MUSICAL EVIDENCE FOR SYLLABIFICATION OF HIGHLY MORAIC STRUCTURES IN ENGLISH

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INTRODUCTION AND HYPOTHESES

- The purpose of this study
  1. Look at the representation of diphthong + liquid rime constructions in American English by musical artists
  2. Exploratory study of the use of music as a method to determine speaker representation
- Hypotheses
  1. There will be two separate groups of artist– those who produce two (or more) pitches per rime and those who only produce one.
  2. This study will provide evidence that musical text setting is a justifiable method of inferring speaker's linguistic representation without eliciting explicit judgements.

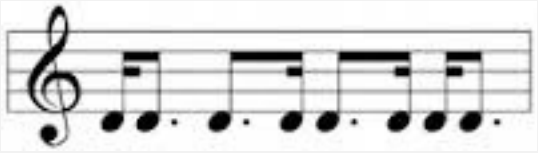
EXAMPLES

- Ingrid Michaelson "Fire"

- Conor Oberst "Hundreds of Ways"

LITERATURE

- Previous work in metrics has assumed correlation between syllable and musical pitch
  - Dell & Halle (2005)
    - Stressed syllable→ strong metrical position
    - One to one correspondence between musical note and syllable
- Linguistic rhythm has a direct effect on the musical rhythm in different European languages
  - Temperley & Temperley (2011):
    - Distribution of scotch snap across IE languages
    - Tentative evidence that linguistic rhythm does affect musical form



- Inference of linguistic behavior from music at the language-specific level
  - Sui (2013)
    - This study conducts text setting experiment in Standard Chinese to investigate how syllables are aligned to the rhythmic patterns in music

METHODS

Data was gathered from 12 American singer-songwriters, each of whom composed and sang their own songs:

- Ben Folds
- James Taylor
- Ryan Tedder
- Beck Hansen
- Ingrid Michaelson
- John Mayer
- Billy Joel
- Bruce Springsteen
- Suzanne Vega
- Conor Oberst
- Bob Dylan
- Stevie Wonder

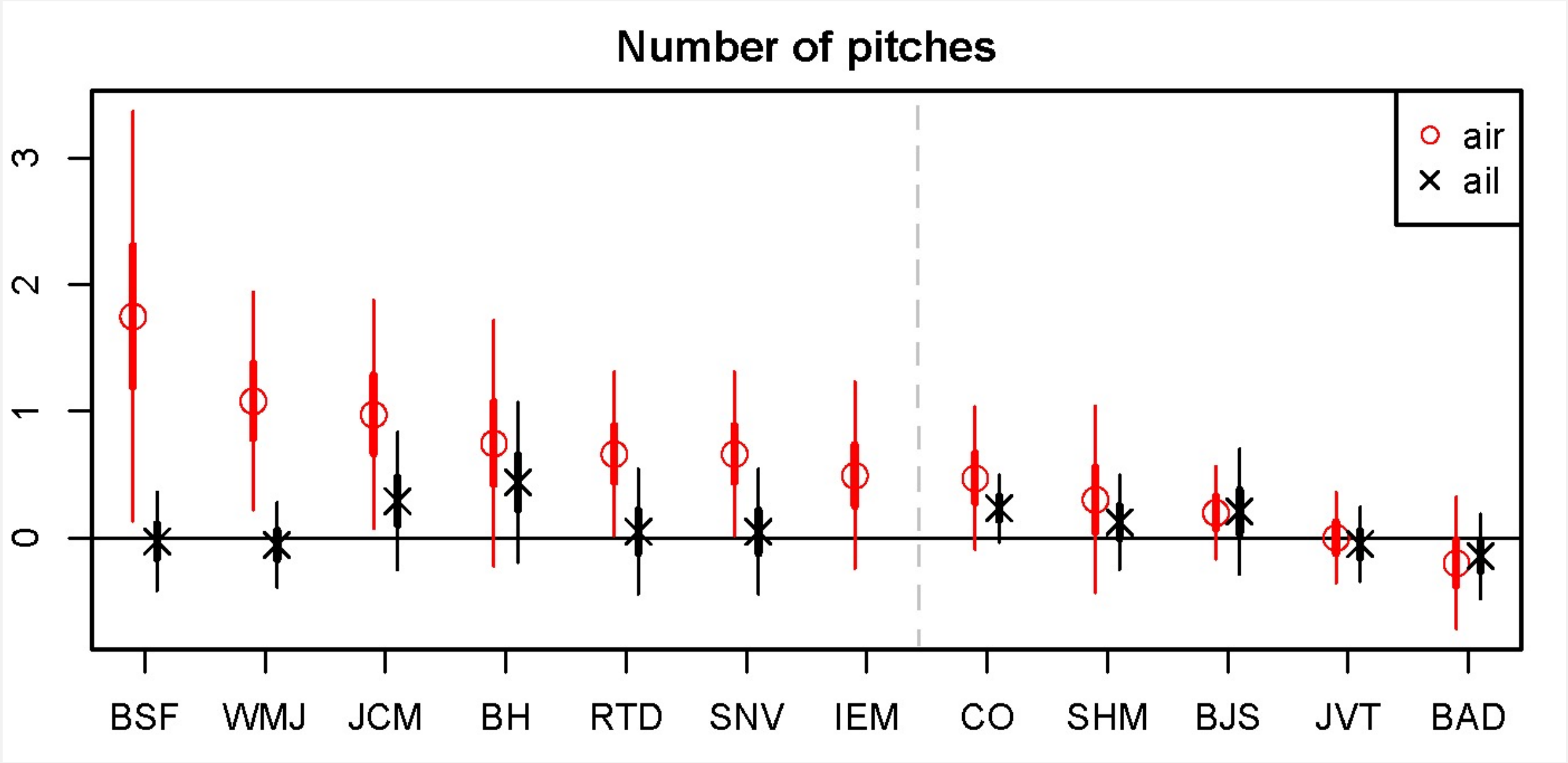
METHODS

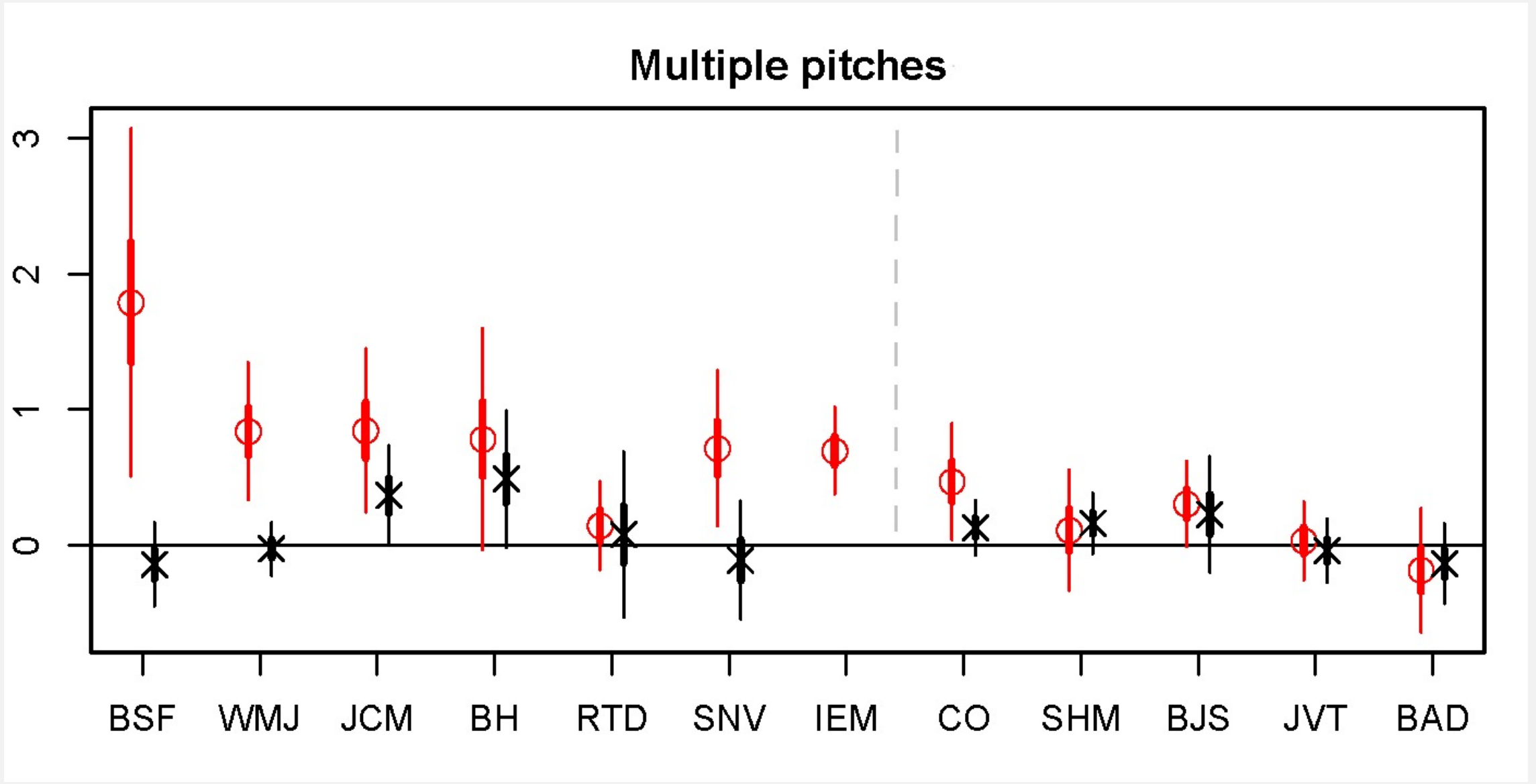
- The words that were investigated had stressed final syllables with the following rimes:
  - **[aiɹ] (as in *fire*)**
    - [aɹ] (as in *far*)
    - [al] (as in *fall*)
    - [ain] (as in *fine*)
  - **[ail] (as in *file*)**
    - [iɹ] (as in *fear*)
    - [il] (as in *feel*)
    - [aim] (as in *time*)
- Polymorphemic words and contractions were not included in the initial coding
- Two researchers listened to each token to determine how many notes were sung
  - If they had different judgements, the entire research group listened to and discussed the token

RESULTS

Abbreviations for artist names:

- Bob Dylan (BAD)
- Beck Hansen (BH)
- Bruce Springsteen (BJS)
- Ben Folds (BSF)
- Conor Oberst (CO)
- Ingrid Michaelson (IEM)
- John Mayer (JCM)
- James Taylor (JVT)
- Ryan Tedder (RTD)
- Stevie Wonder (SHM)
- Suzanne Vega (SNV)
- Billy Joel (WMJ)


Number of pitches
air
ail
0
1
2
3
BSF
WMJ
JCM
BH
RTD
SNV
IEM
CO
SHM
BJS
JVT
BAD


Multiple pitches
3
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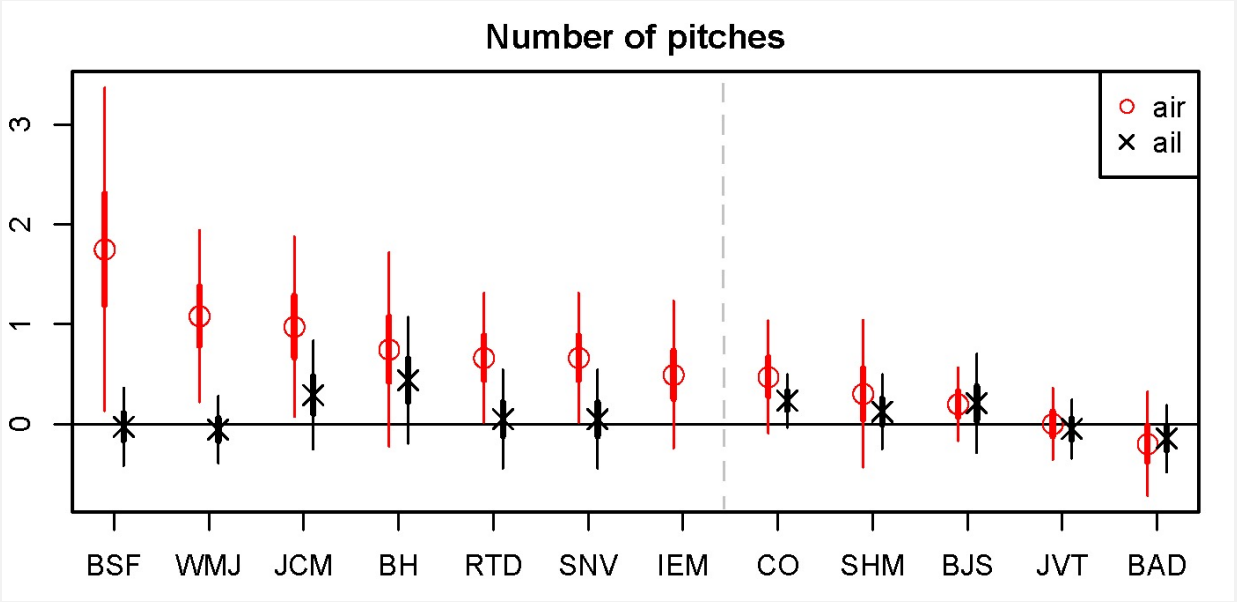
Number of pitches
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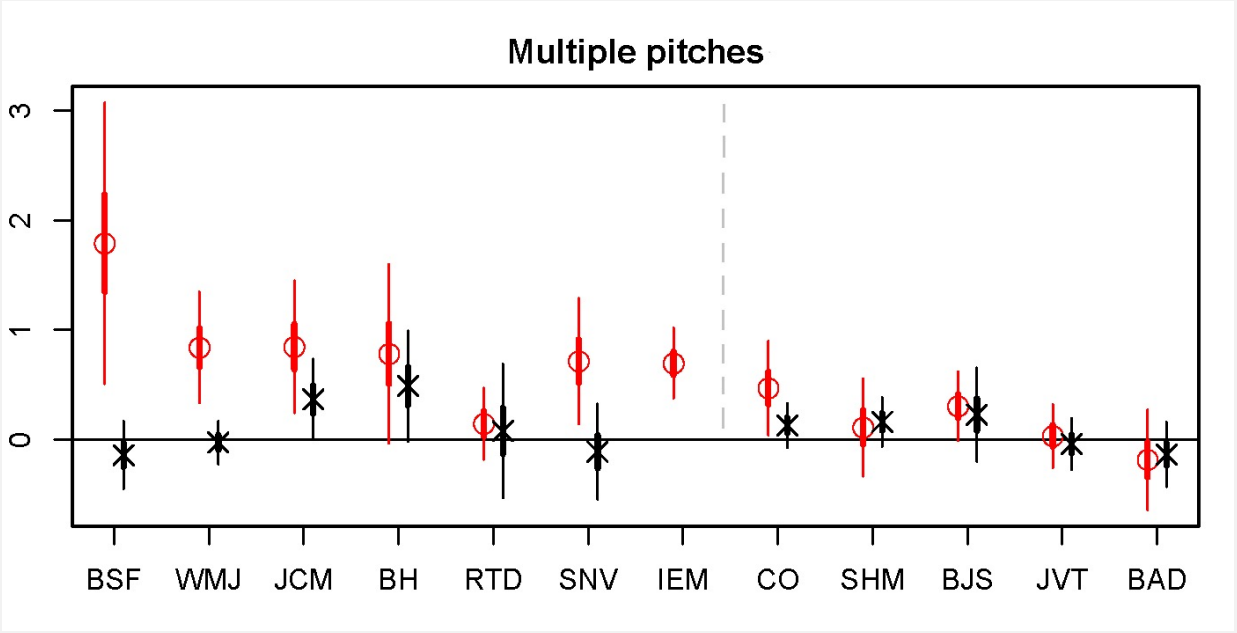
Multiple pitches
0
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3
BSF
WMJ
JCM
BH
RTD
SNV
IEM
CO
SHM
BJS
JVT
BAD

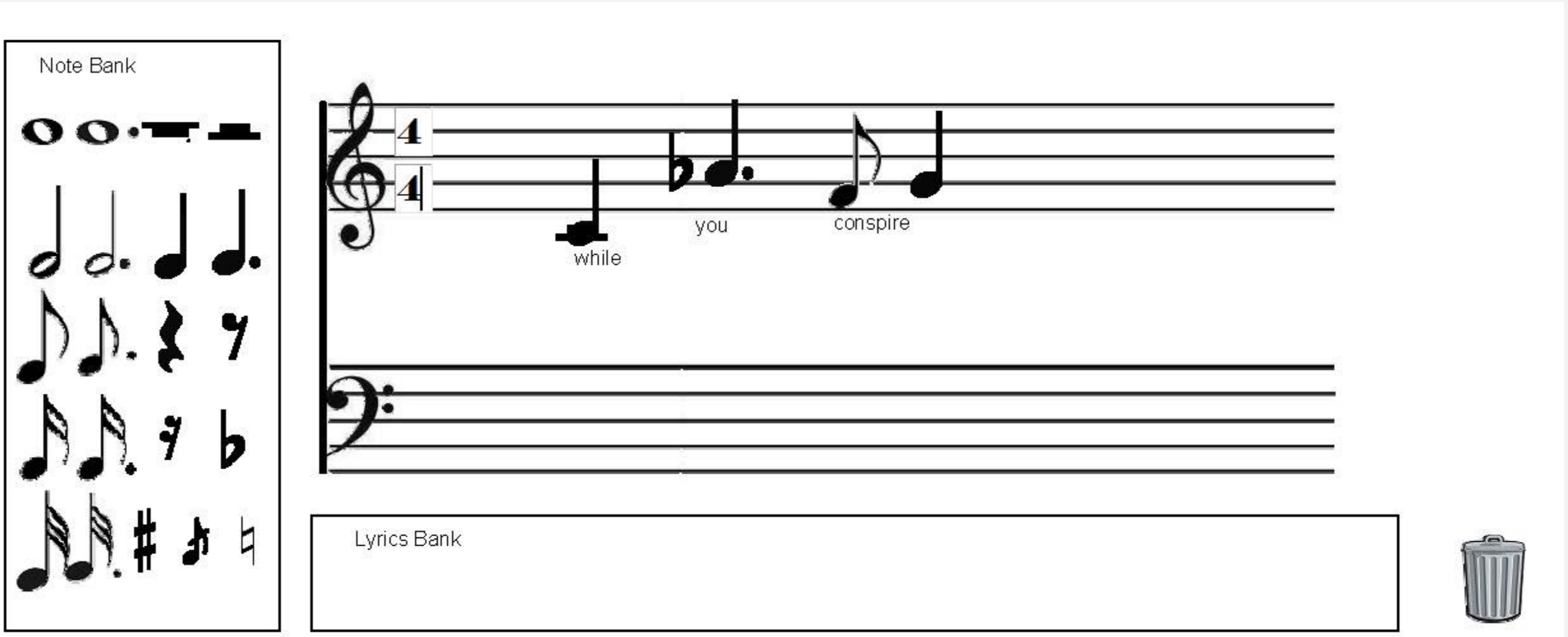
CONCLUSION

- There is a statistically significant differentiation between those people who categorize the diphthong + liquid rime as either one or two syllables
- Of the target rimes, artists were more likely to prefer two pitches for the [aiɹ] rime type than for the [ail] rime type.
- The distribution of pitches in the collected data supports the claim that because English only allows for two moras within the rime, candidate syllables containing more than two moras may be split accordingly (Lavoie, Cohn 1999).
- Impressionistically, artists for whom there was a significant difference in number of pitches, there is also a trend, based in sonority of the coda, of which targets are likely to be polysyllabic.
- Based on the results' concordance with our assumptions, we view that musical pitch is a reasonable estimator of individual's syllabification patterns.

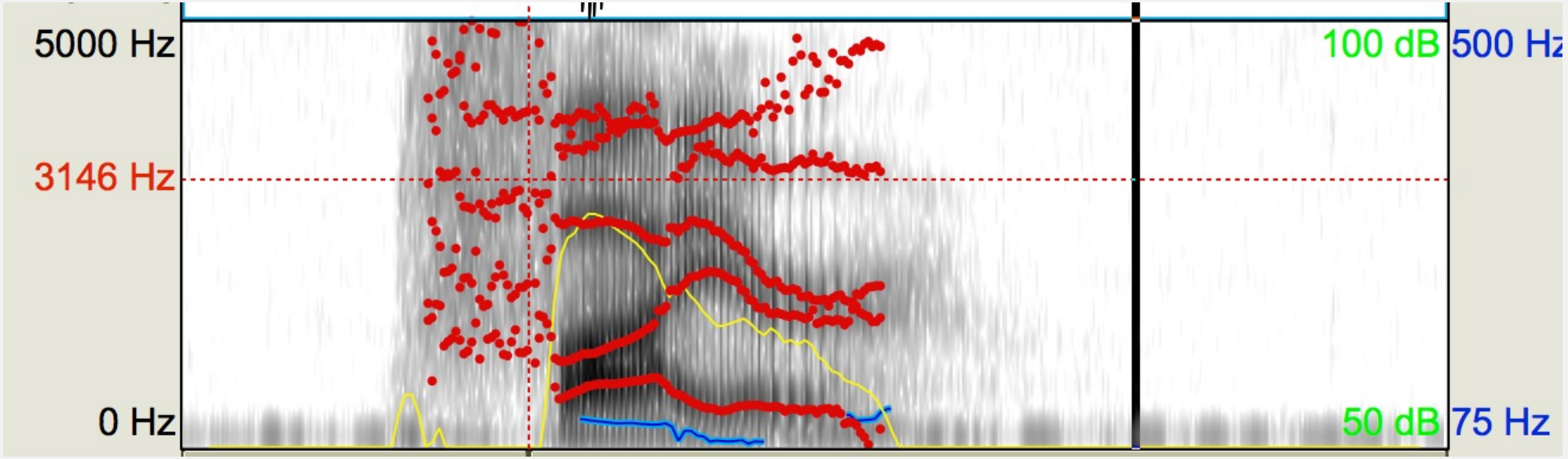
TEXT SETTING EXPERIMENT

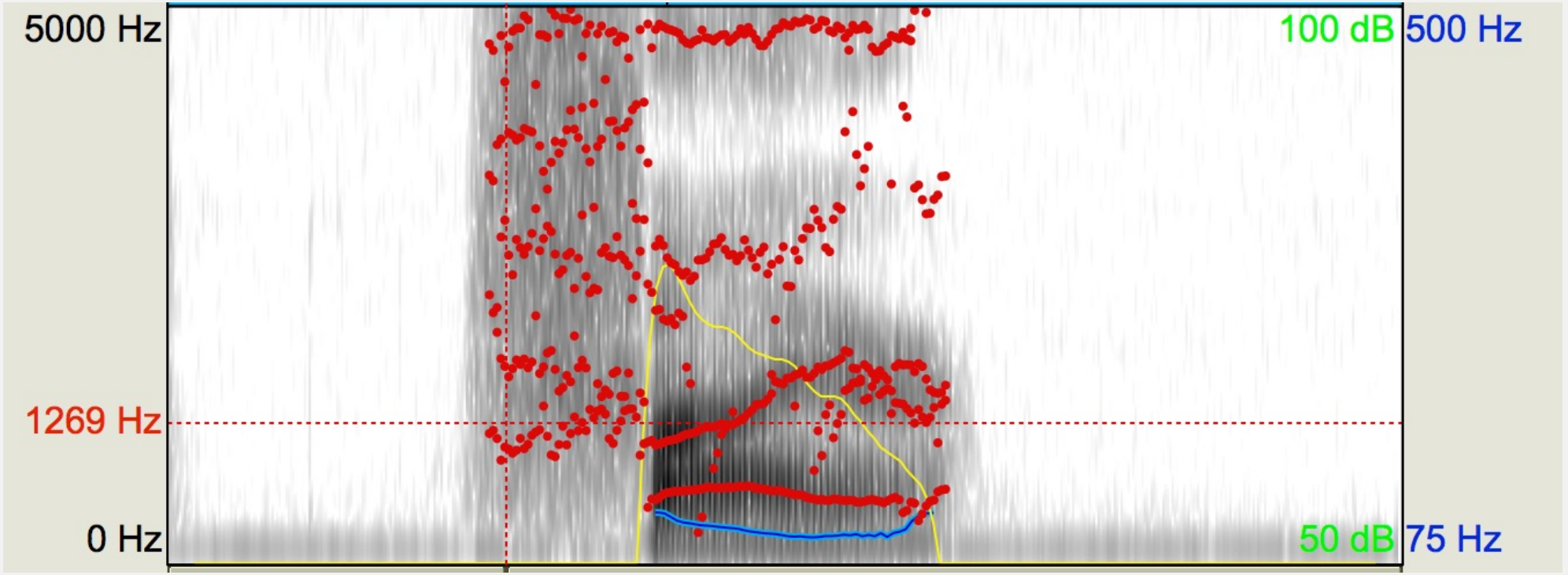
Use of compositional text-setting as a measure of syllabification

- Participants are given lines of text inspired by the lyrics found in our study, and asked to set them to music
- Instead of pitch, count the number of written notes assigned to each word
- Compared to composer's explicit judgement of syllable count
- Production task asked subjects to say each word individually



while: 1,1,1
conspire: 2


5000 Hz
3146 Hz
0 Hz
100 dB
500 Hz
50 dB
75 Hz


5000 Hz
1269 Hz
0 Hz
100 dB
500 Hz
50 dB
75 Hz

POLYMORPHEMIC WORDS AND "WHILE"

- In progress: Further investigation of words excluded from the initial coding
- Part-of-speech pronunciation variations
- Contractions (I'll, we're, I'm, she'll)
- Suffixes (higher, liar)

"While"	Noun	Conjunction		Average Number of Pitches
[ail]	57	8		1.26
[æl]	2	66		1.00

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