

DOCUMENTING BLACKFOOT PITCH EXCURSION

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GOAL OF PROJECT

- Document and describe pitch excursion or “accent curves” of Blackfoot at the word level
 - Provide instrumental support for impressionistic descriptions (Taylor 1969; Frantz 2009)
- Enrich Blackfoot linguistics and application

PRESENTATION OUTLINE

- Blackfoot Background
 - Language
 - Documentation (existing materials)
 - Pitch study
- Present research
 - Data (recording & processing)
 - Description of pitch excursion
- Implications
 - Linguistics
 - Application

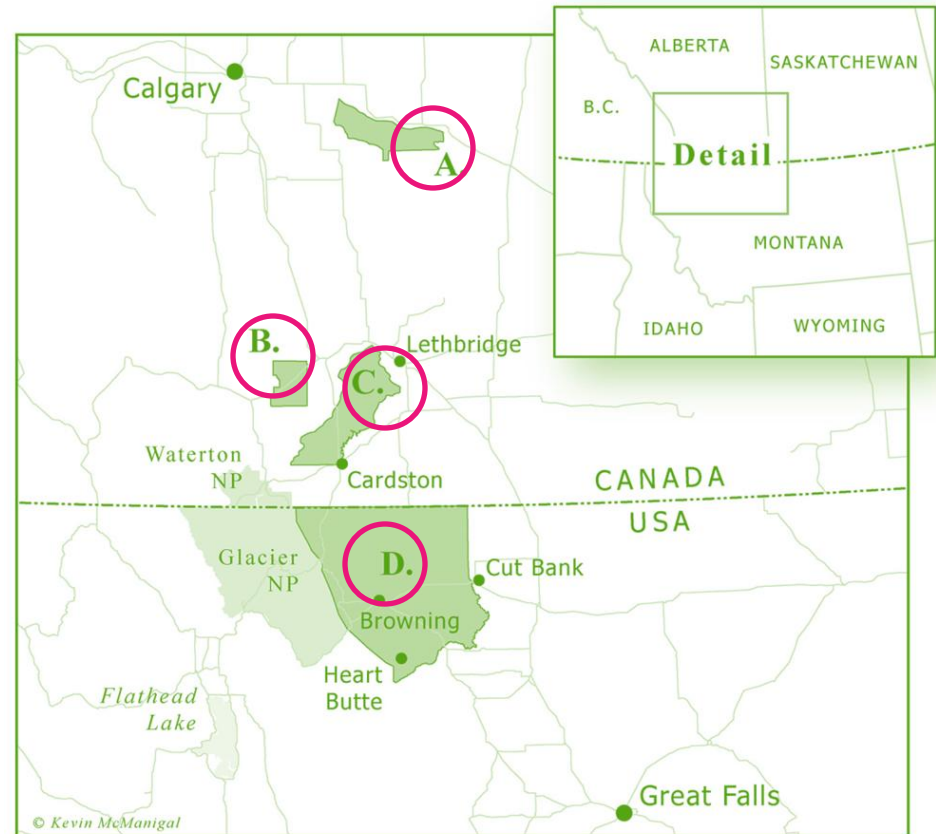


BACKGROUNDS

BLACKFOOT

- Algonquian
- Spoken in Alberta & Montana
- Speaker estimation
 - 3,250 in Canada (Census 2011)
 - 50 or less in US (p.c. Kipp 2009)

- The language is spoken by the members of the Four Bands



	Bands	Translation	English Name
A.	Siksika	'Blackfoot'	Blackfoot
B.	Apatohsippiikani	'North Spotted Robe'	Piikanii
C.	Kainai	'Many Chiefs'	Blood
D.	Amsskaapipiikani	'South Spotted Robe'	Blackfeet

DOCUMENTATION: EXISTING MATERIALS

○ Grammar

Uhlenbeck (1938), Taylor (1969), Frantz (2009)

○ Dictionary and Wordlists

Tims (1889); Lanning, C. M. (1882); Uhlenbeck and Van de Gulik (1930); Frantz and Russell (1995)

○ Pedagogical materials

Print: Russell, Ayongman, Kainai Board of Education, Miyashita (Blackfoot Language Group 2007~)

Technology: Native Teaching Aids, Blackfeet Community College, Piegan Institute

○ Linguistic journal articles & theses

Morphosyntax, semantics, phonetics, phonology

BLACKFOOT PITCH STUDY

- Blackfoot has pitch accent (Frantz 2009)
 - Accent is realized as high pitch
 - There is at least one pitch accented syllable in a word
 - Based on the claim, pitch in Blackfoot has been examined in terms of phonetics and phonology.

BLACKFOOT PITCH STUDY - PHONETICS

Phonetics

- Phonetic correlates are F0 with intensity (Van der Mark 2002)

Issue:

- The measurements focus only on accented (or prominent) syllables.
- However... accented syllables are realized in contrast with unaccented syllables
- The examination should also include pitch measurements of unaccented syllables.

BLACKFOOT PITCH STUDY - PHONOLOGY

Phonology

- Accent is unpredictable (Uhlenbeck 1938; Frantz 2009)
- Recent studies claim that it is **largely predictable**
 - Quantity sensitive, interacting with culminativity and alignment (Kaneko 1999); iambic foot type (Weber in press)

Issue:

- The analysis treats counter examples as words with inherent pitch accents
- However...counter examples include frequently occurring words (e.g., boy, man, baby)
- Inclusion of these words is important for conservation.

WHAT WE WANT TO KNOW...

- How the pitch begins, continues, and ends a word:

Melody of Blackfoot words or **Pitch Excursion**

The slide features a dark blue background. On the left side, there are several vertical decorative elements: a wide, light green-to-white gradient bar, a thin white vertical line, and a cluster of five green circles of varying sizes. The largest circle is at the top left, with four smaller circles arranged below and to its right. The text 'WORD MELODY DOCUMENTATION' is centered in the right half of the slide in a white, serif font.

WORD MELODY DOCUMENTATION

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WORD MELODY: LOCAL PITCH EXCURSION

○ **Local Pitch Excursion**

Pitch movement at word level (Jie Liang 2006)

- One may also refer to intonational tune, accent curve, or pitch contour of a word

IMPRESSIONISTIC STUDIES OF WORD MELODY

- Taylor (1969) briefly describes pitch contours
 - Type I: Prominent syllable is located near the beginning of a word & is high pitched
 - Uses terms 'crescendo/decrescendo' for rising-falling pitch
 - Type II: Prominent syllable is final or penultimate & is high in intensity. Pitch is low; contour is steady.
- Frantz (2009)
 - An accented syllable is high pitched
 - Pitch gradually lowers throughout the word
 - Pitch movement on long vowels are not always the same (some stable; some drop in the middle)
- **We aim to provide instrumental support**

DATA COLLECTION: RECORDING

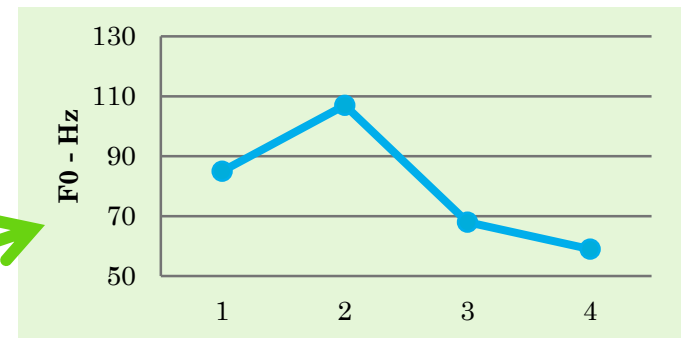
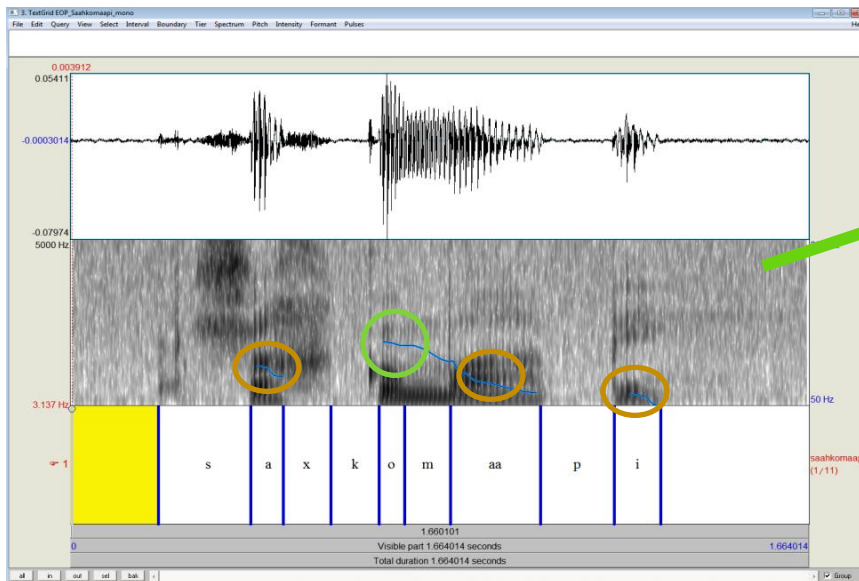
- Used recordings from word pronunciation project capturing phonemes in Blackfoot. (2013)
 - Pronunciation of 196 words in isolation were recorded
- Selected 2, 3 and 4 syllable words
 - 35 out of 196 met the criteria
- Pronunciation provider
 - Blackfeet tribal member
 - Elderly native speaker
 - Male; 80s



with Chief Earl Old Person

DATA PROCESSING

- Measured F0 of all vowels
- Identified accented syllable by locating the highest F0.
- Made graphs to show extracted pitch movement



Pitch Art (Slide 41)

- Observed four characteristics



ACCENT LOCATION

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Where in a word an accent is located

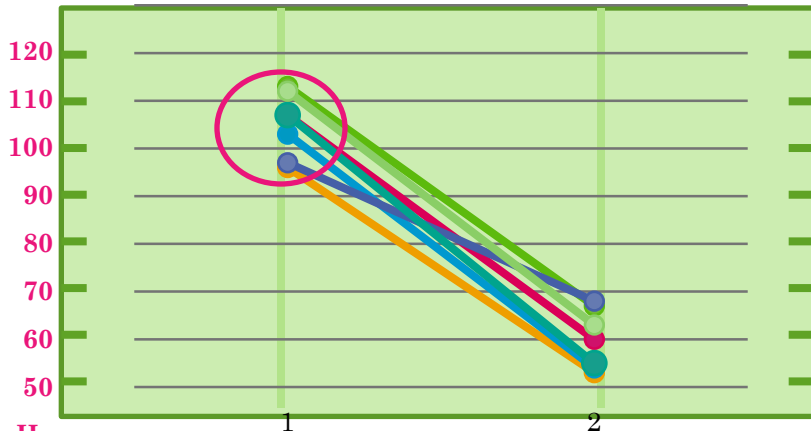


TWO SYLLABLE WORDS: óó & óó

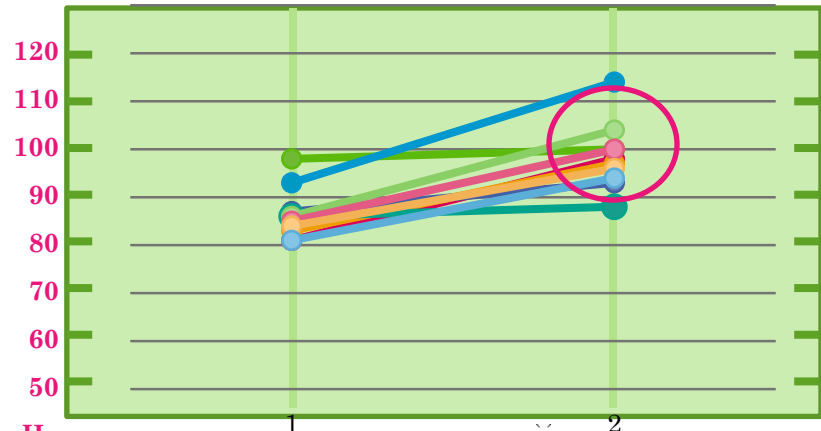
○ *nínaa* 'man'



kiisto 'you'



- ní.naa(wa)
- ksááh.komm(a)
- ká.yii(s)
- áps.siw(a)
- (a)pán.nii(wa)
- íss.ka
- ón.ni



- saa'ái
- iiniíwa
- aa.kíi(wa)
- kiistó(wa)
- nohkóiks(i)
- kapsíw(a)
- naató's(iwa)
- moápssp(a)
- aohkíiw(a)
- pokon(a)

THREE SYLLABLE WORDS: *óóó*; *óóó*; *óóó*

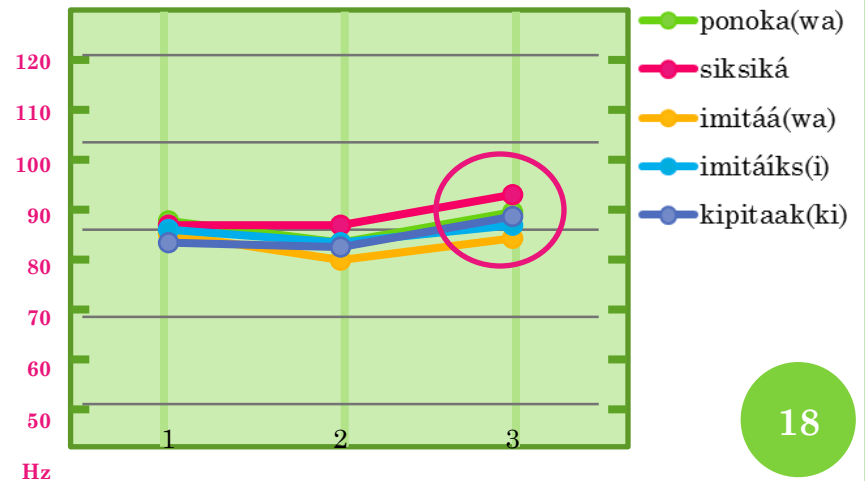
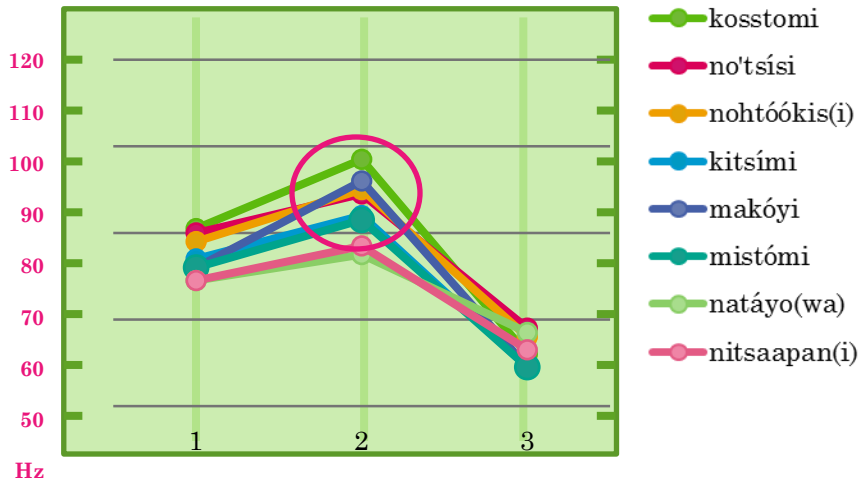
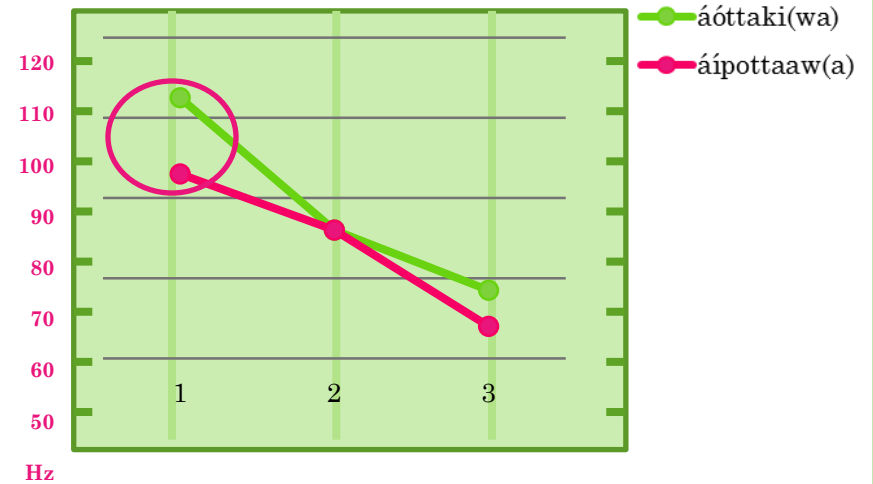
○ *áóttaki* 'bartender'



○ *makóyi* 'wolf'



○ *ponoká* 'elk'



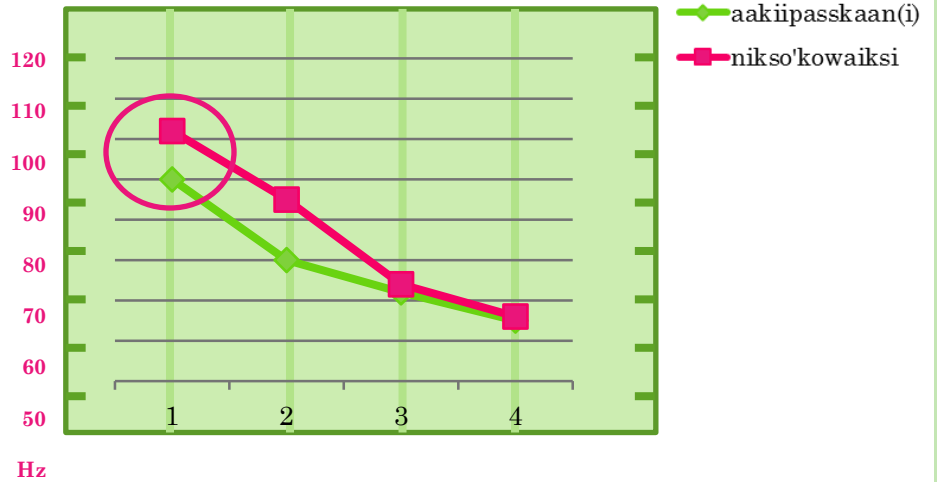
FOUR SYLLABLE WORDS: $\acute{o}ss\acute{o}$; $\acute{s}\acute{o}ss$; $\acute{s}\acute{s}\acute{o}$



\acute{o} *nikso'kawai* 'my relative'

\acute{s} *nitomitaam* 'my dog'

\acute{s} *napayini* 'bread'



Hz
◆ soyóópokists(i) ■ nitomitaam
● otsiikhkowiaks(i) ▲ saahkomaapiw(a)



Hz
◆ nottoana
● napayini

GENERALIZATION 1: ACCENT LOCATION

- Accent falls on first, second, or third syllable

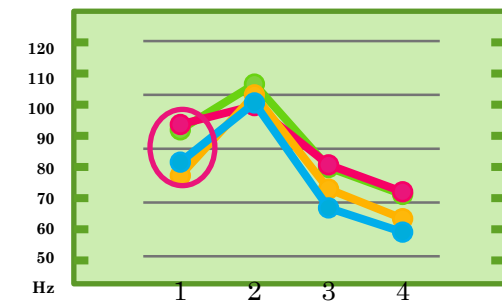
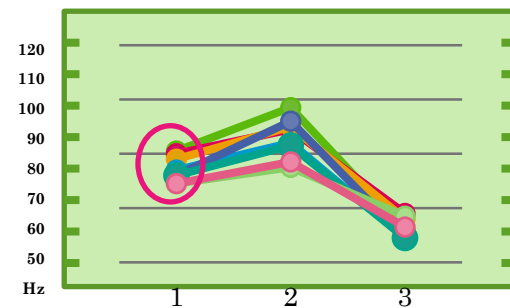
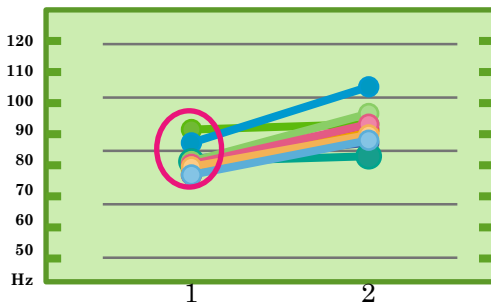
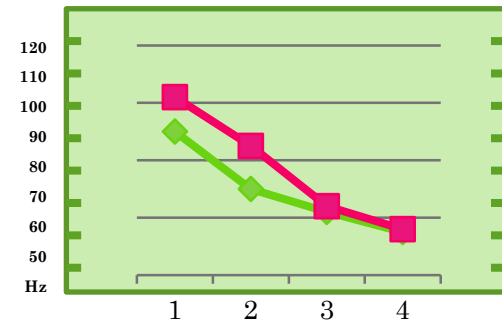
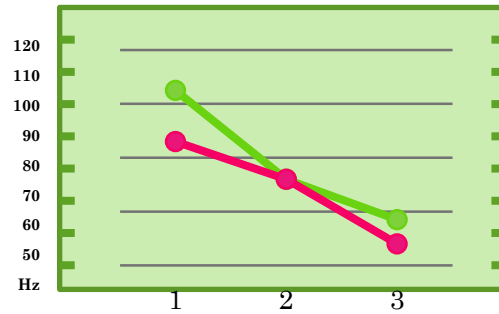
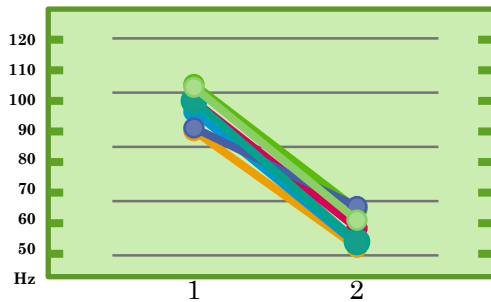
	1 st	2 nd	3 rd	4 th
σσ	nínaa	aa kíi	n/a	n/a
	ónni	kiistó		
σσσ	áóttaki	ma kó yi	pono ká	n/a
	áípottaa	na tá yo	imit áá	
σσσσ	níkso'kowaks	nitómitaam	notto ána	---
	áákiipaskaan	saah kó maapi	napay í ni	---

The slide features a dark blue background. On the left side, there are several vertical decorative elements: a wide, light green gradient bar, a thin white vertical line, and a cluster of five bright green circles of varying sizes. The largest circle is at the top, with smaller ones below it, and a tiny one to the left of the middle circle. The title 'PITCH EXCURSION BOUNDARIES' is written in a white, serif font, centered horizontally and positioned to the right of the circle cluster.

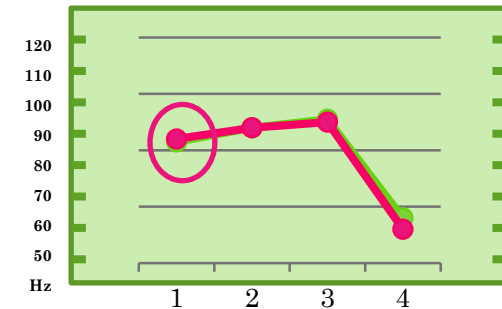
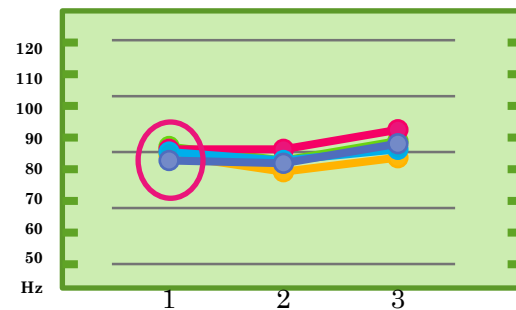
PITCH EXCURSION BOUNDARIES

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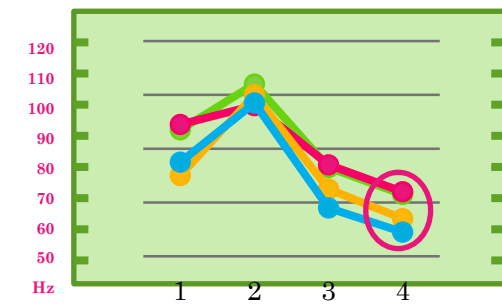
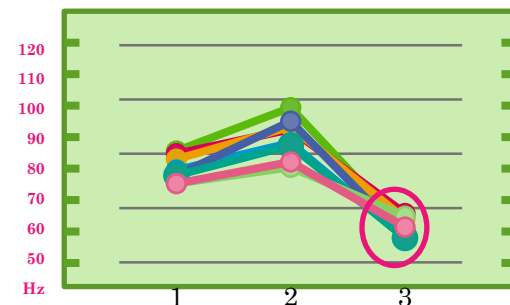
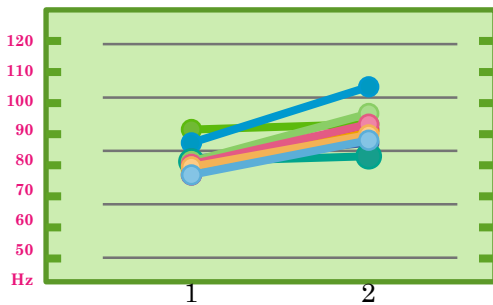
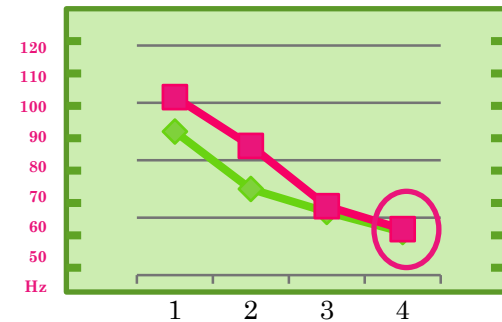
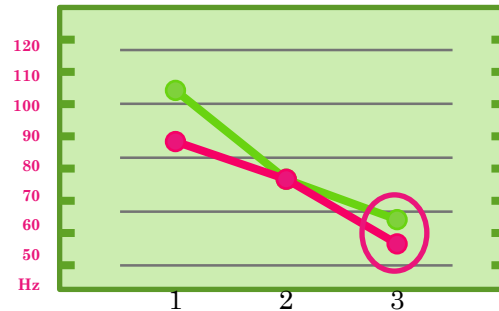
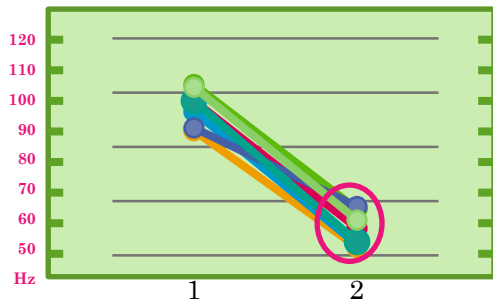
PITCH EXCURSION BOUNDARIES: INITIAL



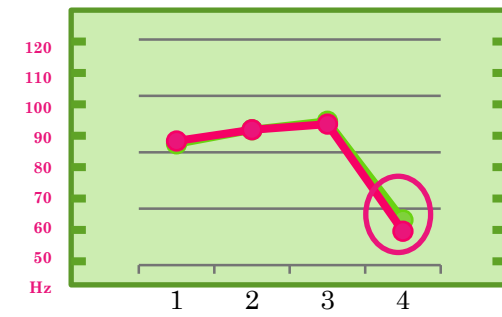
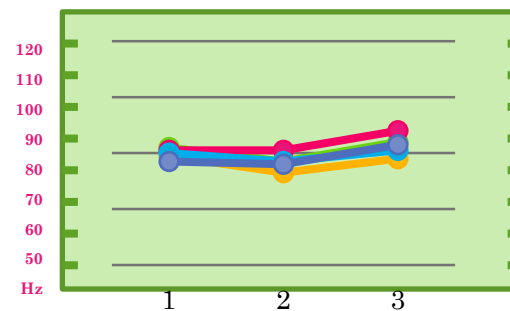
F0 of the initial vowel when not accented ranges from 80-90Hz



PITCH EXCURSION BOUNDARIES: FINAL

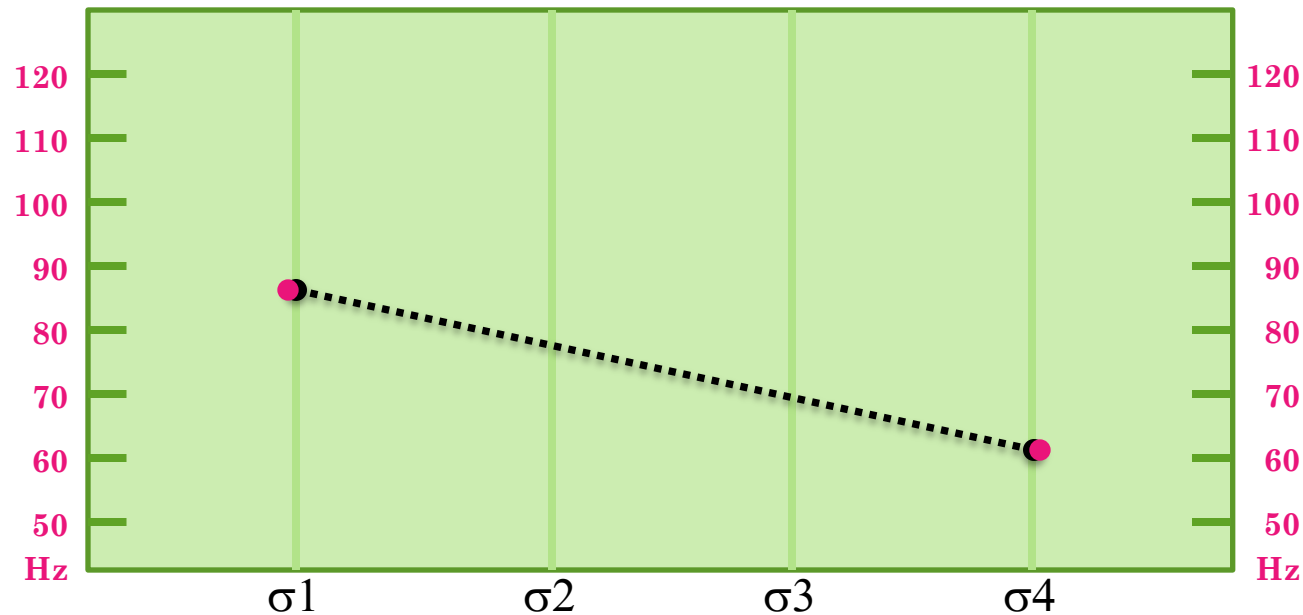


F0 of the last vowel when not accented is approx. 60Hz



GENERALIZATION 2: PITCH AT EXCURSION BOUNDARIES

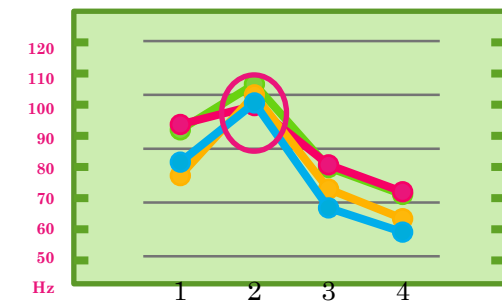
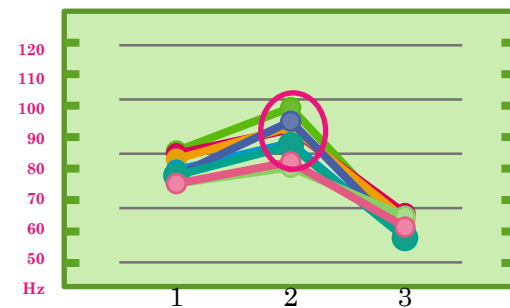
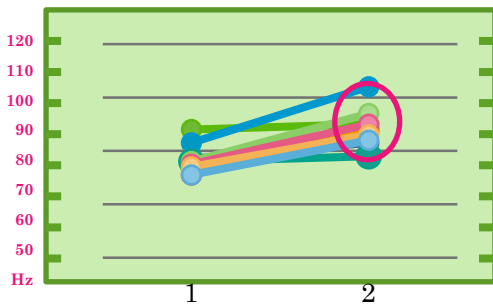
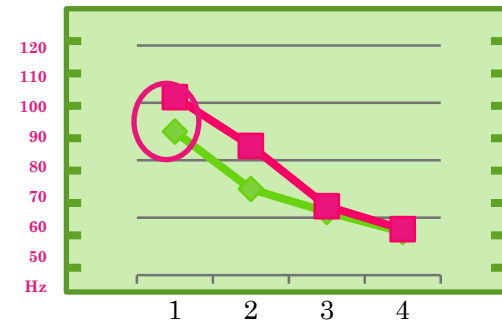
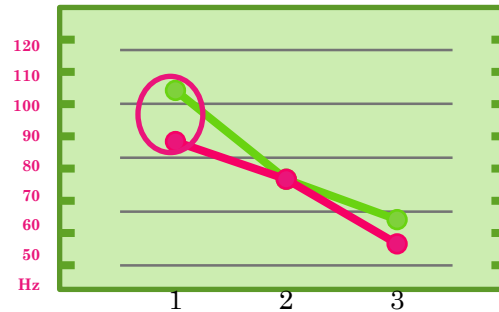
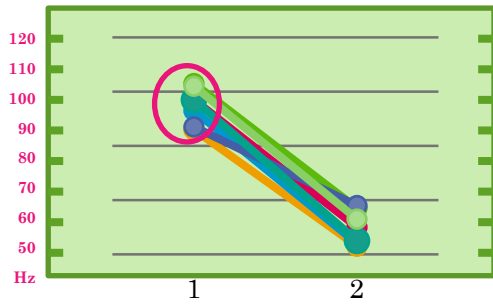
- When not accented, F0 of the initial vowel ranges from 80-90Hz; ending is approx. 60Hz
- Probably capturing Downdrift
- We call this hypothetical line downdrift basic pitch





PITCH AT ACCENT

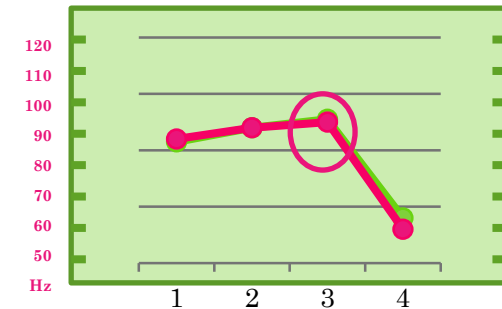
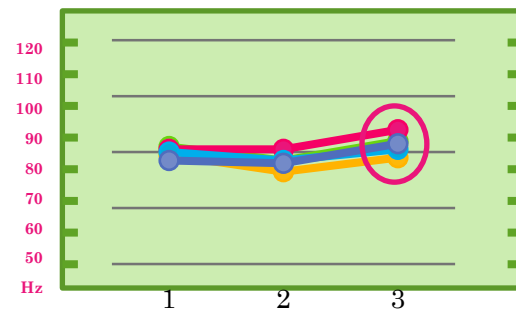
PITCH AT ACCENT



1st 90-115 Hz

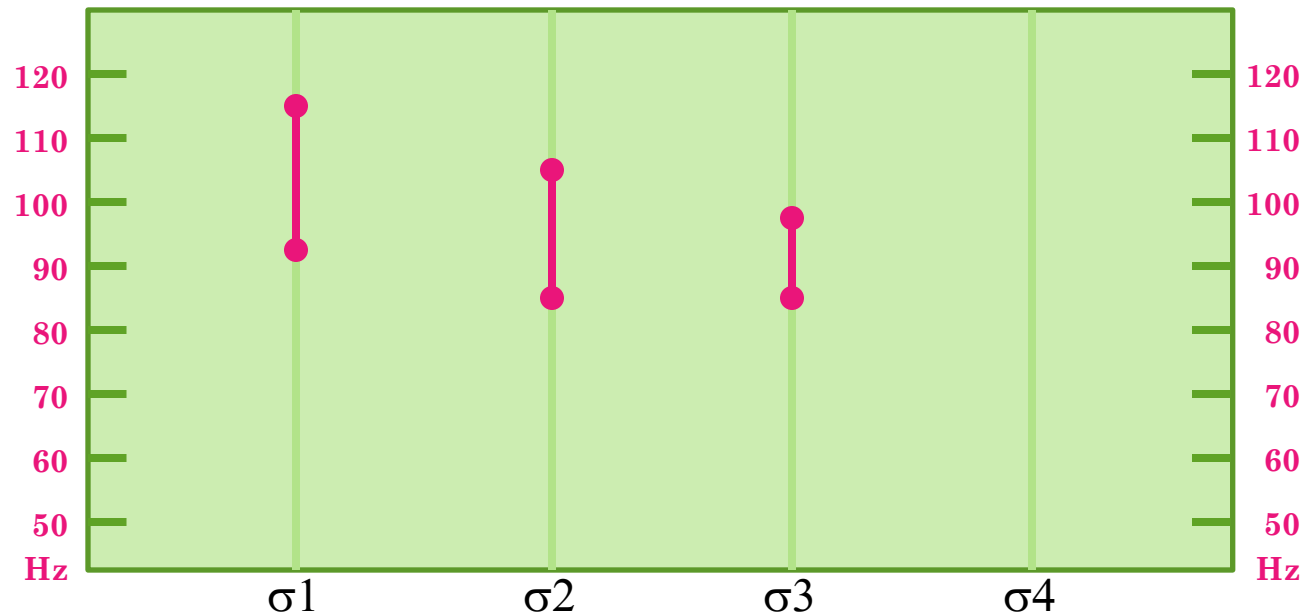
2nd 85-107 Hz

3rd 88-94 Hz



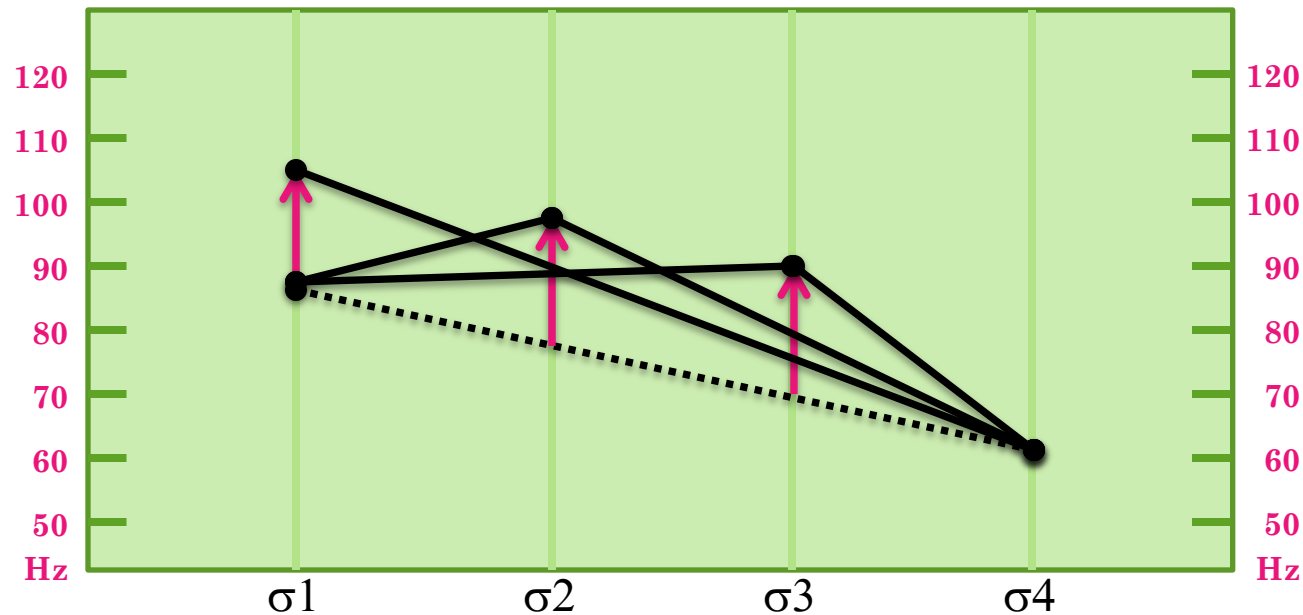
GENERALIZATION 3: PITCH AT ACCENTED SYLLABLES

- Pitch of accented syllables are higher word-initially and it shifts down.
- and...



POSSIBLY...

- Pitch excursion may be realized by the interaction between accent and downdrift basic pitch.



The slide features a dark blue background. On the left side, there are several vertical decorative elements: a wide, light green-to-white gradient bar; a thin white vertical line; and a cluster of five bright green circles of varying sizes. The largest circle is at the top left, with smaller circles below and to its right. The text 'PITCH IN LONG VOWEL' is positioned to the right of these circles.

PITCH IN LONG VOWEL

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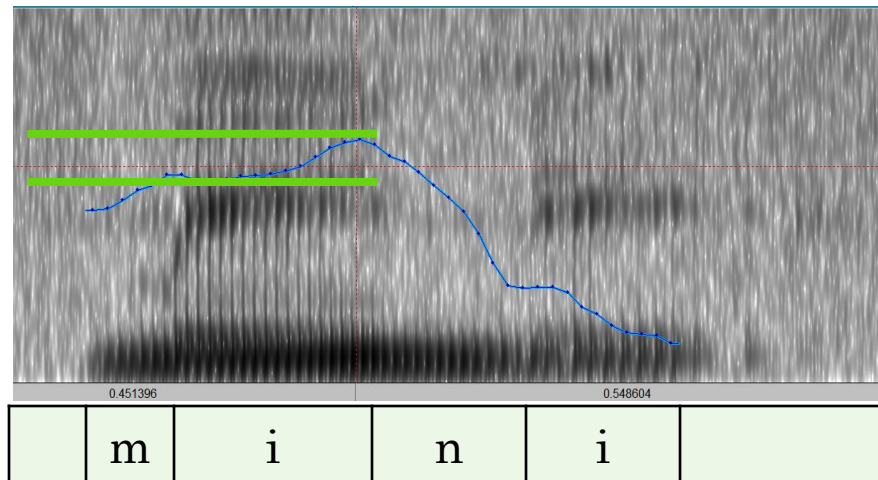
GENERALIZATION 4: LONG VOWELS

- Raised toward the end of the syllable

- *miini* 'berry'



95Hz
87Hz

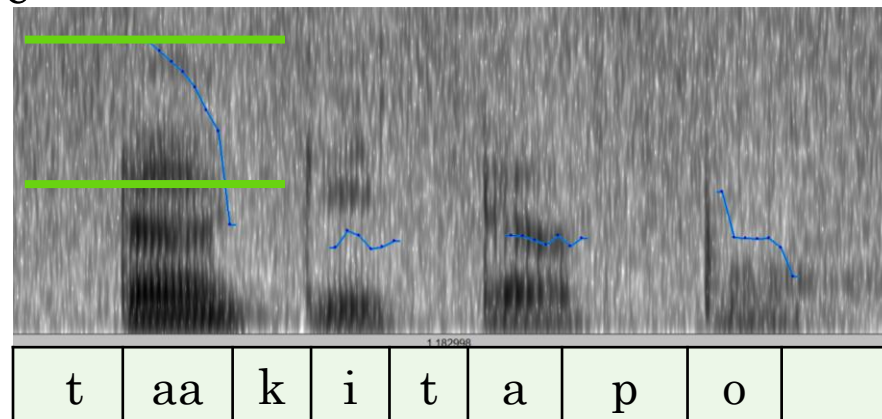


- Steep drop

- *taakitapoo* 'I will go there'



113Hz
90Hz



GENERALIZATIONS (2, 3, 4 SYLLABLE WORDS)

1. **Accent location**

Accent falls on first, second, or third syllable.

2. **Pitch at excursion boundaries**

F0 of the initial release ranges from 80-90Hz; ending is approximately 60Hz when neither is accented, showing downdrift.

3. **Pitch at accent**

Pitch of accented syllables are higher word-initially and it shifts down. (Possibility of interaction with downdrift)

4. **Pitch in long vowels**

When the accented syllable has a long vowel, the pitch is raised toward the end or it drops in the middle of the vowel.



SIGNIFICANCE

SIGNIFICANCE

The study contributes to

1. Phonetics and Phonology
2. Applied Linguistics
3. Language Documentation and Conservation

PROSODY: INSTRUMENTAL SUPPORT

○ **Frantz's (2009) Impressionistic Description**

- ✓ An accented syllable is high pitched
- ✓ Pitch gradually lowers throughout the word
- ✓ Pitch movement on long vowels are not always the same (some stable; some drops in the middle)
 - Stable: slight pitch rise toward the end
 - Pitch drop: wide range of pitch contour - audible

PROSODY: INSTRUMENTAL SUPPORT

Taylor's (1969) Impressionistic Description

- Type I: Prominent syllable is located near the beginning & is high pitched (crescendo/decrescendo)
- Type II: Prominent syllable is final or penultimate & high intensity, contour is steady low pitch.



- We are able to further understand what the description meant
- These two types are result of one pitch excursion mechanism.
- Interaction of downdrift basic pitch + higher pitch at accented syllable

IMPLICATION: PHONOLOGY

- Counter examples to the quantity sensitive analysis (Kaneko 1999; Weber in press) were treated as words with inherent pitch marking
 - e.g., *nínaa* ‘man’, *saahkómaapi* ‘boy’, and *issitsímaan* ‘infant’
 - These words occur frequently and most likely to be included in teaching materials; they should also be examined.
- In addition, the term *pitch accent* has been interpreted in various ways (Hyman 2009); it is important to conduct detailed pitch examinations.

IMPLICATION: PHONOLOGY

- Raises the issue of finding an appropriate theoretical framework for a language involving pitch in prominence, especially for an under-researched language.
- It is significant to consider pitch excursion documentation as well as or even before conducting theoretical pitch analysis.

FUTURE WORK

- Look at pitch excursion in
 - Polysynthetic words
 - Words with multiple accents
 - Sentences
 - Connected speech
- Perception study
 - Where speakers hear accents
 - How native speakers perceive pitch excursion
- Second Language Acquisition
 - How learners acquire Blackfoot pitch excursion



IMPLICATION

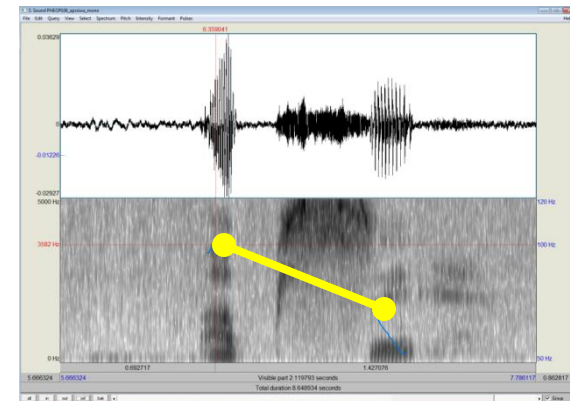
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SIGNIFICANCE: APPLICATION

- Description of pitch excursion tells us how the pitch begins, continues, and ends a word.
 - Melody of Blackfoot words informs whether or not the speakers are first language speakers
 - Most learners are member of the tribes; they want to sound “right.”
- The pitch excursion description provides teachers and learners with the information they need
 - Such as how they should pronounce Blackfoot words regarding intonation
 - e.g. Pitch gradually goes down
 - Pitch is flat if third syllable is accented...

PITCH ART – EXAMPLE APPLICATION

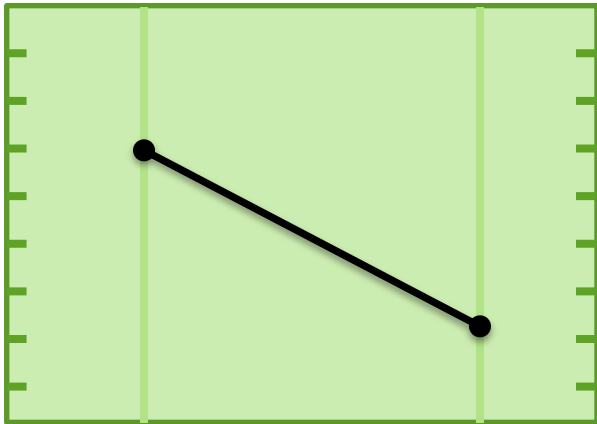
- Pitch Art is a graph visualizing pitch excursion
- “Pitch Art” can be used for teacher training & learners’ pronunciation practice
- It is an adaptation of Tone Art: used in Cherokee to illustrate the rise-fall tone patterns (Herrick et al. forthcoming; Hirata-Edds and Herrick 2015).
- We used Praat to create Pitch Art
Showing phonetic image is a technique for teaching L2 sounds (Liu et al. 2011).



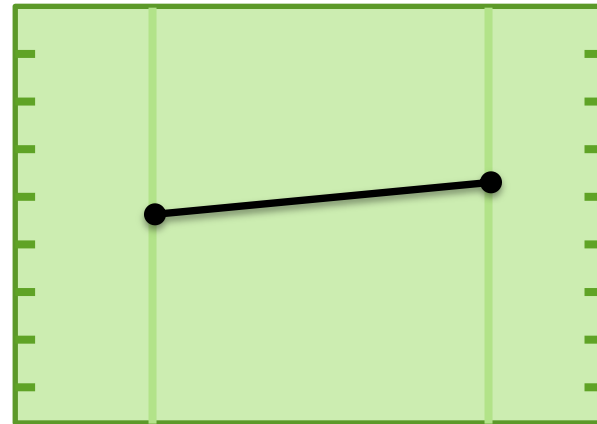
ápsiw 'it's an arrow'

SIMPLIFIED PITCH ART

ápssiw 'it's an arrow'



apssíw 'it's a fig'



- Take these two as examples.
- Pronunciation is the same except for their pitch accents
- But values of accented and unaccented syllables' pitch are NOT the same - Not a mirror image
- Use of pitch art help learners acquire the word melody of Blackfoot

FUTURE APPLICATION PROJECT

- Use Pitch Art in
 - Teacher training seminar (Summer 2015)
 - Language instruction for children (Fall 2015)
 - Adult learners (U of Montana)



Cuts Wood Academy
Blackfeet Nation

SIGNIFICANCE: DOCUMENTATION & CONSERVATION

- The theme of the ICLDC4 “Enriching Theory, Practice, and Application”
- Our project bridges two fields, language documentation and conservation regarding the Blackfoot local pitch excursion.
- This provides the base for more projects that connect these two fields.

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THANK YOU



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Cavan Wagner (RA 2013-14)

Bonny Lahey (RA 2014-2016)

UM Linguistics Club (U of Montana)

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BLACKFEET NATION

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