

# Timbral Salience

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Computational Musicology  
Fall 2018

# What is salience?

- Salience is the characteristic of being able to stand out
- It is correlated to the ability to garner an observer's attention

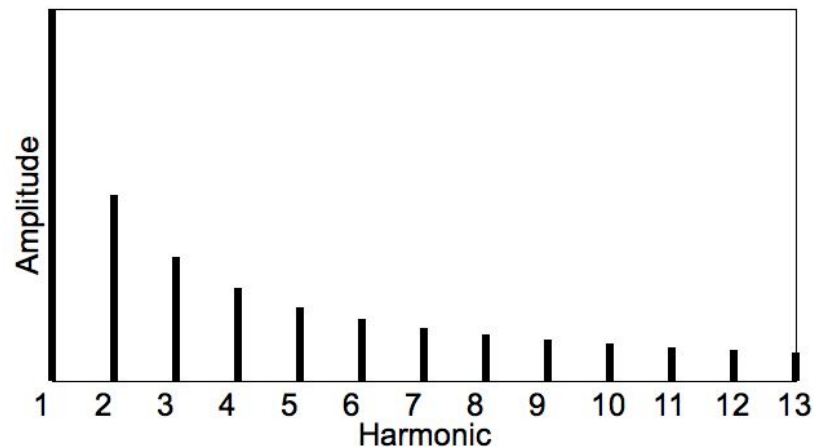


## Three Candidates for Saliency:

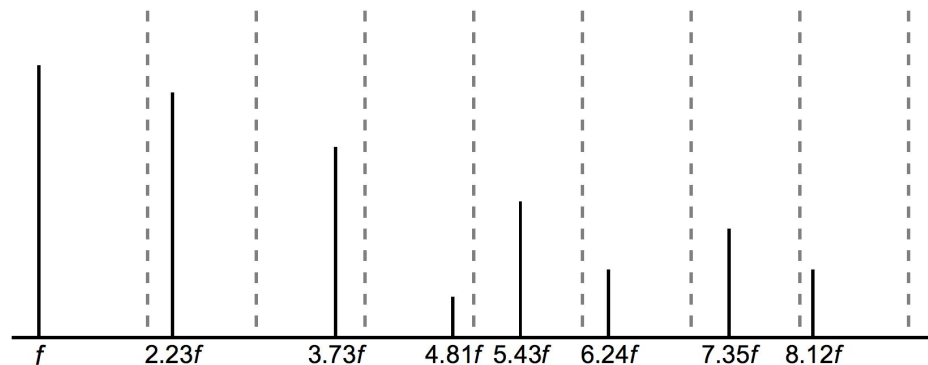
- Inharmonicity
- Odd-to-Even Harmonics Ratio
- Spectral Flux

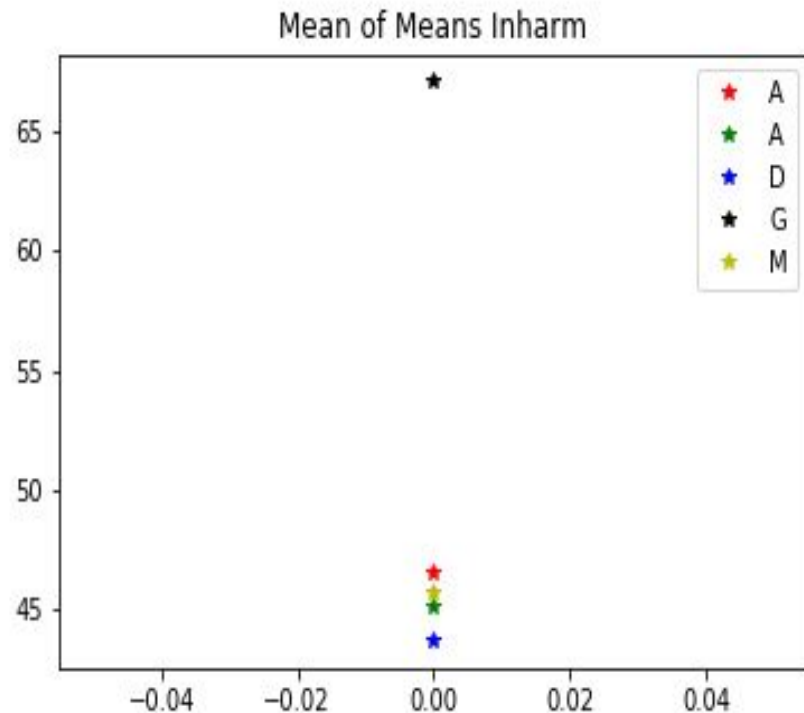
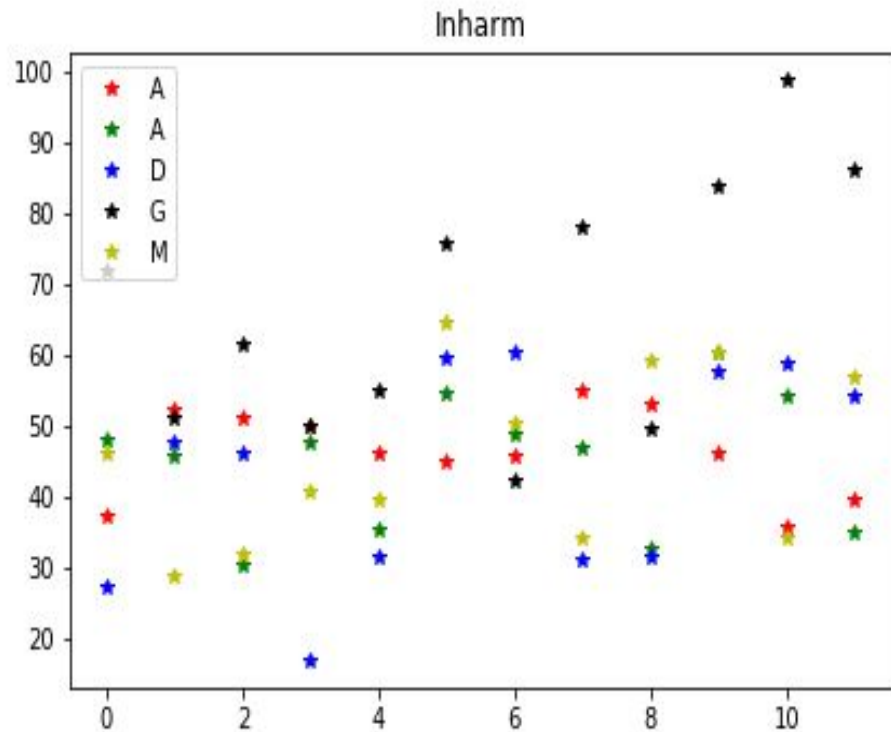
# Inharmonicity

Scale from “purely harmonic”



To “pure noise”

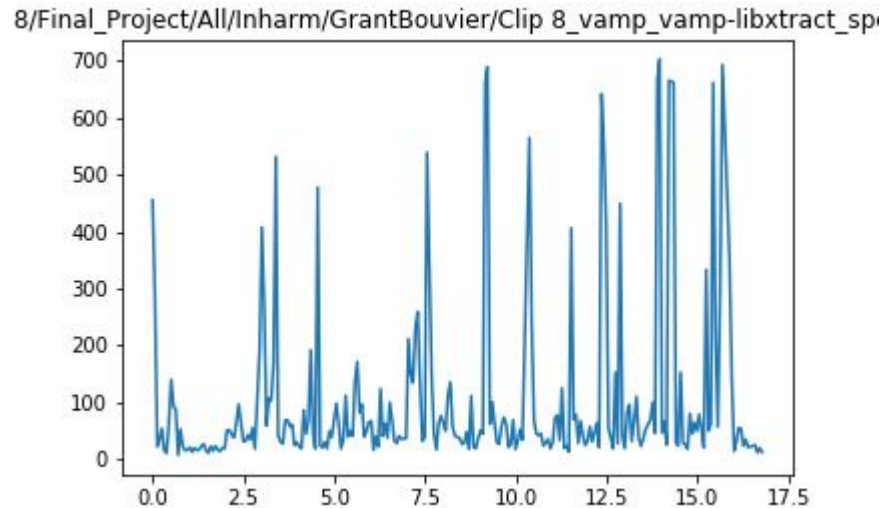




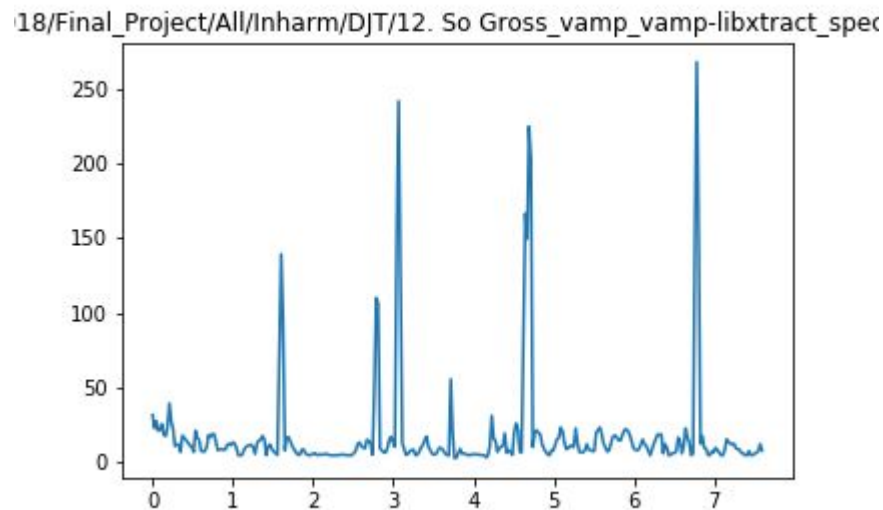
Using Libxtract Inharmonicity, 1024 x 1024

# Inharmonicity

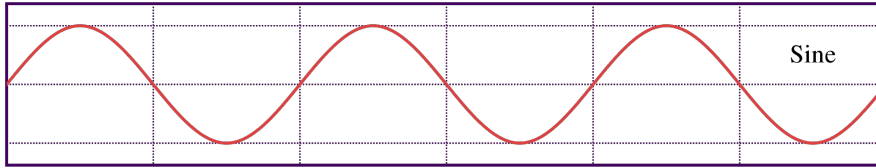
Most Inharmonic: Grant Bouvier, So  
Maybe It's True



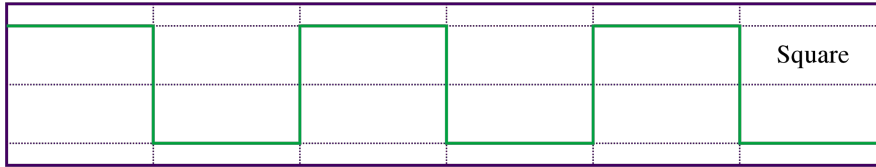
Least Inharmonic: DJT, So Gross



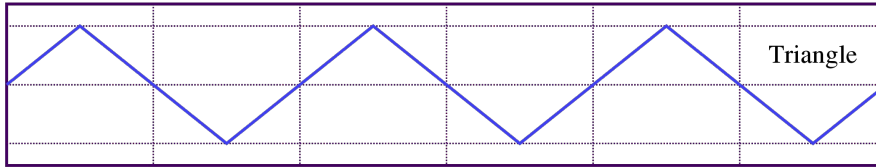
# Odd-to-even Harmonic Ratio



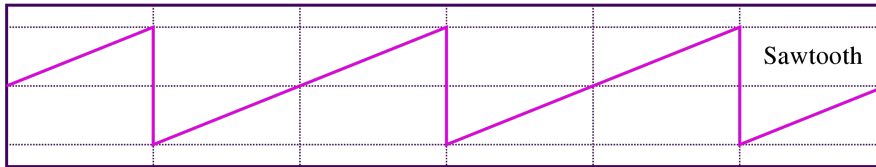
No Harmonics



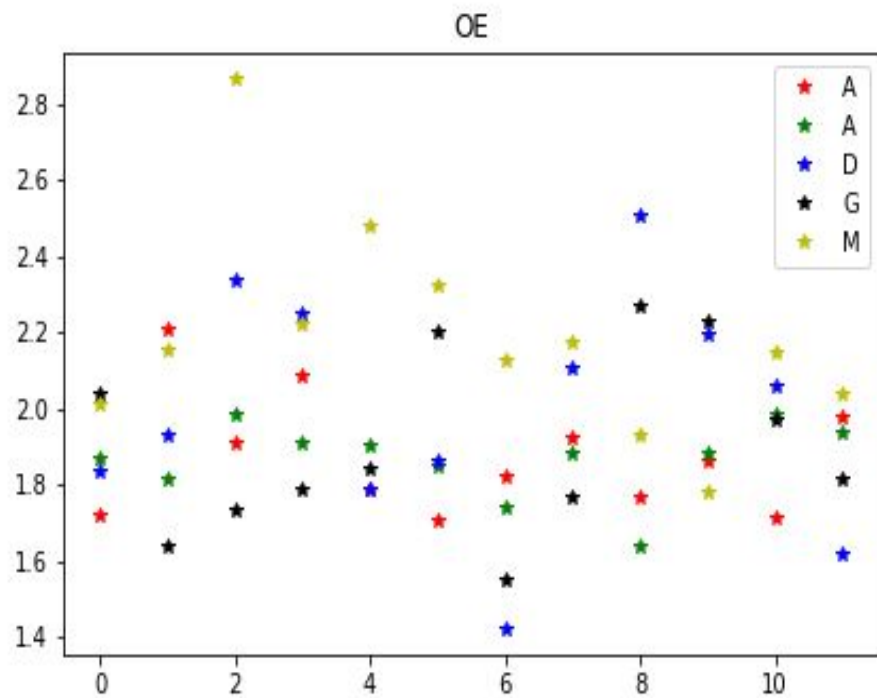
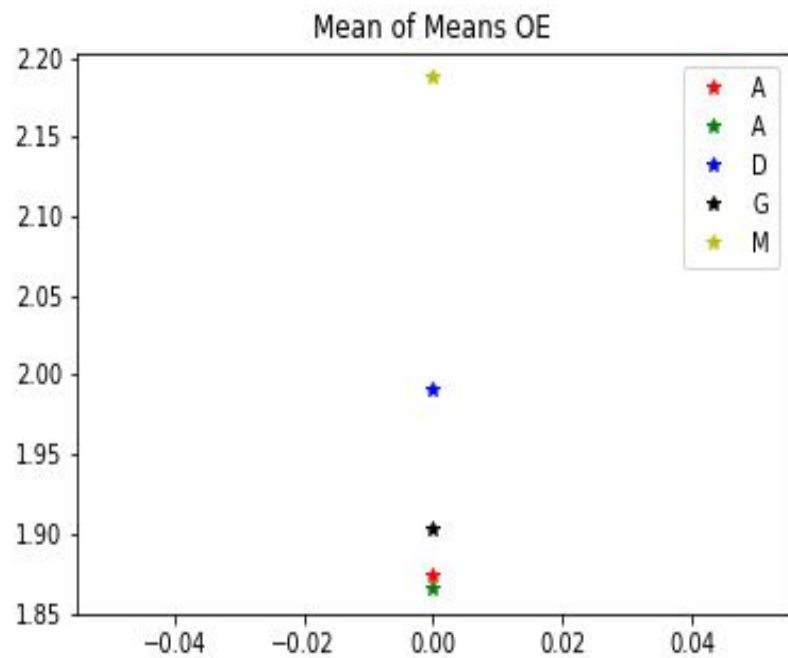
All Odd



All Even



In the Middle



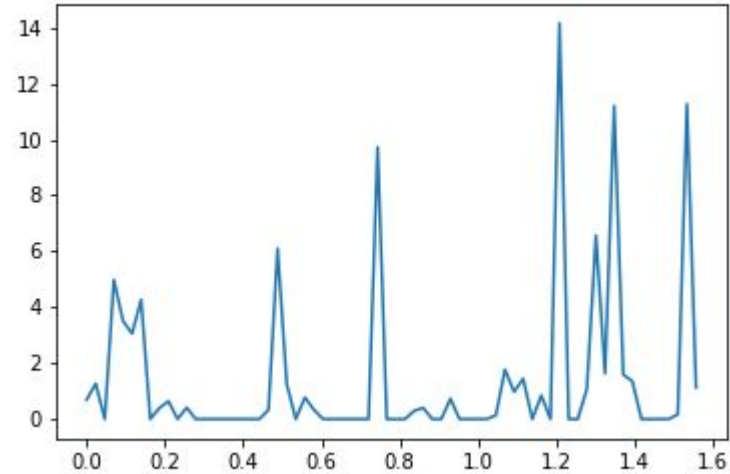
Using Libxtract Odd-to-Even Harmonic Ratio 1024 x 1024



# Odd-to-Even Harmonics Ratio

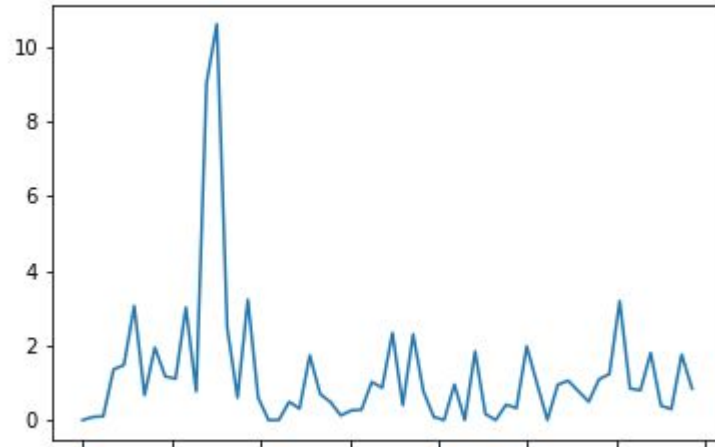
Highest Ratio: MW, Brexit is Brexit

isFall2018/Final\_Project/All/OE/MW/Brexit Is Brexit\_vamp\_vamp-libxtra

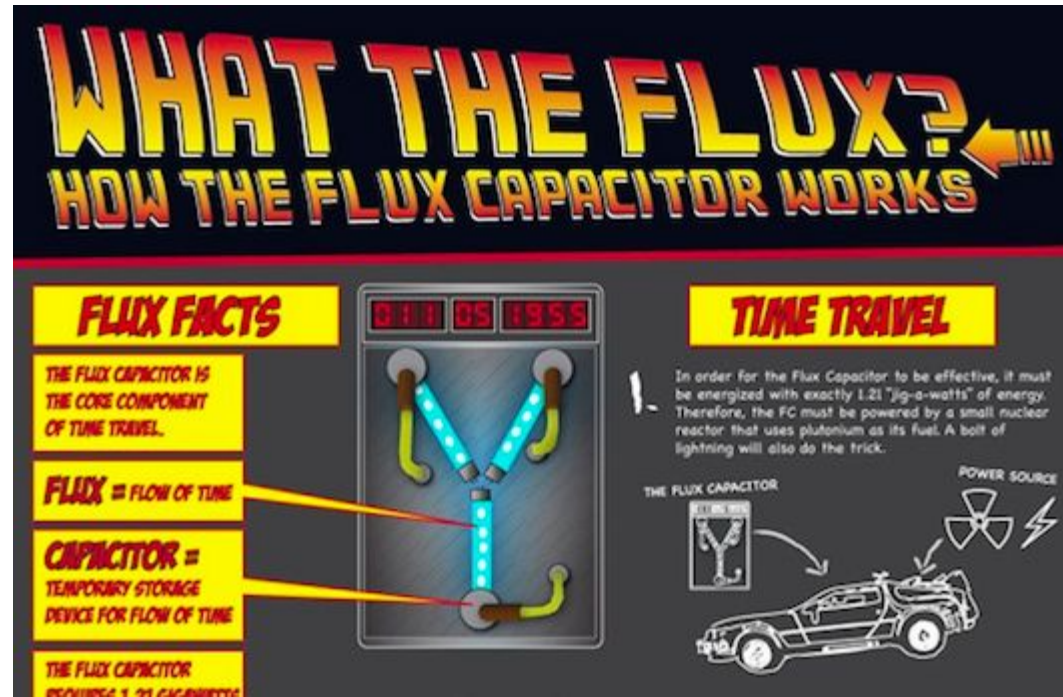


Lowest Ratio: DJT, Brexit is Brexit

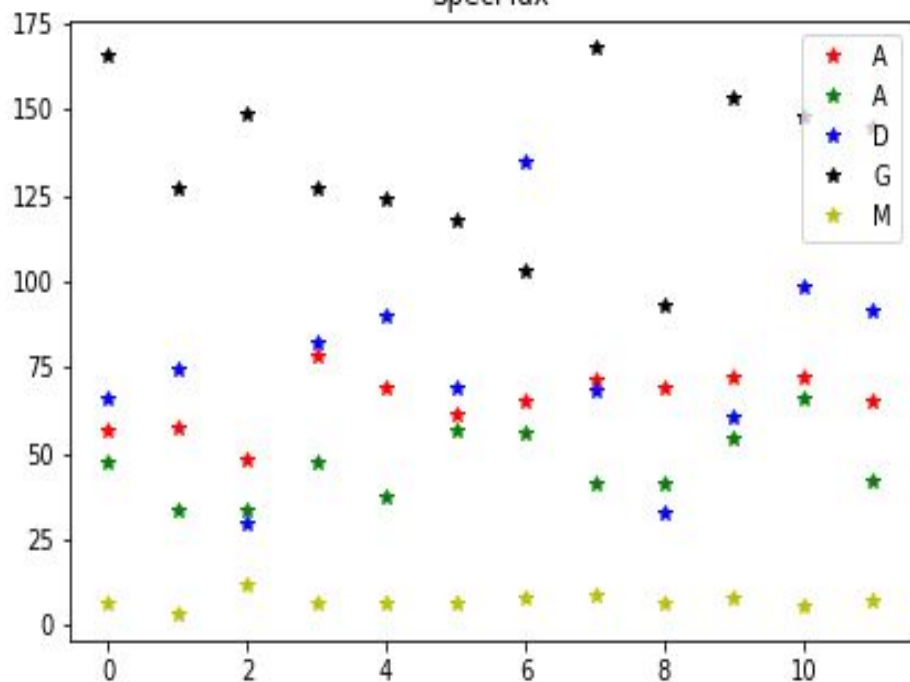
isFall2018/Final\_Project/All/OE/DJT/4. Brexit Is Brexit\_vamp\_vamp-libxtra



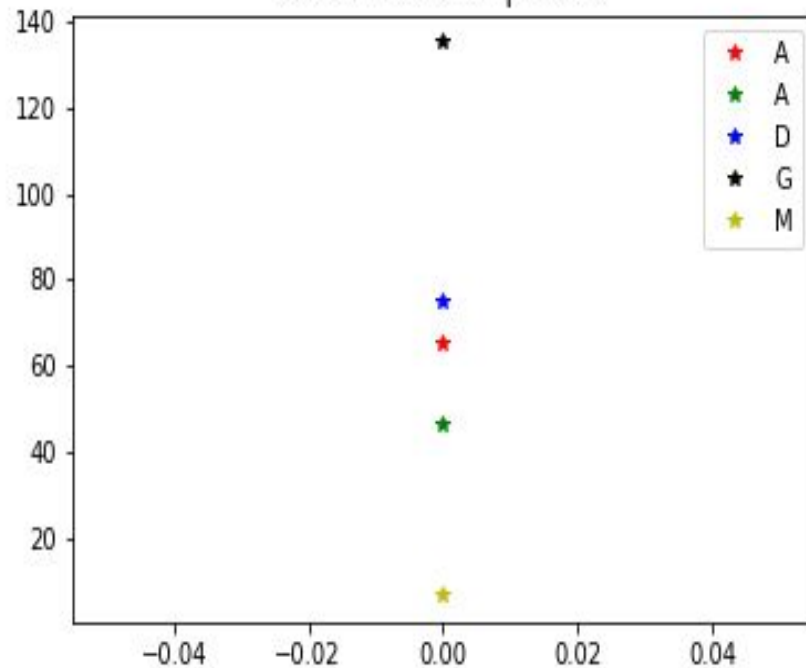
**Spectral flux** is a measure of how quickly the power spectrum of a signal is changing, calculated by comparing the power spectrum for one frame against the power spectrum from the previous frame



SpecFlux



Mean of Means SpecFlux



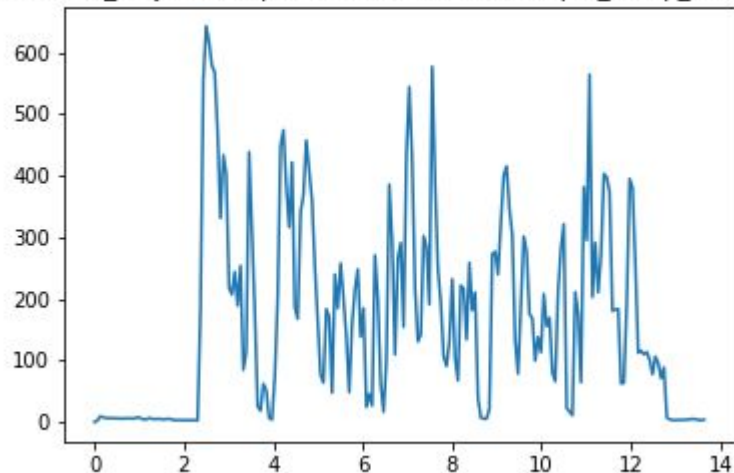
Using BBC Spectral Flux, 1024 x 1024

# Spectral Flux

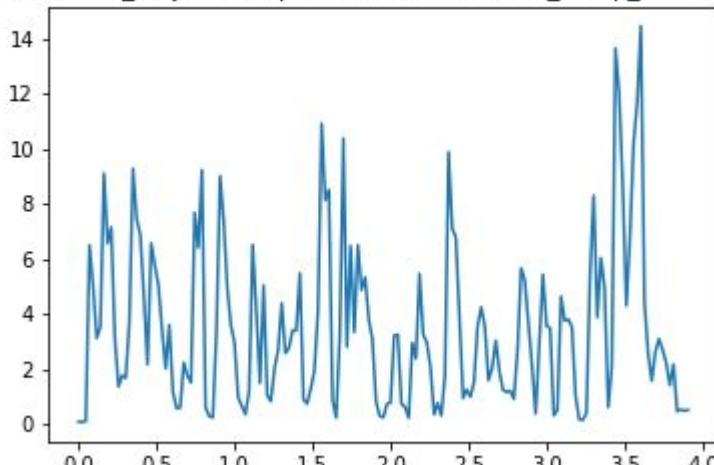
Most Fluctuating: Grant Bouvier,  
Wind Causes a Lot of Problems

Least Fluctuating: MW, They Put  
They're Bad Ones

all2018/Final\_Project/All/SpecFlux/GrantBouvier/Clip 5\_vamp\_bbc-vamp-



sFall2018/Final\_Project/All/SpecFlux/MW/Bad Ones\_vamp\_bbc-vamp-plu



# Overall Inconclusive

1. Microphones could be playing huge part (duh)?
2. Maybe these descriptors are not right/not enough?
3. Future option (unlikely) use Deep Neural Networks to find the features that are important



Lisa R. Welp, Ph.D.

# Why this project?

Deeper understanding of sound shapes  
using harmonic and time-based  
descriptors



Acoustic optimization and  
site specificity



sounds that conform to the  
shape of their  
transmission/reception  
vessels



HUH>>>>>>??????

# For Example

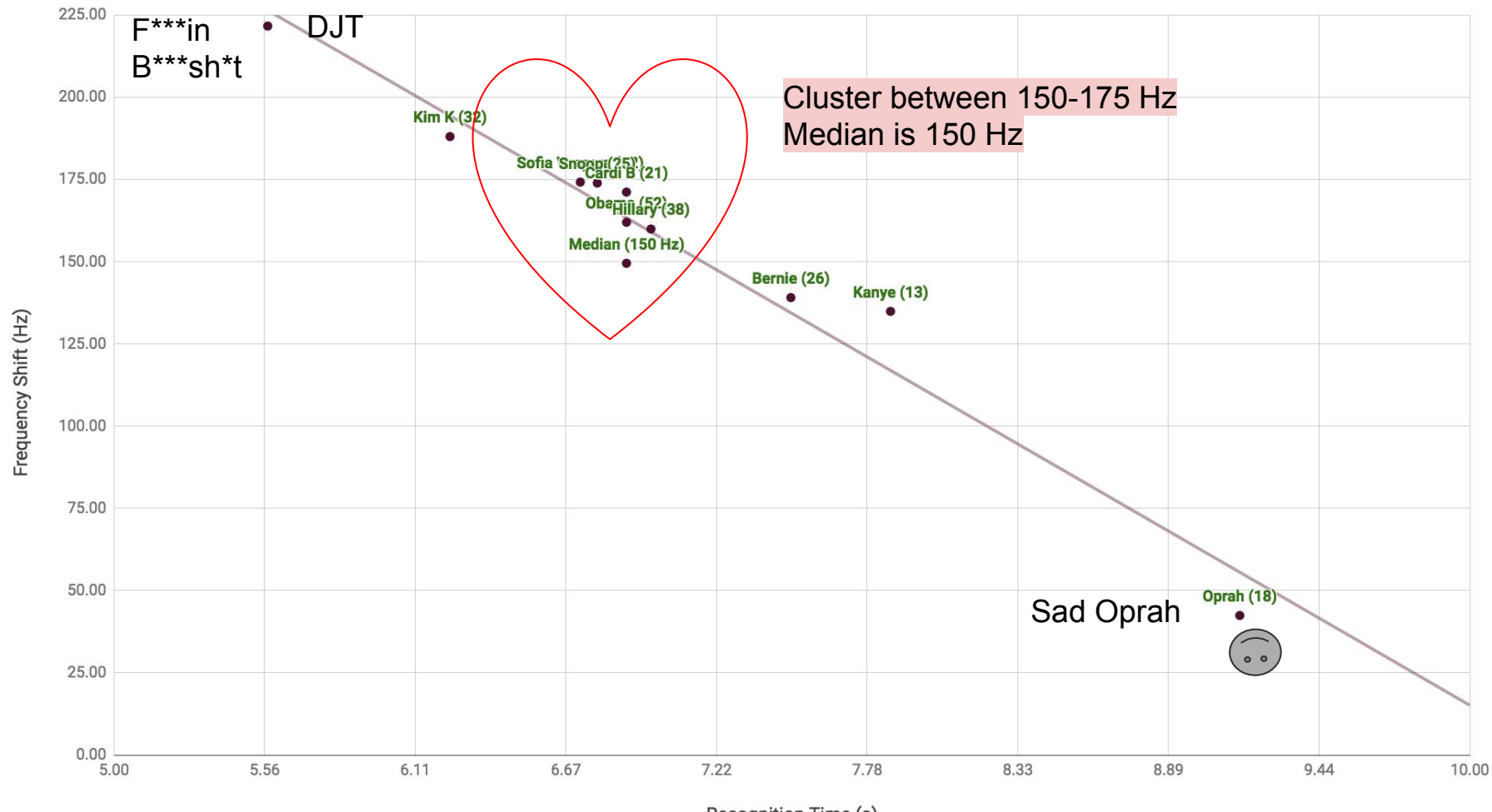
Attention = unit of success in the  
'evolutionary scale' of a media ecology

Therefore greater salience could lead to  
garnering more attention, and therefore  
greater proliferation of your content





Frequency Shift (Hz) vs. Recognition Time (s)



# Media Memory

Spend so much riding the river of sound bites and analysis

Wanted to spend some time just encountering DJT speaking at full length, to find some quotes that maybe wouldn't be making headlines and to bring back some horrifying "hits" we might have forgotten



# A more positive example!

Hoping to use these techniques  
to look at how birds evolve their  
songs to work well in their  
habitats

