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

Resting state
...the brain At Rest

Introspection
What’s *Music* Got to Do With It?
Why Network Science?
Music and Brain Complexity

- Emotion
- Auditory
- Cognition
- Visual
- Perception

MUSIC
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)

Adjacency matrix

Correlation matrix

Threshold

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 5\textsuperscript{th} Symphony Mvt I

**Country**: Brad Paisley, Water

**Rap/Hip-Hop**: Usher, OMG

**Unfamiliar**: Chinese Jinna Opera Band

Plus the **Favorite Song**: *person-specific*
Six Degrees of Love and Hate: *Music Preference*

Any Song
Any Genre
Lyrics or No Lyrics
Default-Mode Network
Preference affects *Connectivity* in the Brain
The FAVORITE

Songs Individually Unique

Brain Connectivity Response Similar
Preference & Auditory Hubs

Like

Dislike

Favorite
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
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