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PEDAGOGY OF PITCH IN L2 BLACKFOOT

By

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Approved by:

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ABSTRACT

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Community Health

Pedagogy of Pitch in L2 Blackfoot

Faculty Mentor: Mizuki Miyashita

Pitch in Blackfoot is characterized by the raising of relative pitch on a syllable in a word. Pitch is not a consciously recognized piece of information among native speakers or teachers. However, pitch is important as it impacts the meaning of words. This study looks at the efficacy of visual guides for Blackfoot pronunciation of pitch by second language learners. I hypothesized that use of visual assistance would improve pitch pronunciation in second language learners.

Subjects were nine Blackfoot learners recruited on campus. Participants were shown 15 words with images and asked to pronounce them. Subjects were then given pitch art, a visual tool mapping pitch, and asked to pronounce the words again with the visual aid. The recordings were analyzed in a phonetic program called Praat, and the measurements were inputted and organized in an excel file for further analysis. Their pronunciation was compared to that of a native speaker.

One participants results were deemed unusable due to creaky voice. Results showed four of the remaining eight learners improved pronunciation overall, but the remaining participants did not. Three conclusions were drawn from these results: (i) the immediate use of images without instruction does not significantly improve pronunciation, (ii) complexity and familiarity of words impact second language pronunciation, and (iii) when words are simple and/or familiar, learners perform better with pitch, and when words are complex or unfamiliar learners struggle with pitch. This study contributes to the field of second language acquisition, especially regarding Blackfoot and other languages with pitch. In addition, language in the Blackfeet community plays a significant role in identity and pride, and, as such, speakers desire to sound authentic and as “native-like” as possible. This study hopes to improve education of Blackfoot language and help learners’ pronouncing Blackfoot words.

1. Introduction

Pitch in Blackfoot is characterized by the raising of relative pitch on a syllable in a word. Pitch is not a consciously recognized piece of information among native speakers or teachers. However, pitch is important as it impacts the meaning of words. This study looks at the efficacy of visual guides for Blackfoot pronunciation of pitch by second language (L2) learners. I hypothesized that use of visual assistance would improve pitch pronunciation in second language learners.

Subjects were nine Blackfoot learners recruited on campus. Participants were shown 15 words with images and asked to pronounce them. Subjects were then given Pitch Art, a visual tool mapping pitch, and asked to pronounce the words again with the visual aid. The recordings were analyzed in a phonetic program called Praat, and the measurements were inputted and organized in an excel file for further analysis. Their pronunciation was compared to that of a native speaker.

One participant's results were deemed unusable due to creaky voice. Results showed four of the remaining eight learners improved pronunciation overall, but the remaining participants did not. Three conclusions were drawn from these results: (i) the immediate use of Pitch Art without instruction does not significantly improve pronunciation, (ii) complexity and familiarity of words impact second language pronunciation, (iii) L2 learners of Blackfoot acquire segmental features before supra segmental features. This study contributes to the field of second language acquisition, especially regarding Blackfoot and other languages with pitch. In addition, language in the Blackfeet community plays a significant role in identity and pride, and, as such, speakers desire to sound authentic and as "native-like" as possible. This study hopes to improve education of Blackfoot language and help learners' pronouncing Blackfoot words.

The rest of the paper is organized as follows. Section 2 provides a brief background of the Blackfoot language and pitch, section 3 covers the research question and hypothesis, section 4 covers my methods, section 5 is results, section 6 is discussion, and finally section are conclusions.

2. Backgrounds

2.1 The Blackfoot Language

Blackfoot is spoken in Alberta Canada and Montana by the four Blackfoot-speaking bands belonging to The Blackfoot Confederacy. The Káínai, Aapátóhsipikanni, and Siksiká bands live in Canada, and the Amskáápipiikani in Montana (see figure [1]). The language as a whole is referred to as Blackfoot, however, there are four mutually intelligible dialects and variations of speech within individual bands and dialects (Weber, 2013).



Figure 1. Map of the Bands of the Blackfoot confederacy

2.2 Endangerment and use

According to Statistics Canada (2011) there are approximately 3,250 speakers' worldwide which classifies the language as endangered. The situation of the language is improving with more activism and younger learners. However, the language is still vulnerable and needs continued work to be revitalized.

2.3 Structure

Blackfoot belongs to the Algonquian language family and shares many characteristics with other Algonquian languages. Notably, pitch accents appear in Arapaho (Bogomolets, 2014), Cree (Dyck, C., & Junker, 2010), and possibly others. According to Frantz (2017) Blackfoot has a sound system incorporating pitch accents. A pitch accent is the raising of pitch on a single syllable that is higher relative to the pitch on the rest of the word, and the pitch from the accented syllable gradually drops throughout a word. This tendency of pitch drop is commonly observed in languages and known as declination (Connell 2001).

2.4 Pitch in Blackfoot

Past studies on Blackfoot prosody (sound systems of a language) have found Blackfoot has word melody determined by the interaction between pitch accents and declination (Miyahsita and Fish, 2015). Pitch accents are the raising of pitch on single or multiple vowels relative to the rest of the word. For example, if there is a single accent on the penultimate syllable of word, such as *napiyíni* ‘bread’ then the penultimate syllable has higher pitch than the rest of the word. Another example would be the word *nitómitaam* ‘my dog’ where the second syllable is accented. Declination is the tendency of pitch to drop throughout sentences or words independent of pitch accents (Connell, 2001). These two phenomena are referred to collectively as word melody (Fish and Miyashita 2017; Miyashita and Fish 2015).

It is generally understood Blackfoot pitch accent is lexical or idiosyncratic (Frantz 2017), though one study claims the location of pitch accents is largely predictable (Weber, 2016). This means that one must learn or memorize where the accent falls in a word. However, Miyashita and Weber (2017) claims that once the accent location is determined, patterns of word melody may be predictable. Accents that appear on the first syllable are higher than accents on later syllables. Further, as shown in figure 2, the change in pitch is more dramatic when accents fall on early syllables, and flatter when accents are on later syllables (Miyashita and Fish 2015; Miyashita and Weber 2017). The word melodies of these two examples in figure two also show pitch can impact the meaning of words (Frantz 2017). An example of lexical pitch can be seen in the words ‘*ápsiwa*’ “it’s a fig” and ‘*apsíwa*’ “it’s an arrow. The difference in meaning between these words is only marked by the location of pitch accents and word melody.

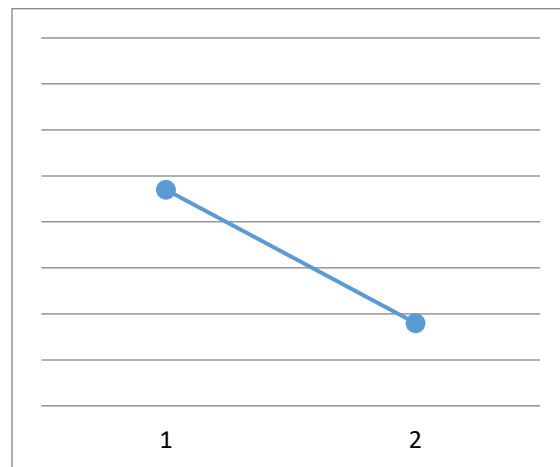


Figure 2 *ápsiwa*

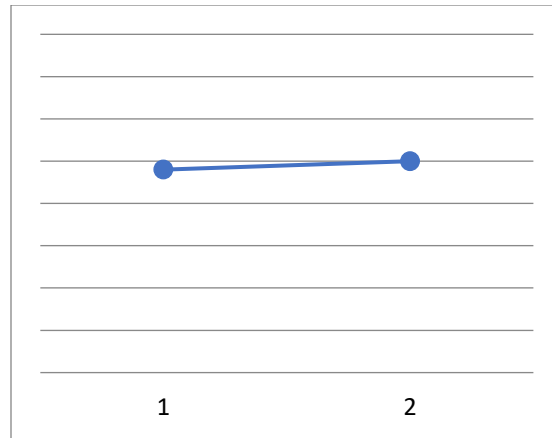


Figure 2.5 *apsíwa*

Figure 2. location of accents on *ápsiwa* and *apsíwa* (Miyashita and Fish, 2015)

First language/Native (L1) speakers of Blackfoot are only aware of pitch subconsciously as noted by Fish and Miyashita (2017). L1 speakers perceive word melody used with the patterns mentioned above as “native like” and variations of the patterns as incorrect. Learners of Blackfoot often run into problems where they will use word melody “non-natively” and be corrected by L1 speakers. The L1 speakers know something is wrong but often don’t recognize that the word melody is being mispronounced. This misunderstanding often leads to frustration on the part of both learners and L1 speakers.

Past research has created a potential pedagogical tool called Pitch Art (Fish and Miyashita 2017). Pitch Art is a visual representation of word melody (see figure 3), and is modeled after Cherokee Tone art (Herrick, et al., 2015).

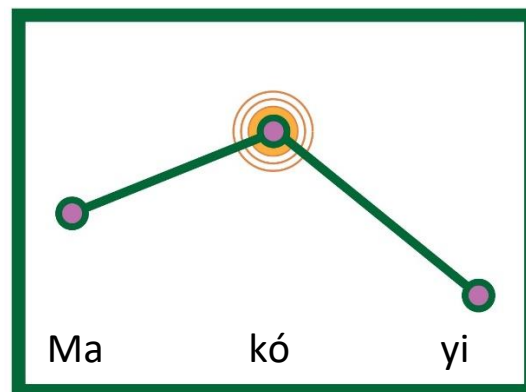


Figure 3. Pitch Art of the word *makóyi* (wolf)

3. Research Question and Hypothesis

Based on the importance of pitch and producing native like speech this study explores the efficacy of Pitch Art in the acquisition of word melody in second language learners of Blackfoot. Because pitch is unrecognized, it is possible that by simply making learners aware of its existence in the language the production of native like pitch could increase. Further, an explicit guide that allows speakers to see word melody serves to make the nuances of Blackfoot more transparent. I therefore hypothesize that Pitch Art will assist speakers to produce more native like pitch. I attempted to prove my hypothesis with the following methods.

4. Methods

In this section the building of research materials, screening participants, and data collection and processing are outlined covered.

4.1 Material building

For this experiment, 15 words were chosen. Words were selected that represented the patterns described previously (Miyashita and Fish, 2015; Fish and Miyashita, 2017; Miyashita and Weber, 2017). These patterns were in two, three, and four syllable words where pitch was accented on the vowels of the first, second, third, and fourth syllables. Using the selected words, I made a PowerPoint showing the words in three rounds. The first round consisted of a picture and the written form of the words. The second round had a recording of a native speaker and the pictures from the previous slide. The final round consisted of Pitch Art. I will elaborate more on the specifics of the power point later in this section.

4.2 Participants

Participants were recruited on the University of Montana campus through posters (see appendix), email, and recruiting in the Blackfoot class taught on campus. The professor offered extra credit for participants in her class. Nine people responded to the recruitment efforts and participated in the research. Participants were given a survey (see appendix) asking about their language background. Participants ranged from beginners with no experience outside of their individual class to learners who had heard the language in the home growing up. None of the speakers were fluent. Participants were various ages ranging from 20-60.

4.3 Tasks

During our data collection sessions, we used a Zoom H4n and lapel microphones to record participants. A researcher wore headphones during sessions to monitor audio quality. Participants would sit in front of a large screen during the slide show.

For the first-round participants were shown a picture and asked to produce the word represented in the picture. If the speaker didn't know the word a written form was provided. The second round played a recording of a native speaker producing the words in conjunction with the previous pictures. Because participants could simply copy the native speaker's word melody the words were given in groups of four with to control for mimicry. Finally, Pitch Art was briefly

introduced, and an example recording was shown, speakers were then shown individual Pitch Art of the words and asked to produce them again.

Upon completion of the study speakers were given a debriefing form explaining the purpose of the research and asked not to share their experience until the research was concluded. Recordings from the first two rounds were measured and the results were reported at the 24th Stabilizing Indigenous Language Symposium (Fish et al. 2017). The first two rounds of this recording session also functioned as improving the participants' familiarity with the words for this study. Since this study's interest is an effect of Pitch Art, measurements were conducted on recordings from the second and third rounds for comparison.

4.4 Data processing

To analyze the recordings, Praat (Boersma & Weenink, 2018) was used to measure pitch change, and the measurements were put in an excel sheet. Only the shape of word melody was measured because female speakers spoke with relatively higher pitch than male speakers. Words were analyzed based on four criteria. Words were marked as improved if speakers were wrong in the second pronunciation and correct or closer to correct in the third pronunciation. Words were marked as correct if speakers pronounced the words correctly in both utterances. Words were marked as got worse if speakers pronounced the word correct in the second utterance and incorrect or farther from correct in the third utterance. Words were marked as incorrect if both pronunciations were incorrect. I allowed for variations between pronunciations. If speakers pronounced the second utterance correct and the third utterance correct, but the third utterance was farther from the target word melody than the second the speaker was still marked as correct (see figure 4).

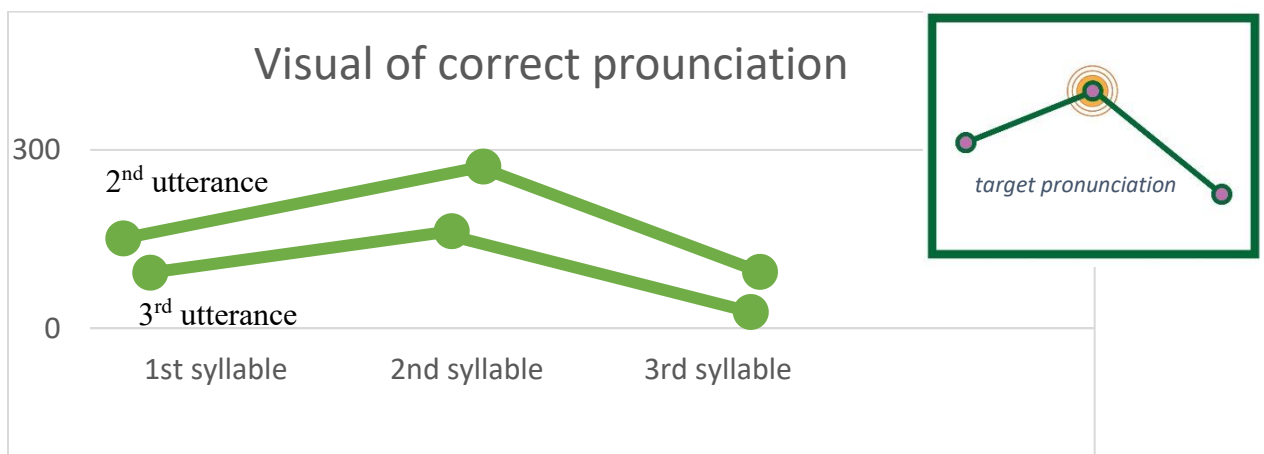


Figure 4. Example of correct word melody of makóyi (wolf).

In this example of the word, a speaker would be labeled correct because both utterances were closer to the target word melody. The accent was placed on the correct syllable (the second in this example), and declination was applied correctly.

5. Results

Of the nine participants, recording of one participant was excluded because of their use of creaky voice during the recording session. Creaky voice gives inaccurate measurements in Praat. Participants age and label (given as Learner A, Learner B, etc.) are shown in the top row, the left-hand column show categories for performance and experience with the language, and the subsequent columns are the number of words each participant produced in that category.

Four learners out of the remaining eight produced more correct and improved results than got worse or incorrect results. These participants, shown in figure 5 below, were LA who produced nine correct/improved results and six incorrect/got worse results, LB who produced nice correct/improved results and six incorrect/got worse results, LF who produced nine correct results and three incorrect results, and LH who produced ten correct/ improved results and five incorrect results.

The remaining four produced more incorrect or got worse results. LC produced four correct/improved results and six incorrect/got worse results, LD produced six correct/improved results and eight incorrect/got worse results, and LG produced three correct results and ten got worse/ incorrect results. In the Experience row, FE represents frequent exposure, IE represents infrequent exposure and NE represents no exposure,

	LA 39	LB 20	LC 28	LD 22	LE 21	LF 40	LG 38	LH 56
Experience	FE	FE	NE	IE	IE	NE	NE	NE
Correct	5	7	2	5	0	9	3	9
Improved	4	2	2	1	5	0	0	1
Incorrect	3	5	5	7	6	3	8	5
Got worse	3	1	2	1	1	0	2	0

Given that results are split 50/50 between participants who used Pitch Art and

Figure 5. Participant results

participants who did not, the results here suggest that initial exposure to a pitch guide with no appropriate instruction does not improve speaker pronunciation.

6. Discussion

In this section, I present other issues, such as attentional resources, and exposure to the language, that might have been interacting with the pronunciation of word melody.

Although Pitch Art does not immediately help learners acquire pitch, some interesting conclusions can be drawn from the data. Notably the participants who performed the best also had the most exposure to the language growing up. The two participants with limited exposure (LD and LE) outperformed their peers with no exposure. Note that the participant LF is an exception. broke apart words into syllables instead of trying to produce the words naturally like other participants which could have attributed to their performance. I believe the reason they broke apart the word was to lessen the load of attentional resources, thereby allowing them to produce a more native like word melody.

I initially thought that speakers with more exposure to the language had already, at least in part, acquired native like word melody. However, in previous research which examined L2 learners' word melody without using Pitch Art, learners' pronunciations did not show native-like pitch movements regardless of exposure differences (Fish et al., 2017).

Attentional resources may have played a significant role in the results of this study. Speakers, when confronted with multiple tasks will "protect" the performance of one task at the expense of the other (Robinson et al., 2012; Gilabert, 2007). The two tasks in this case are word melody (supra segmental features) and articulation of vowels and consonants (segmental features); speakers may have struggled with using word melody because they were focused on pronouncing the word phonemically (sounding out the letters of the word) correct, and therefore dedicating all their attentional resources to articulation rather than pitch use. Speakers who performed better with pitch a) were more confident with the words, meaning no stuttering, no pauses to sound out the word, and fluidly pronouncing the words phonemically correct, and b) had more exposure to the language. Further, all of the participants were first language English speakers, given that pitch is not salient (most important or noticeable) in English, participants may be struggling with pitch because the under-importance of pitch in English could be interfering with their production of pitch in Blackfoot.

This study also suggests that learners of the Blackfoot acquire the phonemic aspects of Blackfoot before the pitch aspects. Evidence of this can be seen in the protection of phonemic pronunciation over use of word melody. Speakers focused on segmental features when producing words, and only after they were comfortable with these did they try to produce suprasegmental features. I hypothesize that further education in the language followed with Pitch Art will improve speakers word melody. Because speakers protect segmental features, they need to be comfortable with these features of the language to reduce the attentional resources needed for them. Once speakers can produce segmental features comfortably they can dedicate more attentional resources to word melody and begin to sound native like.

7. Conclusion

This study has shown that Pitch Art does not immediately impact the pronunciation of native like word melody in Blackfoot. Speakers did not produce significant changes in pronunciation of word melody after exposure to pitch art. Further, speakers with more exposure to the language performed better with word melody than their peers with less exposure. Because

speakers focused on segmental features of the language and performed better with more exposure I believe attentional resources may be a factor in the production of native like pitch.

This research is important because Blackfoot has pitch accents which can impact meaning of words and the identity of the learner. There is a need for more effective teaching of Blackfoot pitch because of its lack of recognition among native speakers. Further, the acquisition of pitch is understudied in Blackfoot creating both a need in the language community, and within the literature for studies such as this.

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