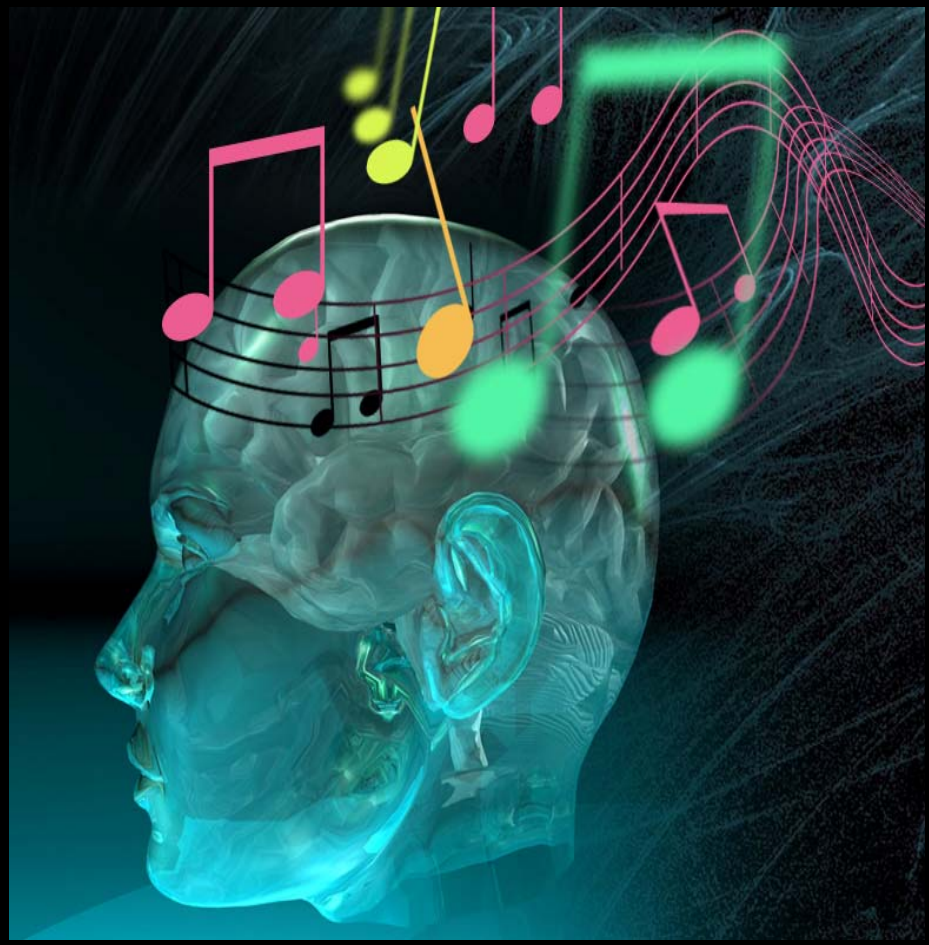
The Effects of **Music on the Brain**



Using *Network Science* to Investigate Music Preference

The Effects of Music on the Brain

The Default Mode

The Effects of Music on the Brain

The Default Mode

Complex Brain Networks

The Effects of Music on the Brain

The Default Mode

Complex Brain Networks

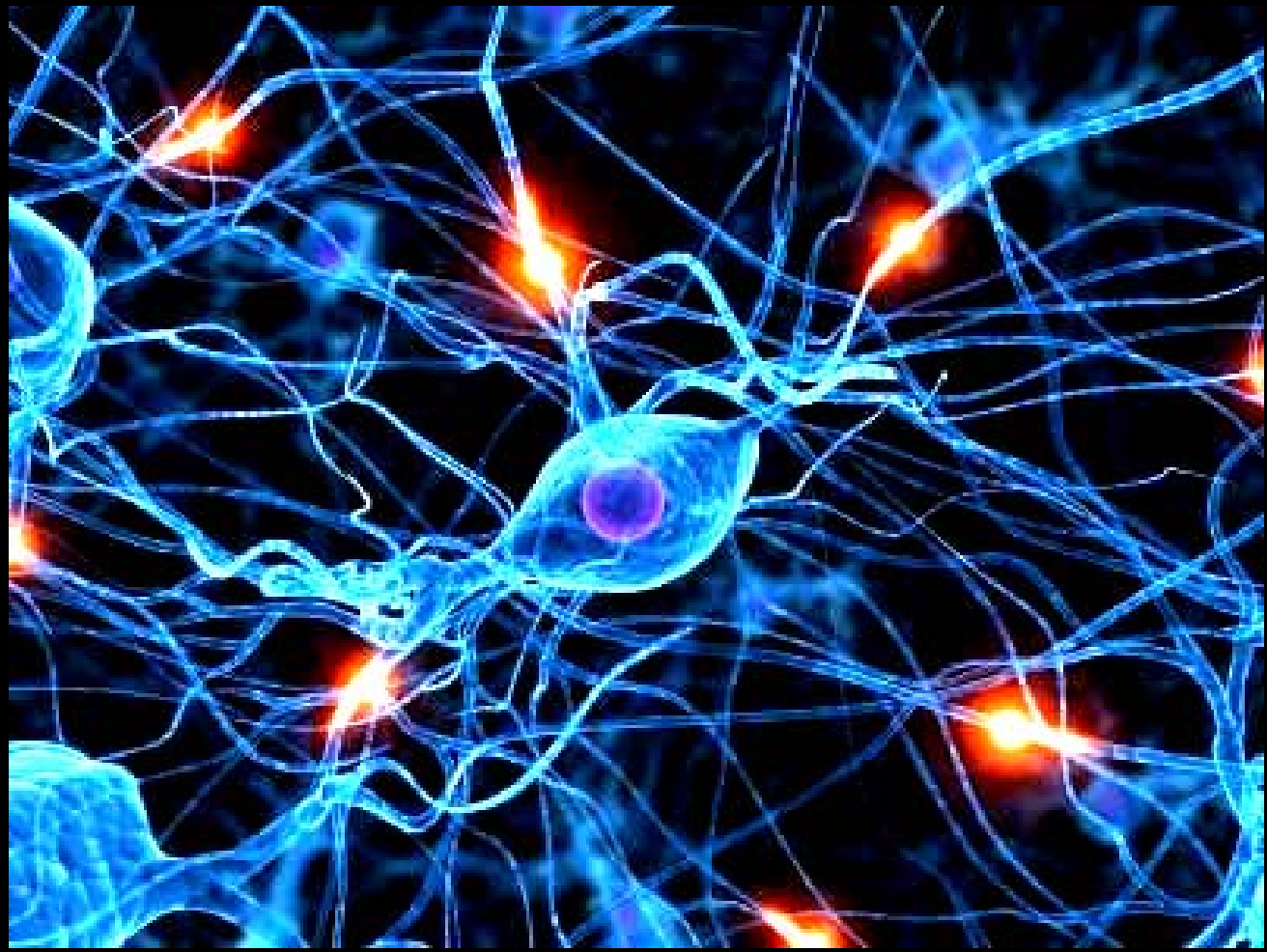
Networks & Music Preference

The Default Mode Network

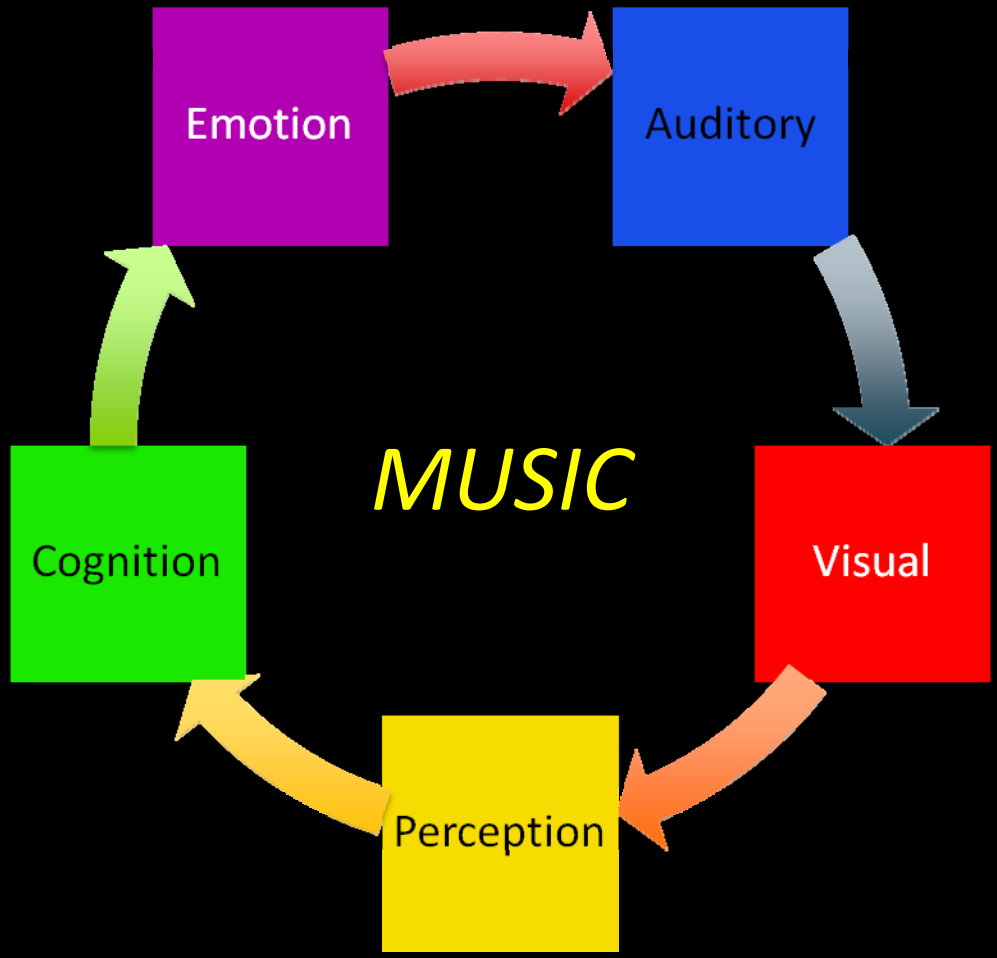
....the brain At Rest

What's *Music* Got to Do With It?

Why Network Science ?



Music *and Brain* Complexity

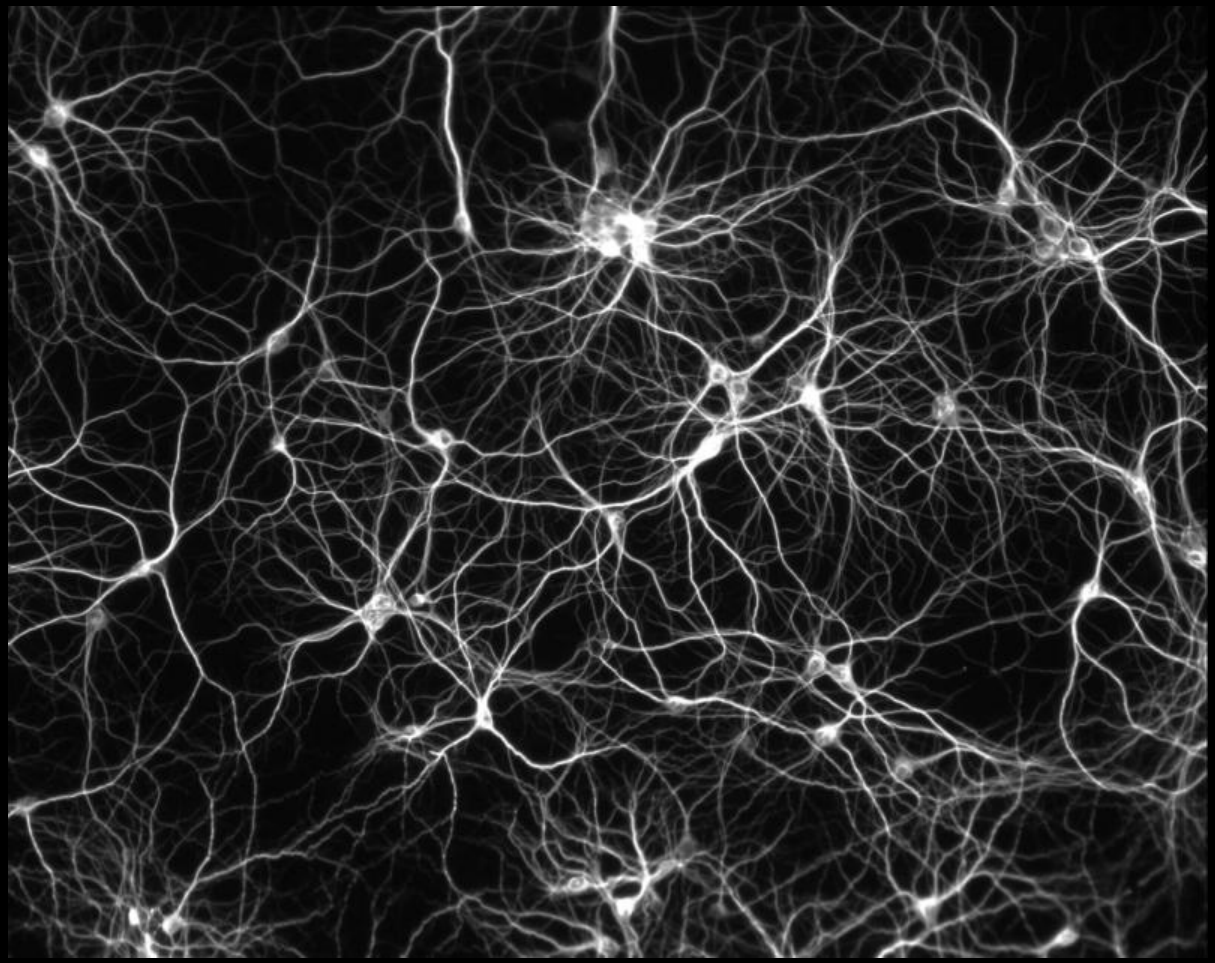


The Brain is a *SYSTEM Network*

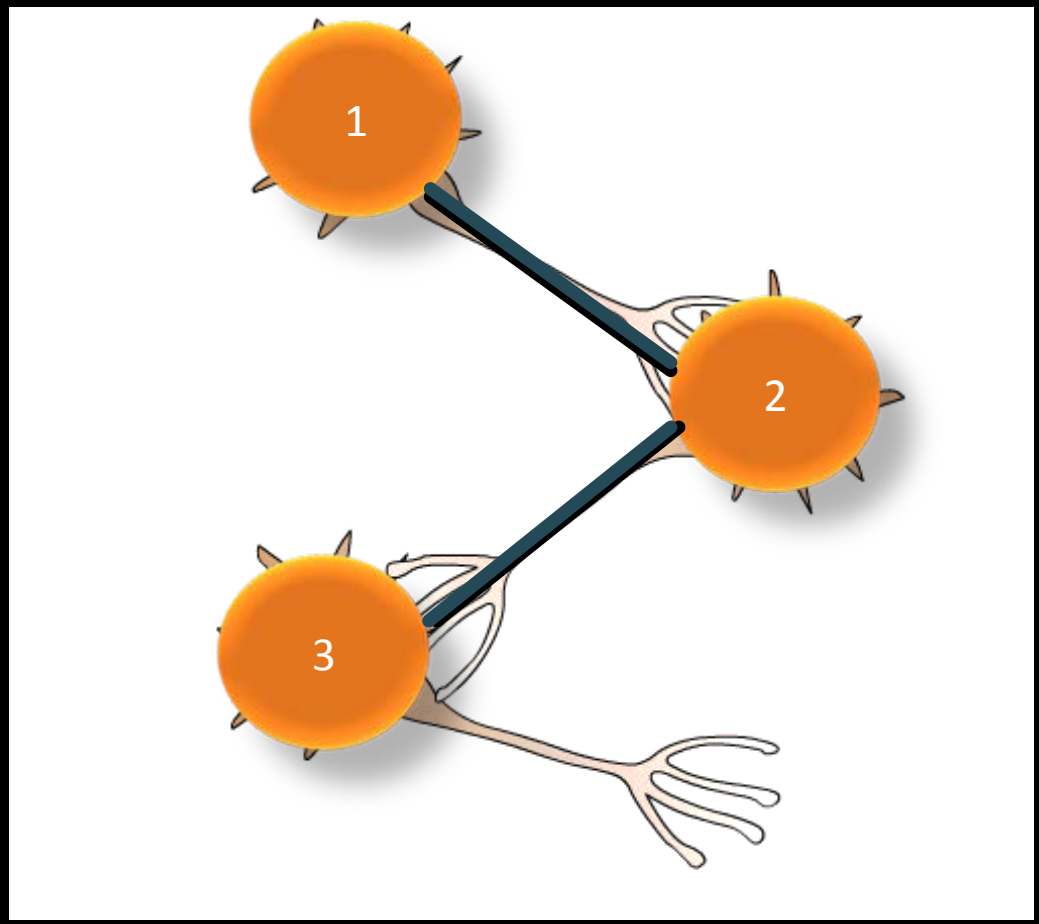
Dynamic
Complex
Interconnected

Like a symphony…

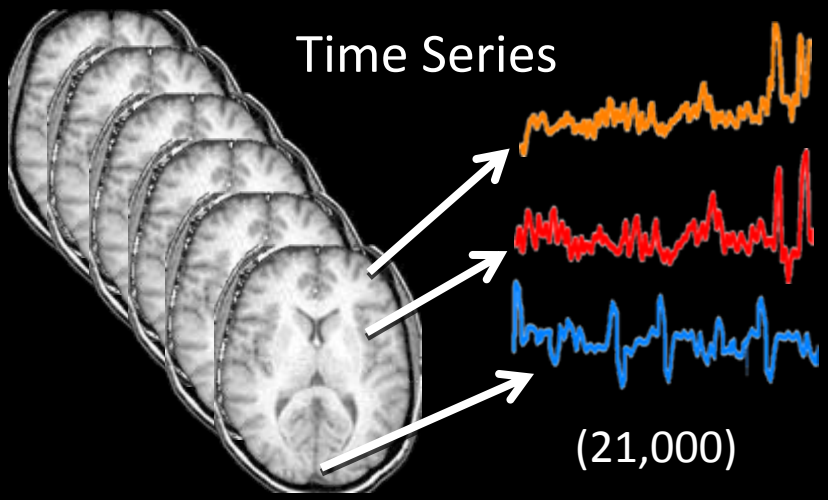
Networks and Neurons (100 Billion)



Network Theory



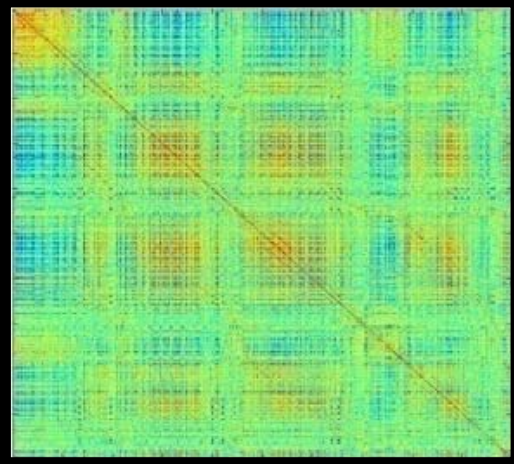
Brain Networks



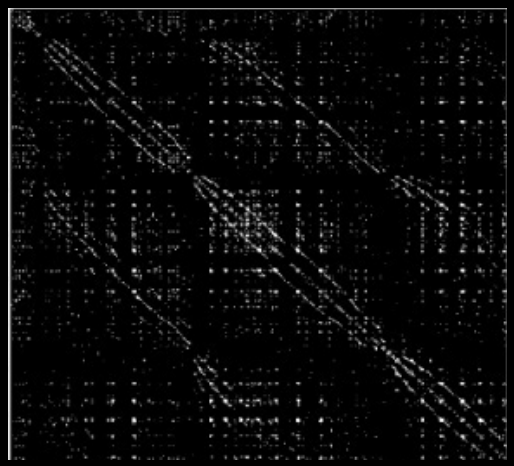
Time Series

(21,000)

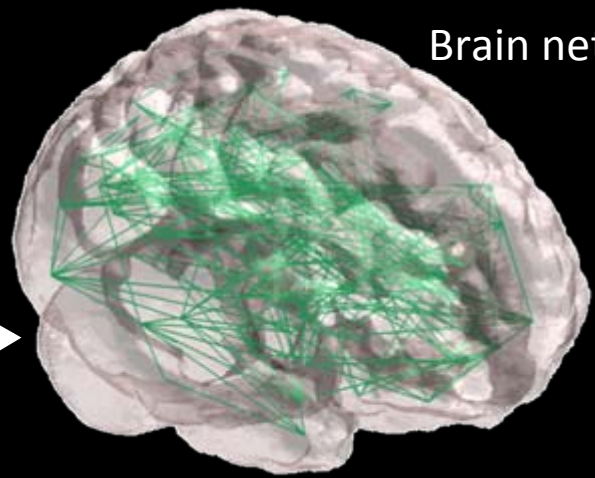
Correlation matrix



Threshold



Adjacency matrix



Brain network

Effects of Music on the Brain

Back to our question:

Does Musical Preference Influence Connectivity in the Brain ?

♫♫♫ The FAVORITE ♫♫

This is my song

‘Rocks my World ’

‘Floats My Boat ’

I LOVE THIS SONG !

All listened to 5 Minutes of Each Song

Rock: Kiss, Rock ‘n Roll All Night

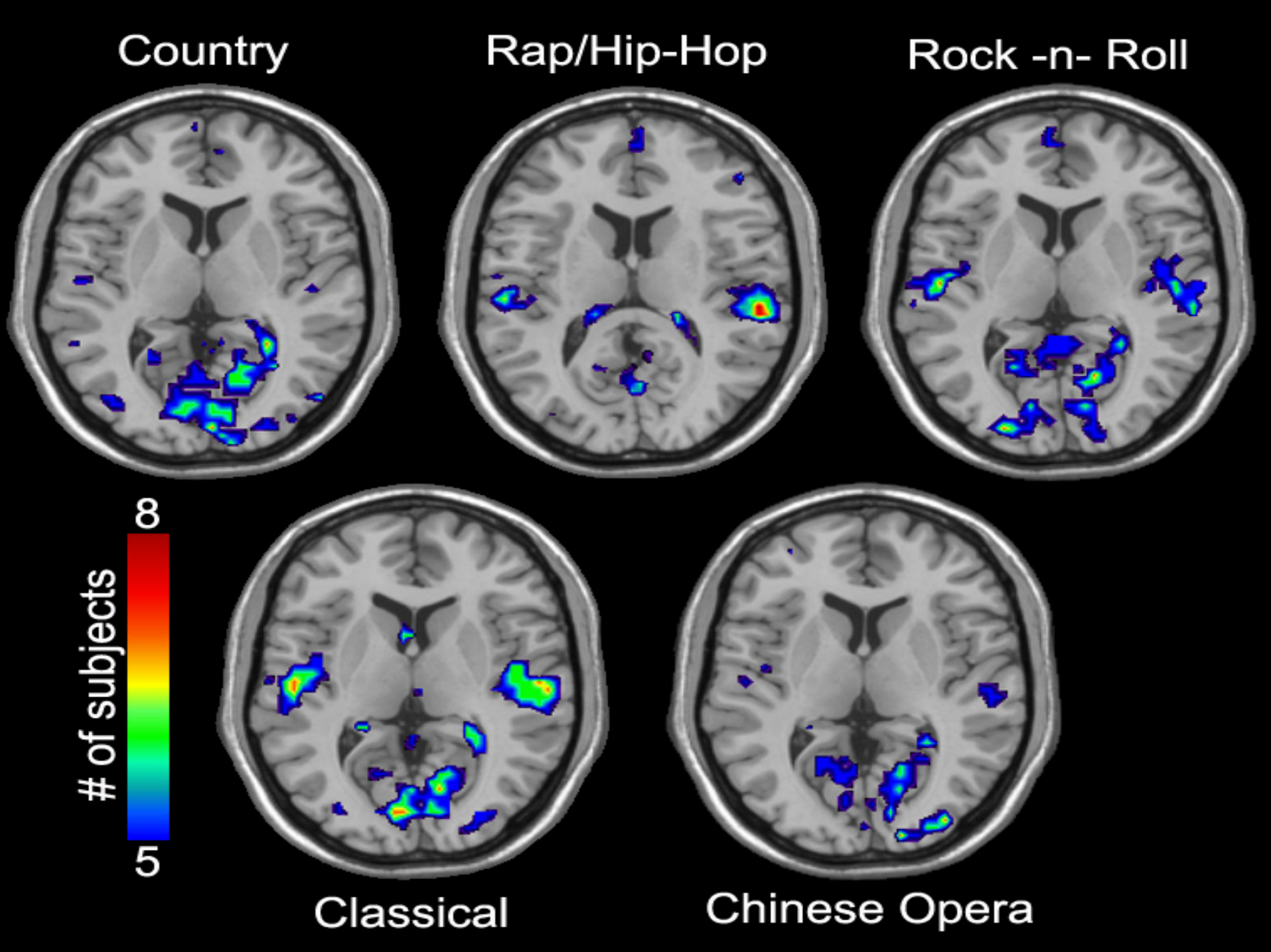
Classical: Beethoven’s 5th Symphony Mvt I

Country: Brad Paisley, Water

Rap/Hip-Hop: Usher, OMG

Unfamiliar: Chinese Jinna Opera Band

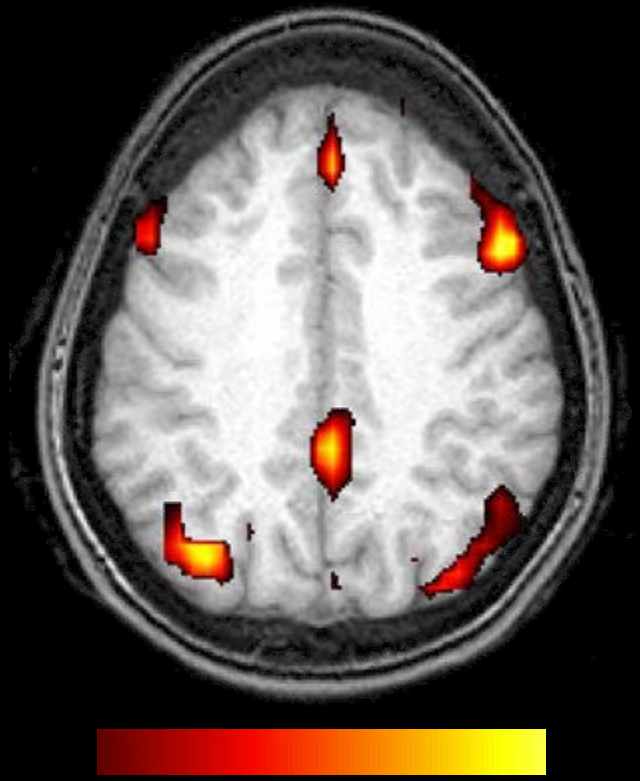
Plus the Favorite Song: *person-specific*


Country
Rap/Hip-Hop
Rock -n- Roll
8
# of subjects
5
Classical
Chinese Opera

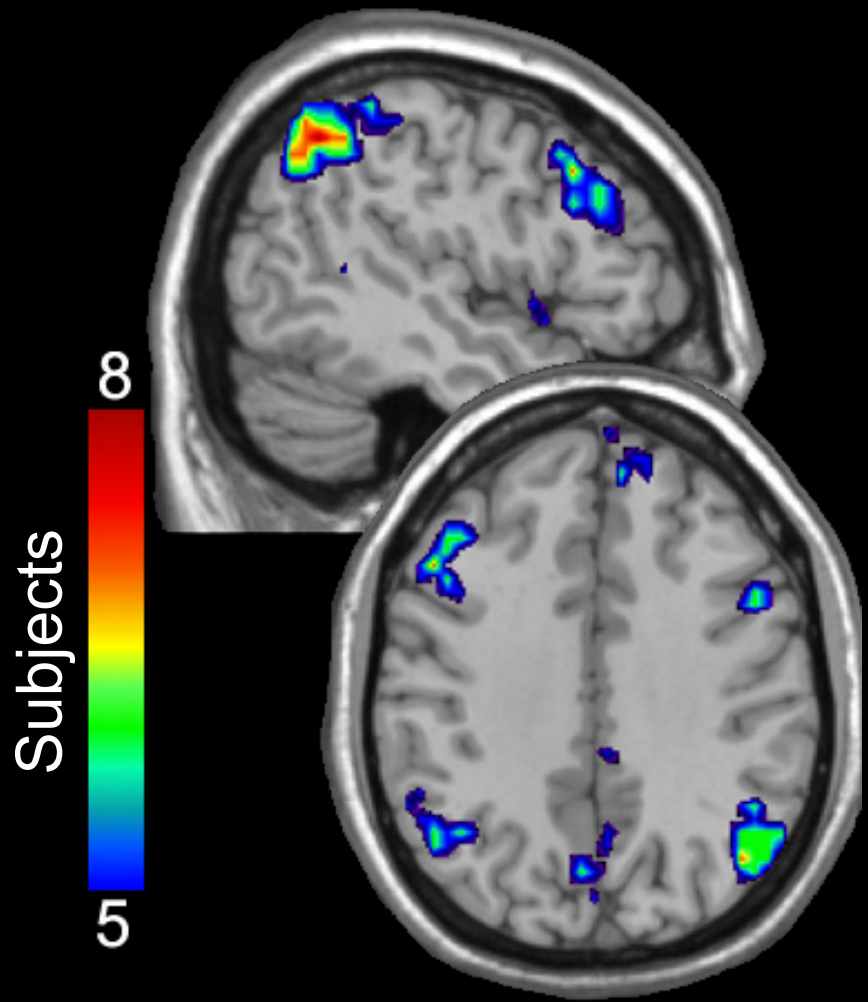
Six Degrees of Love and Hate:
Music Preference

Any Song
Any Genre
Lyrics or No Lyrics

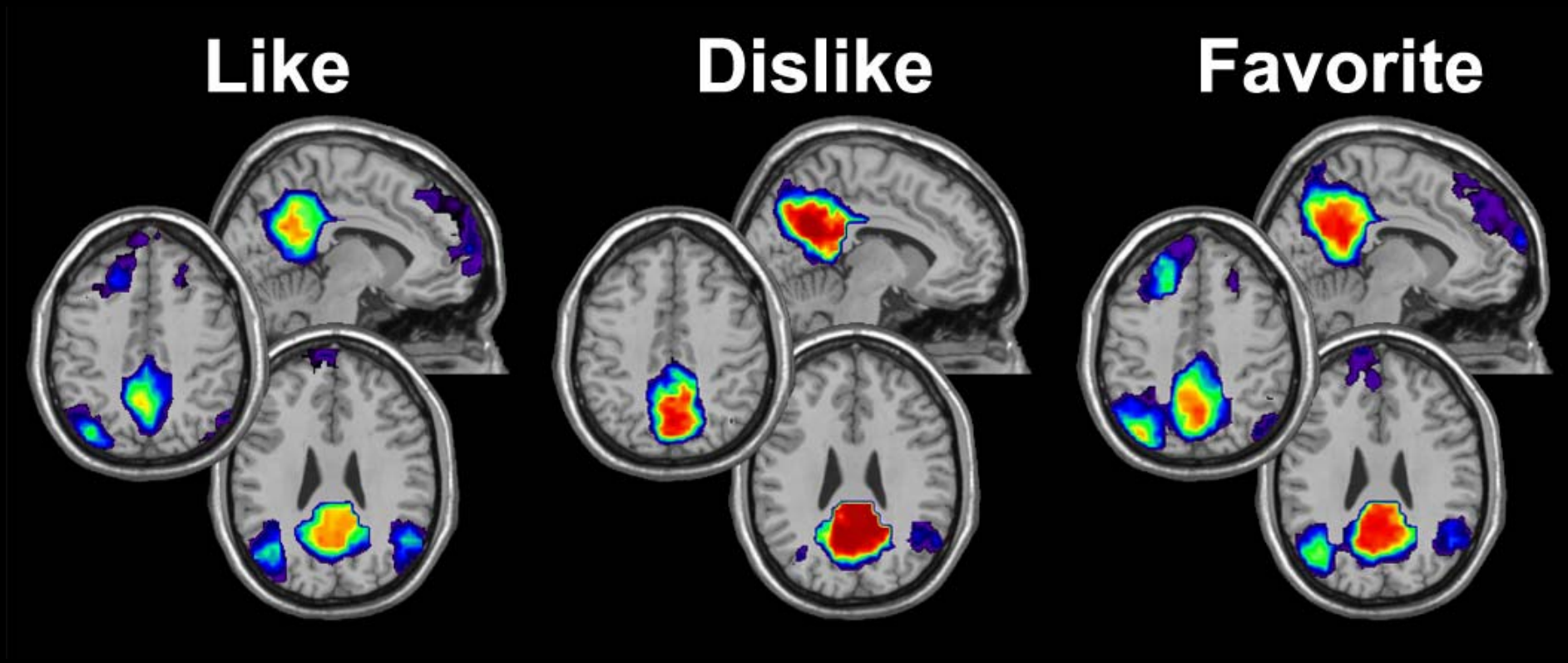
Default-Mode Network



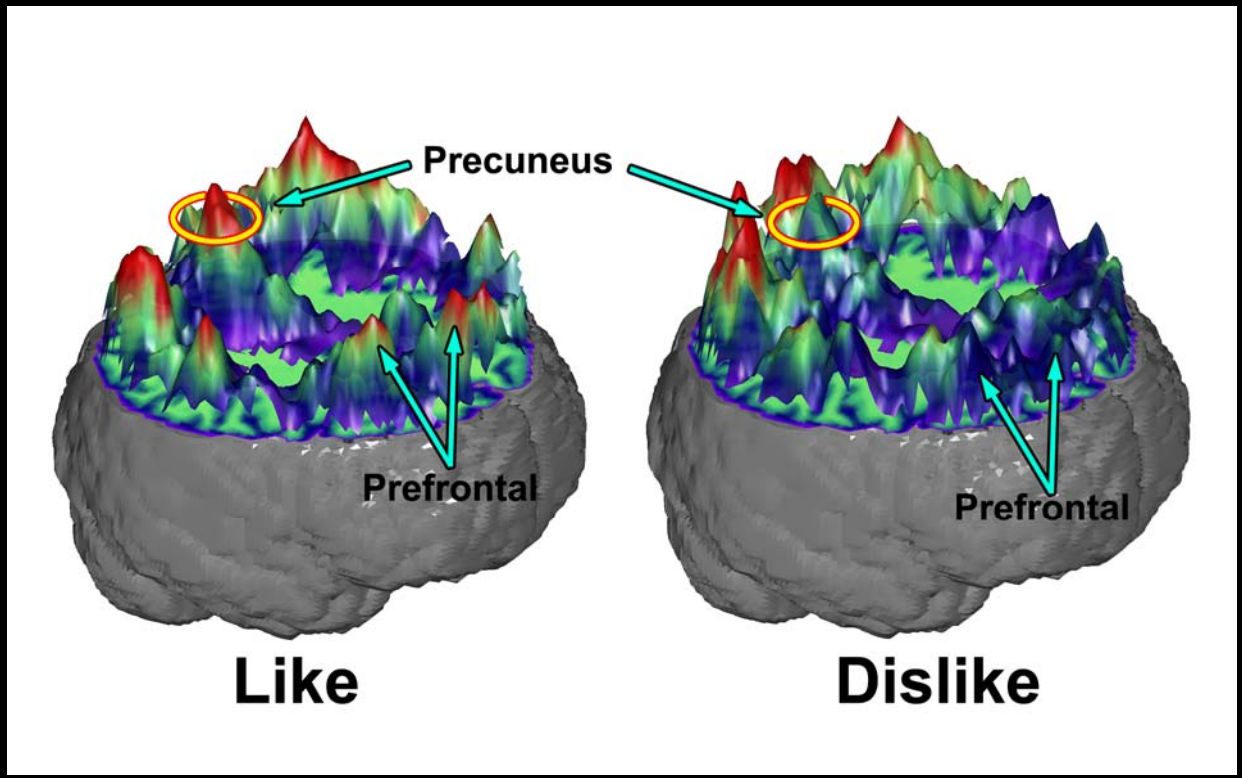
Degree



Preference Community Structure



Preference affects *Connectivity*

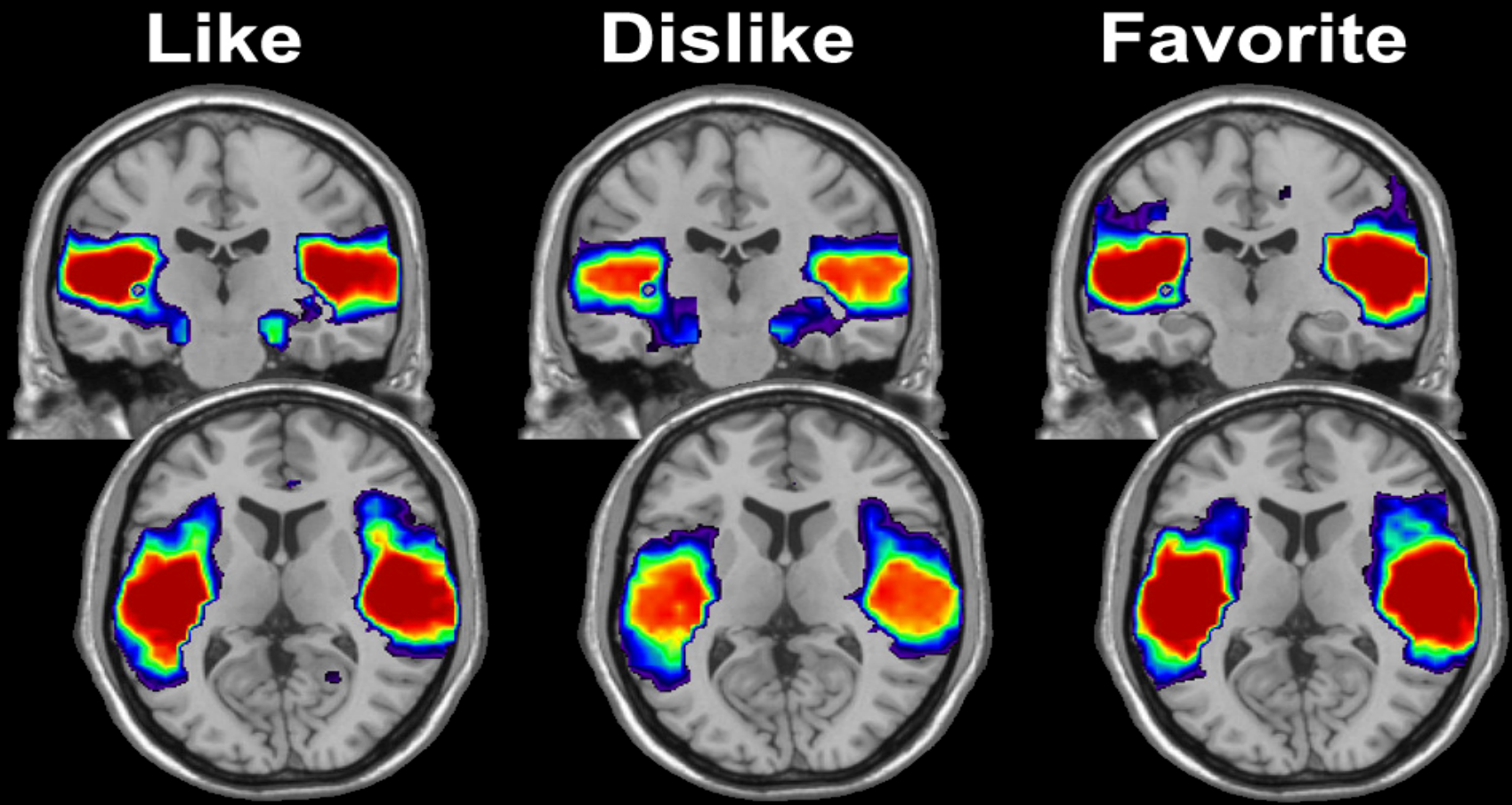


In the Brain

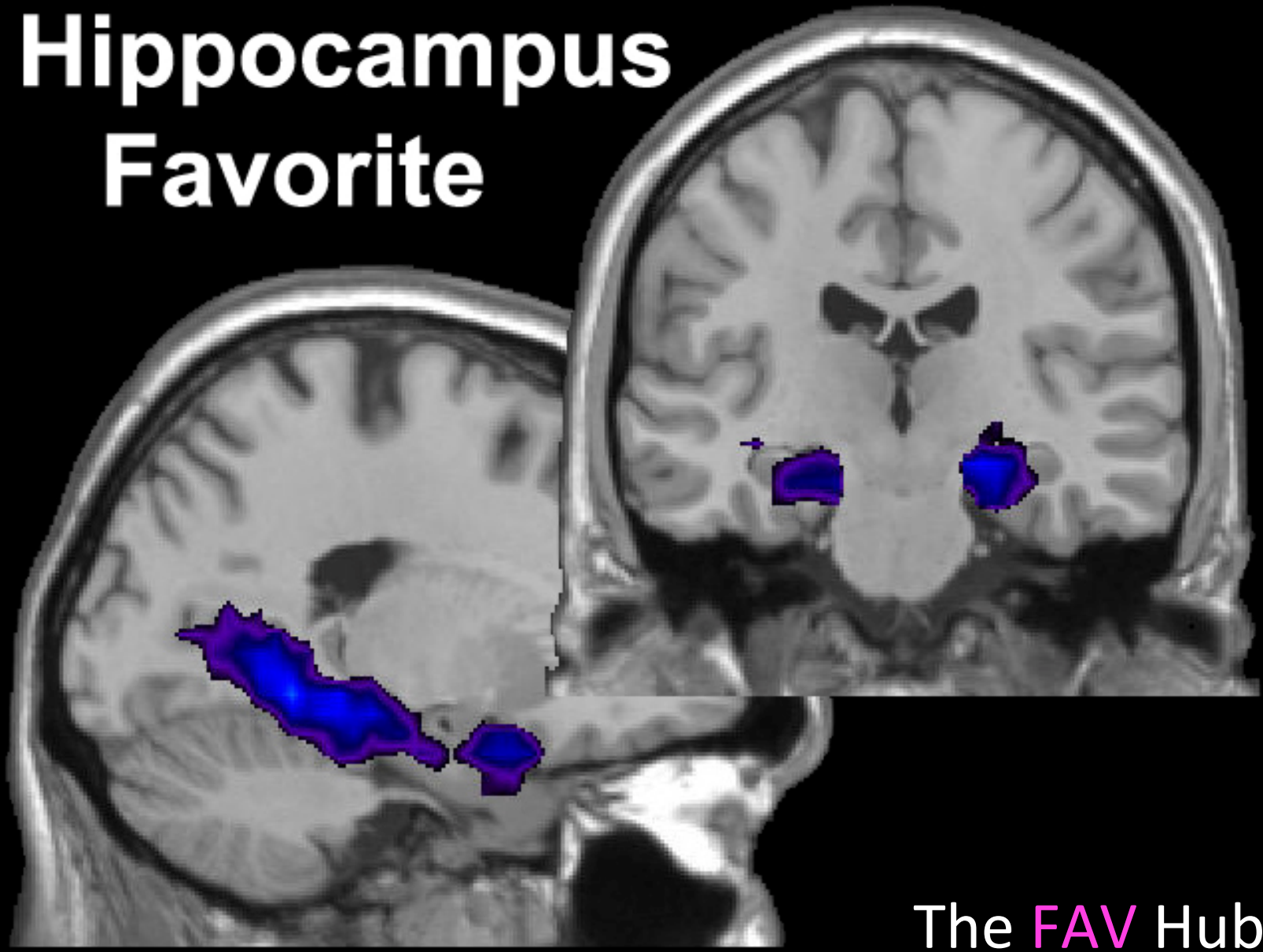
The FAVORITE

Songs Individually Unique
Brain Connectivity Response Similar

Preference & Auditory Hubs



Hippocampus Favorite



The FAV Hub

New Highlights from *Network Science*

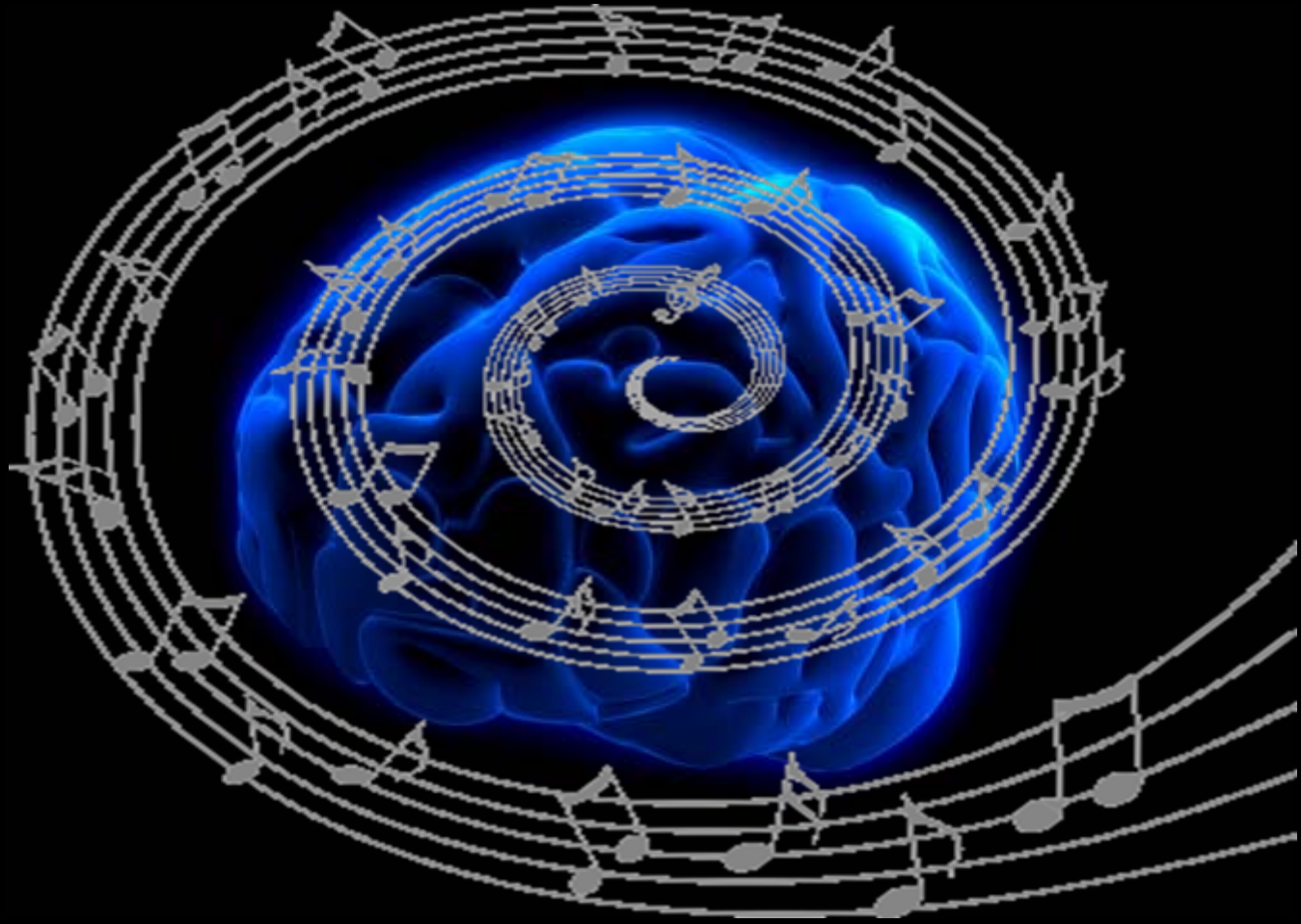
Music Preference *affects* Community Structure

Hippocampus Processing of Short Term to Long Term Memories The FAVORITE

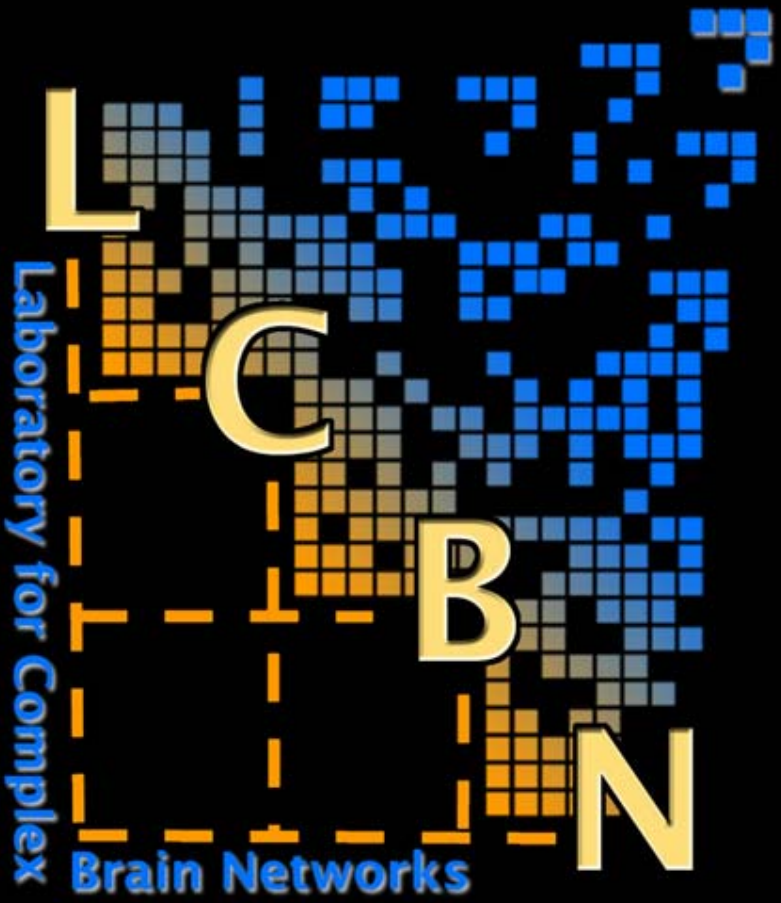
DMN Reprocessing of Memories, Introspection, Daydreaming

Like It? Love It? Hate it?

Music Preference affects Connectivity Between Regions in the Brain



Which in turn Changes the Brain's System:
Community Structure



To understand the brain as a complex system through the application and development of network science methods

Acknowledgements

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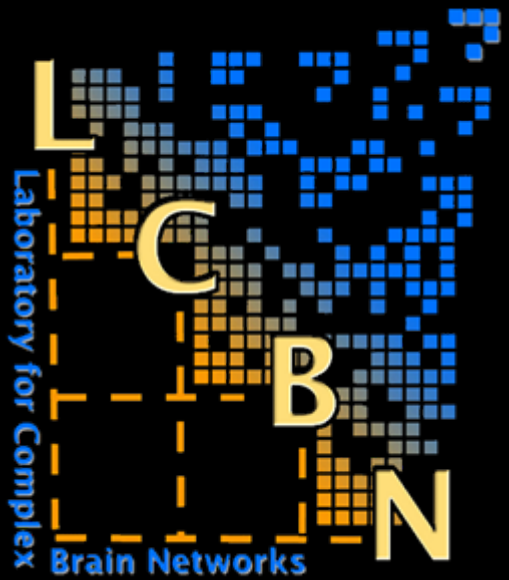
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