Fire Syllables Project Proposal for Undergraduate Research Opportunities Program Spring 2017

Faculty Mentor Department of Linguistics



Statement of the problem/topic of the research or creative work

This research project is looking specifically at the number of pitches that are sung to words that end in [ai1]. While some people may associate a word such as "fire" with one syllable, others may see it as having two. Therefore, the purpose of this research project is to examine the syllable count associated with these rimes and to see whether there is any pattern to the establishment the number of syllables for these types of words.

Some people are unaware or unable to determine the syllable count for these "fire" words; and so, the way we plan to research this topic is by isolating a situation in which people subconsciously divide their words into syllables - musical text setting. By looking at music written and sung by an artist we are able to analyze these specific rimes to see how many pitches an artist sings on these key rimes, keeping in mind that multiple pitches is directly correlated to number of syllable Since peor her of syllables they rtin the be se associate with a word, this cording to artists' а lore ccura e r orese implicit intuition.

Relevant background/literature review

The exact nature of this project is one that has not previously been investigated by any other researcher. However, the idea that there is a correlation between language and music is not new. Several authors discuss the setting of text to music and correlation between linguistic stress, syllable boundaries, and metric beat. The following articles examine the alignment of linguistic text to melodies. In their article, François Dell and John Halle examine the correlation between linguistic stress and strong musical beats (Dell & Halle, 2005). After analyzing data collected through several corpora of sheet music in English and French, they conclude that languages in which stress is more salient are more likely to have stricter requirements for the placement of

words in music. Therefore, languages such as English that are more stress-timed than syllabletimed are more likely to have stricter rules that require accented syllables to be matched to strong musical beats.

On the other hand, Nicholas Temperley and David Temperley discuss whether cultural influence in language affects music. In their article, "Music-Language Correlations and the Scotch-Snap", they look at the rhythmic pattern called the Scotch Snap (a sixteenth-note on the beat followed by a dotted eighth-note) that exists primarily in English and Scottish music and is "virtually non-existent in Italian and German songs" (Temperley and Temperley, 2011). They examine the possibility that this specific rhythm might exist only in these countries due to the linguistic structure of English and Scottish.

However, the last two authors below explore what musical behavior can reveal *about* language. Alison ray discuss glish by looking at rly node usa the pronunciation f mode εE ı F glish time period (Wray, S gers f m sic f om tl rly M de 1999). The author believes that looking at current issues pronunciation of these two phonemes could lead to understanding of the pronunciation of these words in the past. The author researches this claim by listening in on live rehearsals of BBC Singers. Yanyan Sui also discuss the specific correlation between syllable timing and Mandarin Chinese. She discusses the correlation between accented tones and strong metrical beat in her dissertation "Phonological and Phonetic Evidence for Trochaic Metrical Structure in Standard Chinese". For this project, she collects data by having participants listen to a recording of the song Hóng Hé Gǔ (Red River Valley) and then providing them with sentences and telling them to sing the sentences to the same tune. Sui would then go through and see how the subjects chose to set the text to the music.

The overall finding in Sui's research was that stressed syllables are aligned to stronger beats in music.

As can be seen, the amount of literature in this area is quite prolific. One specific idea from all this previous research that is important for this project is that each prior literature assumes, by default, that each syllable is, in fact, associated with one note/pitch, which serves to create a solid foundation for this research. We will be utilizing this same concept that Sui and Wray used to see how people subconsciously categorize their own language. Similar to Sui's methodology, we will be looking at how artists choose to set their lyrics to music in order to discover their underlying perception of syllable boundaries in words ending in [ai1].

Specific activities to be undertaken and a timetable allotted for each activity

May - December 2016: Previous Work

This project rgraduate students involves th othe bor wo and the faculty mettor. The r, we've already begun out t is p st su nmei and sprin se es laying a solid foundation for this project. To begin the project, we decided on our method of coding artists, read several articles regarding this topic in the field and have discussed the methodology in the articles and its relation to our project, and have even already begun coding artists and will be finishing up a total of 8 artists - two artists for each person, with about 500 tokens for each artist, by winter break.

January - February: Data collection from artists

We collect data by first finding a musical artist who fits the criteria established for this project. The artist must be born and raised in the United States in order to make sure that the results of the data are from an artist whose first language is American English as there are other varieties of English that drop "r's" in codas which would interfere with our collection of [aiɪ]

words. And, the artist must sing and write their own music so that it is a legitimate representation of the singer's speech patterns. The next step is to collect the lyrics for all the songs the artist has written and performed, find the token words containing the desired rimes, then code them accordingly. We decided to code words ending in [ail], [ain], [ain], [aɪ], [aɪ], [al], and [il] too as comparison to words ending in [aiɪ]. For the coding process, each person must listen to the music of their artist and listen for the token words. For each token, we list the token number, target nuclei and codas, the artist's abbreviated name, the tokens' time in the song, whether or not the token is a repeat from a previous token in the song, and any other comments we might have regarding the token.

The data is collected in spreadsheets for each person and for each artist. The amount of data required to provide an adequate pool of target tokens is about 500 tokens per artist, and three artists per per on. The ave kens for one artist mo equ col ct ch ar st is takes two weeks. **I**hch set od d twi r to ensure accuracy in Ft cens j r e ir ord coding. After coding one's own artist, we are assigned a econd set of data containing the data from the other collaborators artists and must code this as well. This takes another week. After all the artists have been coded twice, we must come together as a group and collectively resolve any coding disagreements. This can take up to 2 or 3 weeks depending on the amount of coding disagreements. By the end of February each of us will have coded 3 artists, with a total of 12 artists and around 6000 tokens. This will give us the necessary foundation to begin data analysis. March - May : Data Analysis

After the data is collected, it will be analyzed to answer several different questions. Utilizing the statistical programming language R we are can analyze the data according to several different factors such as artist's age, place of birth, and change in tokens over time. This will

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allow us to answer some specific questions we have. Are there artists who clearly treat "fire" as a one-syllable or two-syllable word? Are older artists more likely to have two-syllable "fire"? Is there evidence that the number of pitches sung to "fire" words can change over a person's lifetime? Is the part of speech of a word a determining factor in the number of syllables in a word? There are many questions that we can answer through this project as well as opportunities to expand on this research. According to our preliminary data, there already seems to be some evidence that some artists consistently sing "fire" with one pitch or two pitches. Two of the artists we have coded have given promising results. Ingrid Michaelson seems to consistently sings "fire" words with multiple pitches while James Taylor does not show any difference between "fire" words and other words indicating that that his "fire" is only one syllable. After researching these question we will be preparing the results to submit to the 2018 meeting of the Linguistics Societ of America.

Relationship of the propised work to the expertise of the faculty in intor

The faculty mentor is a professor in the linguistic department at the University of Utah whose expertise is in phonetics and phonology. Her research interests include phonetic and cognitive underpinnings of phonological pattern. She also has experience in researching this area and has published several articles analyzing large datasets through use of corpora to research homophony in various languages. She is currently working on this Fire Syllables project as a collaborative research project with three undergraduate students - myself included. My specific contribution to this project involves the collection of data for my chosen artists as well as the investigation of some of some specific questions such as the ones listed above. Since we have the advantage of such a large pool of data, I am able to utilize the data set to research any of the questions above that I choose.

Relationship of the proposed work to the student's future goals

The proposed work is relevant to my future goals as I hope to attend graduate school to further study linguistics after my undergraduate career. This project will not only allow me to apply all the theoretical linguistic knowledge I have gained from my linguistics classes to a substantial linguistic research project but will also provide me with a solid foundation in which I hope to build another project off of in the following year. Depending on the results of our research, I may also have the opportunity to learn how to write and submit a research article to an academic journal.

Using statistical analysis and programming is also important to my future goals since I am interested in computational linguistics and theoretical linguistic research. In my undergraduate career I have not been exposed to in-depth statistical research methods; therefore, this project is a perfect opportu tical analysis and uti rien e in tor' rill b propared hat I nd ct more experiments in learn more about the resear h oces SO b d the future. Also, presenting the outcome at a linguistic conference would allow me to learn how to speak about my research in a formal conference environment which will be a great benefit to have when applying for graduate school.

References

- Dell, F., & Halle, J. (2005, April 8). Comparing Musical Textsetting in French and in English Songs. *Typology of Poetic Forms*.
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