Teaching phonetics in the context of Indigenous language revitalization

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Abstract

Many Indigenous language communities in North America are working hard to reclaim and revitalize their languages, with efforts often focused on developing oral proficiency among adult second language learners. These learners are extremely motivated to learn 'accent-free' pronunciation in languages with complex sound systems, with very little resources to help them achieve their goals. Based on our experiences with Hul'q'umi'num' and Blackfoot, we argue that incorporating phonetic analysis into teaching pronunciation is very effective as a pedagogical approach, and also contributes to developing capacity within the community for conducting much needed phonetic documentation work.

Keywords: Indigenous language revitalization, pronunciation teaching and learning, collaborative phonetic documentation, Salish, Algonquian.

1. Introduction

According to UNESCO's Atlas of the World's Languages in Danger [1], approximately 68% and 83% of Indigenous languages in Canada and the United States, respectively, fall into the categories of "severely endangered", "critically endangered" and "extinct". In response to this crisis, many Indigenous language communities are working hard to reclaim and revitalize their languages [2], recognizing the importance of language to individual and community health and wellbeing [3, 4]. Though some engage in language education among young children [5], revitalization efforts are often focused on developing oral proficiency among adult second language learners [6]. These learners have taken on the task of passing on their language to future generations, as teachers, parents, and researchers, and they are particularly concerned with speaking their language in a way that honours their Elders [7, 8]. In SENĆOŦEN scholar PENÁĆ's words [9], "In the course of learning from our elders, I have always wanted to honour them. I cherished them and hoped to see them smile, knowing they were assured that we were carrying the language forward and that the language was going to be safe with us" (p. 60). In the Adult Indigenous Language Learning context then [10], intelligibility and comprehensibility are often not enough (cf. Tracey Derwing's paper in these proceedings); as Blackfoot scholar Fish [11] notes, "[L2] speakers desire to sound authentic and as "native-like" as possible" (p. 3). While adult Indigenous language learners often have very high standards with respect to pronunciation, they have very little access to resources to support them achieve their goals (see Section 2). In this paper, we describe the ways in which we have incorporated phonetic analysis into Hul'q'umi'num' (Sonya) and Blackfoot (Mizuki) pronunciation teaching, as a way of supporting learners' pronunciation work and developing capacity for much needed phonetic documentation work

2. Contexts for Indigenous language revitalization (ILR)

Northwestern US and Canada, where we work, is home to numerous languages and language families, many of which have sound structures very different from learners' first language - English. In this paper, we focus on two languages that are genetically and typologically distinct: Hul'q'umin'um' (Coast Salish) and Blackfoot (Algonquian). Hul'q'umin'um' has 37 consonants, 24 of which do not occur in English (including ejectives, larygealized resonants, uvular consonants, and an extensive set of coronal fricatives and affricates). In addition, thanks in part to its rich morphology, consonant clusters occur regularly, e.g. the Hul'q'umi'num' word for 'slice it for me' is [t̓q̓witθeʔełtsθ]. While the consonant inventory of Blackfoot is much simpler, having only 12 consonants, it too has sounds that are not present in English, such as the velar fricative /x/ which surfaces as a coalesced sound with the preceding vowel, e.g. /ix/, /ax/, and /ox/ are realized as [ç], [x], [xʷ], respectively [12, 13]. As a result of this coalescence, complex consonant clusters surface, e.g. the Blackfoot word for 'sheep' is [imxkçkinaa]. Blackfoot also exhibits pitch contours that are very

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different from English. Rich consonant inventories, complex syllables, and unique pitch contours also lead to prosodic structures in Hul'q'umi'num' and Blackfoot that are quite distinct from those in widely studied languages like English, French, and Japanese (see [14]). All of these sound-based features are challenging for learners who grew up exposed only to English.

Phonetic documentation of the kinds of features outlined above is relatively sparse [15]. Existing descriptions are most often based on the auditory impressions of a few linguists. Typically, these descriptions are written for other linguists and are therefore inaccessible to community members. Even with adequate phonetic documentation, teaching the details of pronunciation can be daunting for teachers without specialized knowledge in phonetics and phonology. It is therefore not surprising that most popular approaches to Indigenous language learning such as Total Physical Response (TPR) [16], TPR-Storytelling [17], Greymorning's Accelerated Second Language Acquisition (ASLA) [18], and Where Are Your Keys (WAYK) [19] do not explicitly address pronunciation, but rather assume that learners' pronunciation will improve over time through listening to and modelling fluent speakers. This assumption is problematic though in that most North American Indigenous languages have extremely small speech communities, with very limited opportunities for learners to be exposed to and interact with the language(s) they are learning.

Thus, we have a situation in which learners are extremely motivated to learn 'accent-free' pronunciation in languages with complex sound systems, with very little resources to help them achieve their goals. One promising solution to this conundrum is to provide learners with the skills to conduct basic phonetic analysis, giving them the tools to document the pronunciation details of their Elders' as well as their own speech and, based on this documentation work, to develop strategies for matching their Elders' speech as much as possible (or desired). In the following sections, we present case studies from Hul'q'umi'num' (Section 3) and Blackfoot (Section 4). In all of these cases, phonetic analysis (and speech visualization more generally [20]) has proven to be highly engaging and beneficial in raising awareness about the details of speech and how they can be documented, taught and learned.

3. Hul'q'umi'num'

3.1. Hul'q'umi'num' teaching context

In the summer 2018, I (Sonya) had the opportunity to teach a Hul'q'umi'num' Phonetics and Phonology course to a group of sixteen Hul'q'umi'num' students registered in Simon Fraser University's Master's in Linguistics of a First Nations Language (https://www.sfu.ca/linguistics/graduate/MA_First_Nations_Language.html). In this course, students each chose a sound (or small set of sounds) that they felt were challenging for learners; they created elicitation lists for them and recorded them with Elders and learners. They then used basic Praat-based acoustic analysis [21], and in some cases articulatory (ultrasound) analysis, to identify differences between Elders' and learners' speech. At the end of the course, they shared with each other what they had learned; their combined work has laid the foundation for further phonetic documentation of Hul'q'umi'num' across speakers. Since most of the MA students are Hul'q'umi'num' teachers as well, their work is also directly applicable to their teaching practices. It is worth pointing out here that the students varied widely in age and comfort level with technology; nonetheless, almost everyone was able to navigate Praat by the end of the course, and many expressed their excitement to me about its usefulness for pronunciation work.

3.2. Example 1: Hul'q'umi'inum' ejectives

Hul'q'umi'num's rich consonant inventory includes extensive use of glottalization: plain and ejective obstruents contrast (e.g. /q/ vs. /q'/), as do plain and glottalized resonants (e.g. /m/ vs. /m'/). A common pattern among learners is to 'over-ejectivize' obstruents (stops and affricates), by (a) producing ejectives where they should be producing plain obstruents [22], and (b) over-emphasizing ejective releases, making them more tense/strong than they should be (see [23, 24]). Figure 1 provides an example of (a): /xpey'/ ("cedar"), pronounced by an Elder (left) and a learner (right); the learner's stop release is that of an ejective [p'] rather than a plain [p].

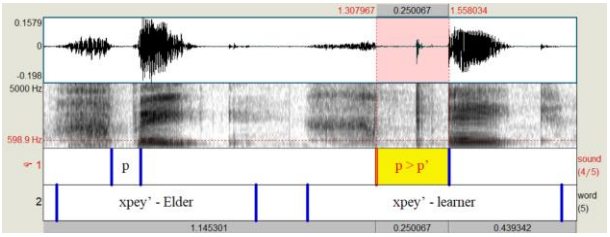

Figure 1: *xpey'* ('cedar') as pronounced by an Elder (left) and a learner (right) (visual display created in Praat [21]).

The difference in stop release between the Elder's ([p]) and the learner's ([p']) is clearly visible even to novice phoneticians, and provides a useful visual aid for learners, in terms of trying to match their [p] release to that of their Elders'.

3.3. Example 2: Hul'q'umi'num' velar and uvular stops

Hul'q'umi'num' also contrasts velar and uvular stops and fricatives: /k kw kw' xw/ vs. /q q' qw qw' χ χ^w/. These sounds are generally difficult for learners to acquire, partly because they are not found in English and partly because, being produced far back in the mouth, their articulation is not easily accessible to learners. For these sounds, ultrasound imaging is an ideal teaching and learning tool: it is designed specifically for visualization, and is intuitive and engaging. Figure 2 provides stills extracted from a short ultrasound video illustrating the articulatory difference between /k/ (on the left) and /q/ (on the right). The tongue contour is in white, with the tongue tip on the right; the red dot indicates the approximate maximal tongue body constriction against the palate. The stills show that this constriction is fairly far front for /k/ and much further back for /q/ (on the right).

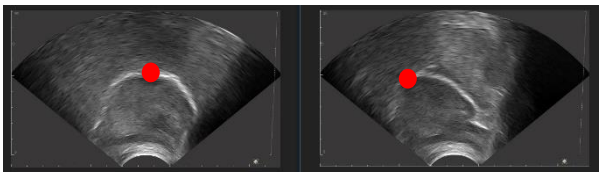

Figure 2: tongue contour for /k/ (left) and /q/ (right); tongue tip is on the right.

As mentioned earlier, students of all ages and abilities found that visualizing speech using Praat and ultrasound imaging was engaging and beneficial. They also recognized the opportunity that Praat in particular provided to practice their pronunciation whenever and however often they wanted to, without having to rely on sitting with an Elder and asking them to repeat the same words over and over again (which can be tedious for the Elder - see also [25]). Many of the students said that they would continue to use Praat in their own learning as well as in their teaching.

4. Blackfoot

4.1. Blackfoot teaching context

I (Mizuki) have been actively involved in one-on-one training in Blackfoot phonetics with students at the University of Montana who are from the Blackfoot speaking tribes. Opportunities have varied from independent studies to grant funded research training. Naatosi Fish, a recent trainee and a key collaborator of mine, is a graduate from Cuts Wood School, a Blackfoot Immersion School on the Blackfeet Reservation in Montana. His first exposure to linguistics was through the *Bridges to the Baccalaureate Program* (Bridges Program for short), which provides opportunities for tribal students to obtain research experience under the mentorship of a faculty member. Following his enrollment in the Bridges Program in the summer 2014, Naatosi became a research assistant on my project on Blackfoot Prosody, funded by NFS's *Research Experience for Undergraduates* program. Through this program, and until his graduation in May 2018, he was trained in basic linguistics, taking several linguistics courses as his minor. As part of our work together, we investigated pitch movements of Blackfoot words and, based on our findings, produced a pitch-focused pronunciation guide for language teaching and learning.

4.2. Example 3: Blackfoot pitch art

In his Blackfoot grammar, Frantz describes Blackfoot as a pitch-accent language [12], with complex pitch excursions occurring within each word [26]. Orthographically, the accented syllable is marked by an acute accent, e.g. *natáyo* 'lynx'. Each word has at least one accent, and can have more. In words with multiple accents, accented and unaccented syllables do not necessarily alternate, e.g. *ponokáómitaa* 'horse', *ihkitsikíkammiksi* 'the big dipper (constellation)', *áíssksinimá'tsaa* 'student'. The pitch of accented syllables is generally higher than that of unaccented syllables. In words with multiple syllables though, pitch countours are complicated by pitch declination throughout the word, which interacts with pitch

accent to create unique word-internal pitch trajectories, or "word melodies" [11, 27].

While acute accents help locate the syllable(s) with the highest pitch in a given word, they do not provide any details about how high the pitch actually is relative to the pitch of the rest of the word, nor do they provide any clues as to the more holistic word melody. Native speakers produce word melodies instinctively, but for learners these can be challenging. Partly because not much is known about their phonetic realization, explicit instruction on their pronunciation is generally lacking.

As an extension of his research with me, Naatosi, who is also a Blackfoot second language learner, proposed the idea of creating Pitch Art as a way of teaching and learning word melodies [11, 28]. Using Praat [21], he plotted vowels' F0 values and inputted them into an Excel spreadsheet to create a graphic chart. He then transformed this chart into a more aesthetically pleasing image, in collaboration with another student – Kaylene Big Knife, from the Chippewa-Cree Tribe in Montana, who is also a professional graphic designer. Figure 3 is an example of the resulting Pitch Art; the pitch contour lines are based on acoustic measurements of the pitch movement in the word.

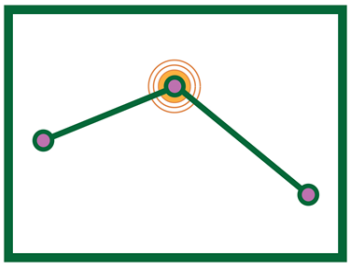

Figure 3: an example Pitch Art for *makóyi* 'wolf'.

Though there is more to be done in terms of its implementation, Naatosi currently uses Pitch Art to explain this aspect of Blackfoot prosody to his own students (he was appointed as a Blackfoot instructor in year 2018-2019). We had an opportunity to present this collaborative project at the 25th Stabilizing Indigenous Language Symposium in Lethbridge, AB, Canada in June 2018. More than half of our audience were from the Blackfoot speaking tribes (Siksika, Kainai, and Piikani), including Elders and fluent speakers. Our research and the Pitch Art idea that it led to were well-received, and gave us and other young community scholars encouragement to continue this line of work.

5. Discussion and conclusion

The examples of incorporating phonetics into teaching pronunciation that are described above also represent community-based and collaborative phonetic work which is *on*, *for*, and *with* our community partners [29, 30]. The benefits of this kind of work are twofold: in terms of pedagogy, engaging in phonetic description work raises learners' awareness of pronunciation features, and helps them to develop their perception and production skills, both of which contribute to improvements in their pronunciation. In terms of language documentation, collaborative phonetic analysis serves to document phonetic structures, facilitates transcription work (of legacy stories) and, perhaps most importantly, builds capacity among community members to do this work themselves rather than relying on outside experts.

Our experiences incorporating phonetic analysis into teaching pronunciation have been entirely positive, but we recognize that not all contexts are ideally suited to this kind of endeavour[i]. In particular, our ongoing relationships with the Hul'q'umi'num' and Blackfoot communities has made it relatively easy to introduce new technology seamlessly and without push-back of any kind. The teaching contexts described here have also involved intermediate to advanced level students. These students have already mastered the basics of their language, and are ready to tackle the more challenging features, including the details of pronunciation. Emphasizing these details – inherent in teaching phonetics – may not be appropriate for learners at less advanced levels, the danger being that they would become too self-conscious to speak comfortably. Ultimately, this kind of work must be carefully thought through, tailored to the specific learning context involved.

In teaching phonetics in the context of Indigenous language revitalization, we have found that the lines are often blurred between research and pedagogy, and between researchers, teachers, and learners (see [31]). The work we have reported on here combines our expertise as linguists and phoneticians with the language expertise of the Elders and teachers that we work with, also incorporating valuable insights from learners on the challenges that they face. From our ongoing experiences in this context, we have learnt that there

is much to be said for this kind of reciprocal relationship, and we hope that our approach might inspire others to work in similar ways, across a broader range of contexts.

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