

Guiding Pronunciation of Blackfoot Melody¹

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This paper reports our project on “sound education” in second language teaching in Blackfoot. “Sound” in this context refers to word melody and pitch accent. As described in (Frantz, 2009), accents in some words impact meaning. For second language learners of Blackfoot, in addition to learning words with the correct pitch accents, it is also important to learn correct word melody. Sounding “right” or sounding like elderly fluent speakers of their community may lead to self-confidence and a strong cultural identity. Our goal is to provide an example to help others teach the melody of Blackfoot to second language learners.

The Blackfoot Language

The Blackfoot language is spoken by members of four bands, three in Alberta, Canada (the Siksiká, the Aapátóhsipiikanií, and the Kainai), where there are an estimated 3250 speakers (Census Canada, 2011), and one in Montana (the Amsskáápipiikanií), where there are approximately 50 speakers (Kipp, p.c., 2011). There has been a very large movement to revitalize the Blackfoot language, leading to varying levels of language instruction. One example is Cuts Wood Academy (Formerly Cuts Wood School or Nizipowahsin), which is a private language immersion school on the Blackfeet reservation. Blackfoot is also taught at the collegiate level; classes are offered at The Blackfeet Community College, The University of Lethbridge, Red Crow College, and The University of Montana. Students taking these classes include a large number of people learning their ancestral language, Blackfoot, as a second language.

Second Language Sound Acquisition and Word Melody

It has been suggested that learning a second language is a very difficult task if one aims to obtain native-like proficiency (White & Genesee, 1996). This is especially true if sound acquisition in the second language doesn't occur very early in one's life; as an infant acquires the sounds of her own language, she starts to lose the natural ability to acquire the sounds of other languages (Kuhl et al., 2001). Accordingly, it is challenging for an older English speaker to acquire the prosody of Blackfoot as a second language because of the differences in their prosodic systems (e.g., Van Der Mark, 2002, Weber, 2012). For example, the phonetic correlate associated with word prominence in English is intensity, but in Blackfoot it is pitch (Frantz, 2009, Van Der Mark, 2002). Because most modern Blackfoot learners are fluent in English as a first language, it could be assumed that it is challenging for them to hear and speak Blackfoot words with a native-like word melody. In addition, without being formally trained most learners (and even teachers) are unaware that there is a prosodic system at work that could help

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them recognize word melody when hearing and producing the language.

Word melody is the continuous movement of pitch throughout a word, and pitch is the auditory perception of sound frequency. Sound frequency, in regard to the pitch of a word, is the speed of vibration in the sound wave created by the movement of the vocal folds. The faster the vibration, the higher the pitch, and vice versa. Taylor (1969) observed the rise and fall of pitch in Blackfoot, which resembles a musical melody. Word melody is an important component of the Blackfoot language because changes in pitch can affect the meaning of words. For example, *apssiw* has two distinct meanings based on where the pitch accent occurs. When the accent is located on the first syllable, *ápsíw*, it means ‘it’s an arrow’; when it is located on the second syllable, *apssiw*, it means ‘it’s a fig’. Thus, word melody is semantically important as it distinguishes meaning.

Besides its structural importance, word melody plays a key role in developing a sense of identity and sense of belonging to the community. Many learners become interested in their ancestral language as part of establishing a cultural identity. Often, Blackfoot learners are community members, and the desire to establish and maintain their identity motivates them to sound fluent.

Orthography and the Difficulty of Pitch Realization

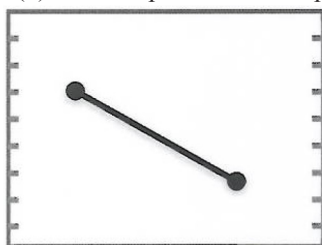
The primary Blackfoot orthography was developed by Frantz with native speakers (1978). In this writing system, an acute symbol (´) is used above a vowel to mark the highest pitch in a word. This accent marking system is used in particular within the Blackfoot grammar book (Frantz, 2009) as well as the dictionary (Frantz & Russell, 1995). This same system was voted for at a conference for Blackfoot language educators (Darrell Kipp, p.c., 2007) to be used for education, and, although its use is not ubiquitous, we find teachers in Canada who are trained (or self-trained) in the orthography. However, in Montana the orthography is not in use. As a result, we have observed that many teachers write Blackfoot words using their knowledge of English orthography.² This phenomenon has also been observed in tribes in California (Hinton, 2003).

Even where the orthography is used, we have not observed anyone marking pitch in writing. We assume that this is because pitch is not something speakers are consciously aware of, and we therefore assume that it is not implemented in their language teaching.

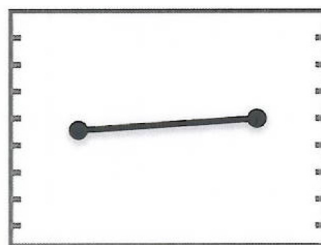
Another element which must be mentioned is that orthographic pitch marking does not fully represent word melody. The acute accent indicates the highest pitch in the word, but the pitch of other syllables is unrepresented. This can result in speakers producing a variety of non-Blackfoot melodies. Take the two examples already mentioned: *ápsíw* ‘it’s an arrow’ and *apssiw* ‘it’s a fig.’ They are pronounced exactly the same in terms of the sequence of sounds: *apssiw*. The only difference in terms of the orthographic representation is the location of the pitch marker indicating the highest pitch in each word. It would be natural to assume that the first syllable of *ápsíw* and the second syllable of *apssiw*, both marked high, are pronounced at the same high pitch. In the same way, it may be assumed that the pitch of the unaccented syllables (the second syllable of

ápssiw and the first syllable of apssíw) is low and at about the same low pitch. However, the actual pitch range of these two words is quite different. As shown in (1), when the first syllable is accented, the pitch starts from a high point and drops steeply (1a). On the other hand, when the second syllable is accented, the unaccented first syllable is not as low; the word melody starts from a mid-point and rises gradually (1b).

(1) Visual representation of pitch



(a) *ápssiw* ‘it’s an arrow’



(b) *apssíw* ‘it’s a fig’

This sound realization is not usually focused on by language teachers. We believe that it is important to increase awareness of the language’s linguistic properties: pitch is a significant element of learning Blackfoot, and there are patterns that learners must acquire. As discussed above, pitch is not fully represented in the orthography and, therefore, presenting pitch patterns in the form of a pronunciation guide may help learners’ pronunciation.

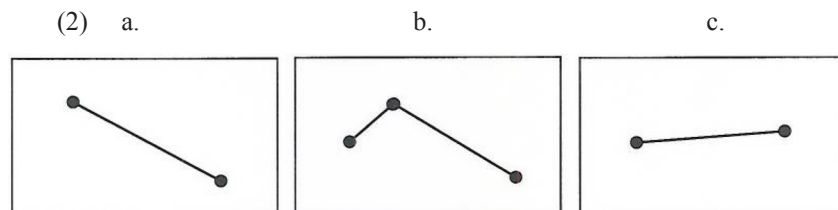
Pitch Pattern Study

In order to create a pronunciation teaching tool, first we need to understand the patterns of Blackfoot pitch. Although Blackfoot is a relatively well-studied language, very few studies describe word melody or pitch range, the exceptions being Frantz (2009) and Taylor (1969). Even these descriptions, however, do not include sound files. Therefore, for our recent study of Blackfoot pitch (Miyashita & Fish, 2015) we used a set of recordings produced by Chief Earl Old Person. He is considered one of the most proficient speakers today in Montana, and he is also knowledgeable in the Blackfeet culture.³ Furthermore, he is a singer and storyteller, which means he is a “special style” speaker. According to Tsunoda (2006), a speaker who has a command of special style speech also has a command of ordinary speech. Thus we are confident that his pronunciation can be used as a model.

Based on our research, there are several pitch patterns among two-, three-, and four-syllable words: (i) a word contains an accent on the first, second, or third syllable; (ii) for unaccented syllables, the pitch of a first syllable is at the mid-point and of a last syllable is at the low point; (iii) the accented syllable has a higher pitch than any unaccented syllable. These principles result in three general patterns. Schematic illustrations of these types are shown in (2). The first type is seen in words of two to four syllables. It begins with a very high pitch, and the

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pitch drops towards the end of the word, as in (2a). The slope of pitch-drop is steep in disyllable words and gradual in four syllable words. The second type, shown in (2b), is observed in three- and four-syllable words. The accent is on the second syllable; the pitch starts from the mid-point, rises the highest at the second syllable, and drops to the lowest toward the end. The third type is seen in two- and three-syllable words when the last syllable is accented. The slope is steady and almost flat, as shown in (2c).



For example, words that have the same pattern as the type in (2a) include *nínaa* ‘man’ and *ónni* ‘his father,’ and *áóttaki* ‘bartender’ Words that have the same pattern as the type in (2b) include *makóyi* ‘wolf’ and *saahkómaapi* ‘boy.’ Words that have the same pattern as the type (2c) include *ponoká* ‘elk,’ *imitáá* ‘dog,’ *sinopá* ‘fox,’ *siksiká* ‘Blackfoot’, etc. The last type has an accent on the final syllable in trisyllable words, and the pitch movement is almost flat and steady.

Pronunciation Guide: Pitch Art Creation Process

Using these findings, we are in the process of creating a visual pronunciation aid that we call *pitch art*. The term pitch art is adopted from tone art, which is a pronunciation aid for Cherokee language teaching (Herrick & Hirata-Edds 2015).⁴ To create pitch art, we first used an acoustic analysis program called Praat (Boersma & Weenink, 2001) to measure the pitch of every syllable in a word. Figure 1 shows a screenshot of the word *ponoká* ‘elk’ as seen in Praat. The layers of dark horizontal lines show vowel formants, and the sloping line drawn over the spectrogram is pitch tracking. This line shows the movement of the pitch throughout the word where sounds are voiced. In this word, the last vowel is accented but the pitch movement is more or less flat. The pitch pattern is the type shown in (2c) above.

To generate a simple visual representation suitable for language teaching, the pitch of each vowel is measured using the “get pitch” function. In this word, *ponoká* ‘elk,’ there are three vowels, and the F0 of these vowels is measured at 85Hz, 89Hz, and 90Hz. The next step is to input the measurements into an Excel file, as shown in Figure 2. With the “insert chart” function, the measurements are turned into a simplified graph.

Finally, the graph image is modified to make it accessible to people who don’t have a background in linguistics. Each syllable is transcribed and located under the point of the measured pitch, and the line is made thicker for clear visual presentation as in Figure 3. We believe this is the most important part, as an accessible and non-technical presentation may enhance learners’ motivation.

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Figure 1. Praat image of the word *ponoká* ‘elk’

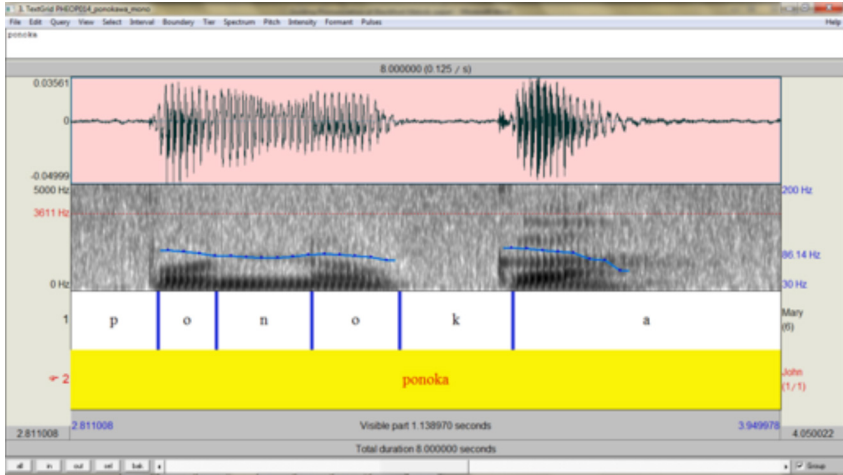


Figure 2. Creating a simplified graph in Excel

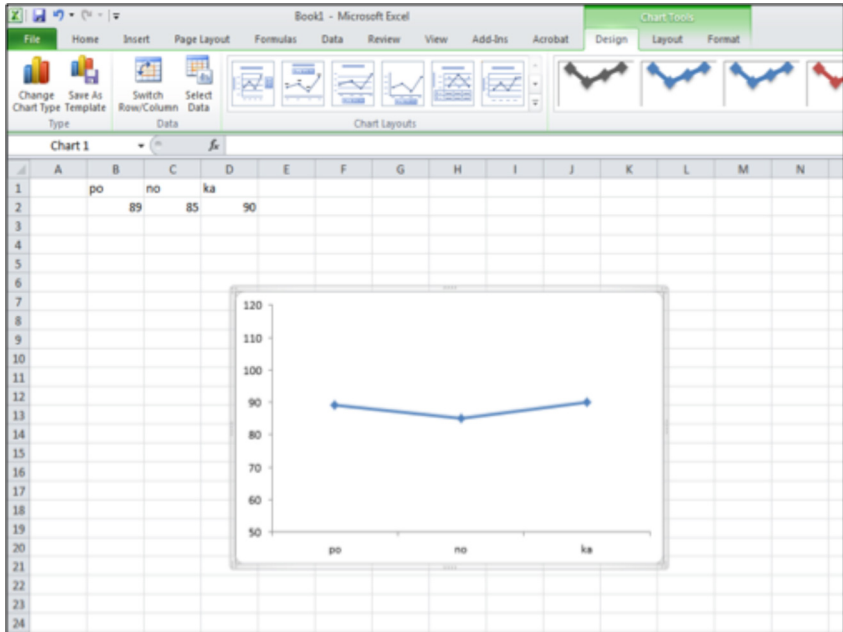
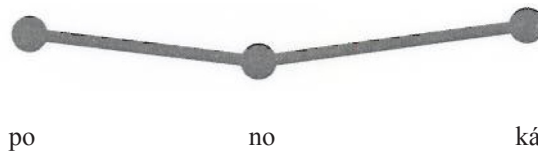


Figure 3. Pitch art for *ponoká* ‘elk’



Application

In addition to creating pitch art images, we have been experimenting with animating the graph in PowerPoint to guide speakers through the pitch melody of the word. In the animated version, the left-most point first appears with the syllable ‘po,’ then the line from this point toward the next point is drawn. When it reaches the second point the syllable ‘no’ is printed. The line continues from the second point to the last point, and the last syllable ‘ká’ is printed. The audio is also linked so that the visual guide and the model pronunciation synchronize. This animated version is aimed to help learners acquire the melody or the pitch pattern by the use of a real-time guide.

As we described earlier, there are several pitch patterns and multiple words share the same pattern. Pedagogically, words that share the same melody pattern can be grouped and introduced to learners at the same time. We have seen Blackfoot teaching materials that introduce learners to a group of words that are semantically related (e.g., vocabulary relating to school, morning routine, animals, colors, etc.). Grouping words by pitch pattern would put together semantically unrelated words, but would support learners in hearing and producing accurate word melodies in Blackfoot.

Conclusion

Pronunciation may not be seen as the most important element in language teaching, but the sounds of a language affect members of the community emotionally. Being able to sound like one’s people is especially important for those learning their ancestral language. Pitch is one of many components that make up the pronunciation of words, and it must be studied and presented to learners in a way that helps them achieve fluency. The idea of pitch art (or tone art) is an emerging field in indigenous language pedagogy (e.g., Herrick & Hirata-Edds, 2015). Our suggested pitch art is currently based on words of two, three, or four syllables. Eventually, the melody of intonation units in connected speech should be investigated, as we assume we will find more patterns as words or phrases become longer. We hope that this method of sound pedagogy will be introduced to Blackfoot language teachers for all levels, and also that pitch art can be used in other tonal languages to help learners and revitalization efforts.

This pronunciation guide was developed following research describing and analyzing the pitch contour of Blackfoot words. This kind of research cannot be a part of revitalization efforts unless it is applied to and used for language learning. From an indigenous community’s point of view, research results are published by the researcher but often not used to help endangered languages (Kipp, 2000). Such research is also not accessible to people without a scientific background, and this inaccessibility can hinder people from making use of the research.⁵ This issue may be improved by the involvement of community members in research; however, most involvement is in the form of language consultation, in which linguists ask speakers to translate English into the target language and/or to judge the grammaticality of words or sentences. This process does not readily provide speakers with the linguistic background they would need

to understand and make use of the research. Ideally, members of the community should be actively involved in research in a way that allows the benefits of the research to be well understood. In this way, research results may be applied in language teaching.

As a community member, the first author wishes to learn about linguistic research and turn it into pedagogical materials for the language, as he often asks himself, “Whose job is it to use the research to better the language?”

Notes

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²See also Miyashita and Chatsis (2013) for a discussion of the variety of writing systems in Blackfoot.

³“Blackfeet” refers to the Blackfoot-speaking tribe in Montana.

⁴Tone art draws a line based on multiple points of pronunciation to capture finer pitch movement. The pitch art described here, though, measures the pitch of vowel centers only.

⁵See also Yamada (2007) for a similar discussion.

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