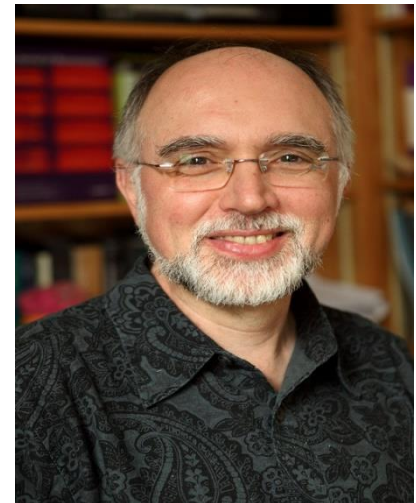
Decreased area in regions of the corpus callosum (critical for higher cognitive functions; enlarged in musicians)

The neuroscience of “Chills”

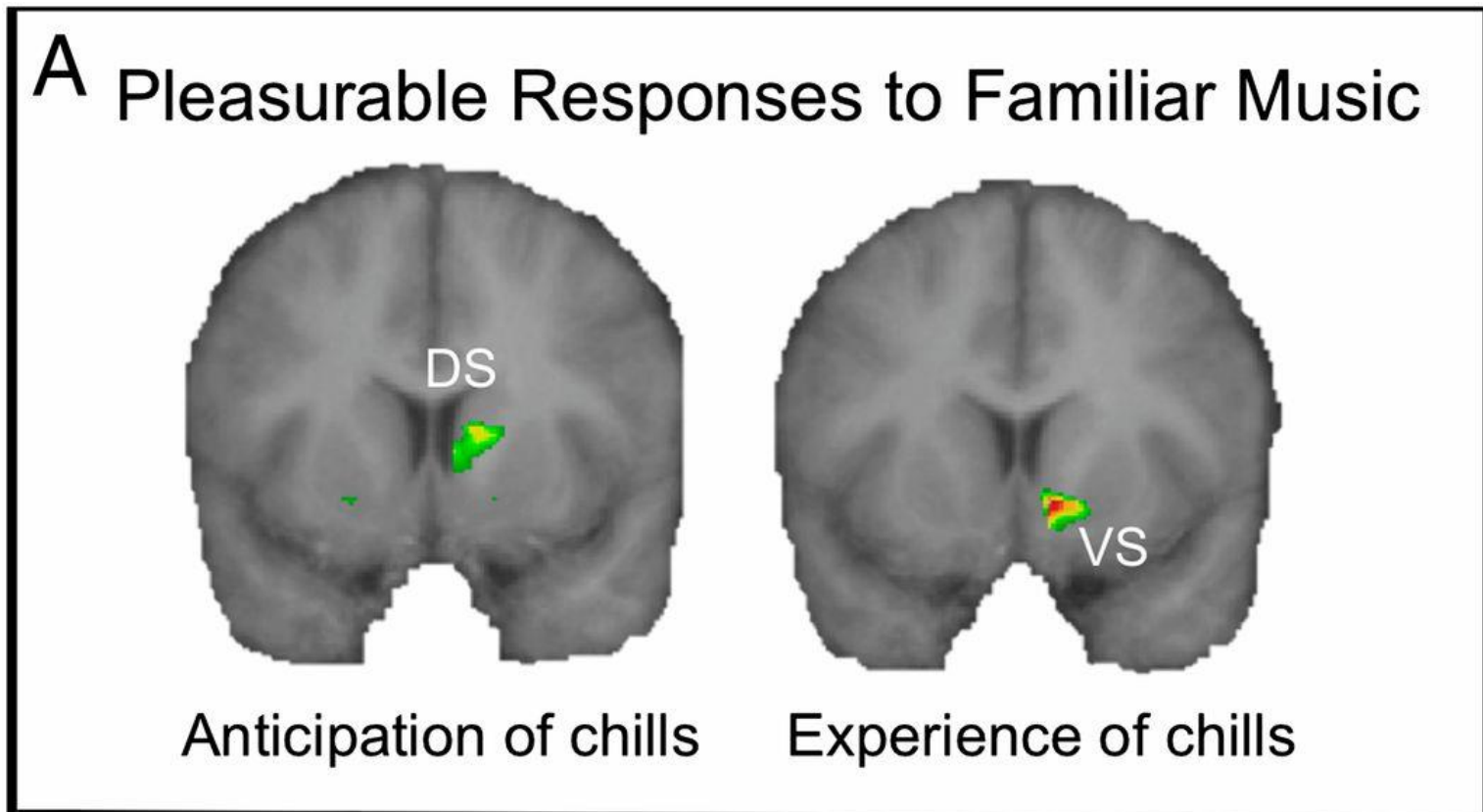
Dopamine release in the striatum leads to reinforcement of behaviors

70% of people respond to peak pleasurable moments in music with “chills”

The neuroscience of this phenomenon has been studied by Dr Robert Zatorre of McGill University



Neural correlates of processing highly rewarding music.



Robert J. Zatorre, and Valorie N. Salimpoor PNAS
2013;110:Supplement 2:10430-10437

PNAS

Another musical interlude



Going to Africa by Pharoah Sanders
from *Heart is a Melody**

History of Music in Medicine

Evidence for “music therapy” exists for Mesopotamia, ancient Egypt and Israel; for ancient Greece and Rome; for Middle ages and the Baroque.

A recurring theme is emotional healing especially in depression

For a comprehensive account see Peregrine Horden (2000), *Music in Medicine*, Routledge

Music in Medicine

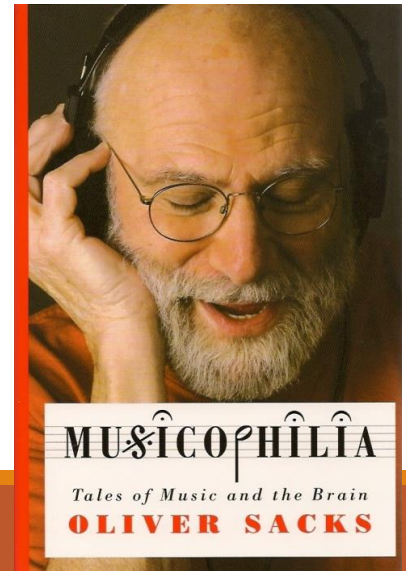
Issue of music vs music therapy

Example of playing music with therapeutic effects in 1960s

is described by Sachs re Parkinson's patients and the post-encephalitic survivors (not from Spanish flu) made famous in "Awakenings":

Music did everything L-dopa would do in the future but only while it was playing and for a few more minutes

Evidence suggests efficacy of music and music therapy in many mental and neurological disorders



Persistence of the musical response

Alzheimer's patients often retain musical skills long after they become seriously cognitively impaired: *"Suddenly a fully intact person was there, a laughing and happy person. Sadly, as soon as the music went, that person was lost (an ex music teacher with AD who had lost speech but played the piano still)**

See Sachs for description of the AD patient who had lost every memory except for music, would get lost on the way to the stage, but once there would sing perfectly

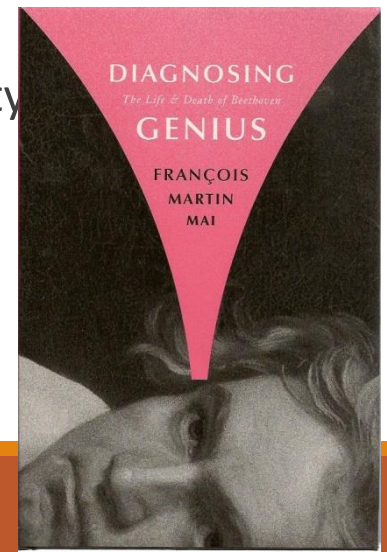
Beethoven and bipolar disorder

Much has been made about great artists deriving some of their inspiration and output during manic episodes

Much of this is purely anecdotal

But a book by Francois Mai (Prof of psychiatry at University of Ottawa) "*Diagnosing Genius*" examined Beethoven's letters (>1500) and medical reports.

Concludes that periods of great output coincide with mania and that these alternate with periods of minimal activity and likely depression



Other composers with mood disorders

Early Music: John Dowland, Carlo Gesualdo

Classical era: Handel

Romantic era: Berlioz, Tchaikovsky, Schumann, Mahler, Bruckner

20th Century: Peter Warlock, Hugo Wolff

What about Sting?

fMRI shows that all genres of music activate similar areas of his brain

EXCEPT Musak (also known as Elevator music piped music, weather music, or lift music) which caused little activation and was used as baseline (anodyne, inoffensive, neutral music?)!

When Sting hears Bach he sees towering buildings such as cathedrals (a form of synesthesia?)

Part of his visual cortex activated by music



Some concluding thoughts

Music is a universal human experience that arose as early as 40,000-60,000 years ago

Conjecture that music is “auditory cheesecake” is unfounded

It is a form of “emotional communication” (theorist Leonard Myers) and “organized sound” (composer Edgar Varese)

Musical skills develop early and can persist well into dementia

Provides a window into understanding how the brain works





The Blue Morpho



- <https://www.youtube.com/watch?v=CJqRsuLbcL0>

Timeline of hominin evolution

