Towards a spoken dictionary of Maskwacîs Cree


SILS – 9.6.2018
Miyo Wahkohtowin Education – Alberta Language Technology Lab collaboration

- Language technology – “low-hanging fruits” according to the Sámi model (← Giellatekno/Divvun, UiT Arctic University of Norway) – meeting in January 2014
  - spell-checkers
  - Morphologically intelligent electronic dictionaries
  - Reader’s tools
  - **Spoken** and written **text collections**
  - Morphologically intelligent CALL (ICALL) applications
  - **Speech synthesis**
- Shift of focus from written to spoken text
  - Miyo priority: recording how Plains Cree is spoken in Maskwacîs

→ Memorandum of Understanding signed between Miyo and ALT Lab in March 2015
Original goals

• record **careful, isolated** pronunciations of each **word** in the Maskwacîs Cree dictionary
• Fill in potential **lexical gaps** in the Maskwacîs Cree dictionary, and record these words as well
• record for each dictionary word one **example sentence**, where it (and other words) are spoken in a normal context
• record **the informal discussions** concerning the words (Cree/English)
• transcribe the recordings and create a comprehensive **text collection** of Plains Cree
• make these spoken words and sentences **publicly available** as part of a **web-based electronic dictionary**
• conduct **linguistic** research on the way
## Maskwacîs Cree Dictionary

- **Content**
  - 8986 words (many would correspond to English phrases or sentences)

<table>
<thead>
<tr>
<th>Word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>achahkos</td>
<td>A star.</td>
</tr>
<tr>
<td>achihnti</td>
<td>It does not fit through.</td>
</tr>
<tr>
<td>achim</td>
<td>Tell about him.</td>
</tr>
<tr>
<td>achimaw</td>
<td>A story is told about him.</td>
</tr>
<tr>
<td>achimew</td>
<td>He is telling a story about him.</td>
</tr>
<tr>
<td>achimewak</td>
<td>They are telling a story about him or them.</td>
</tr>
<tr>
<td>achimoh</td>
<td>You tell a story.</td>
</tr>
<tr>
<td>achimok</td>
<td>All of you tell a story.</td>
</tr>
<tr>
<td>achimostamaew</td>
<td>He tells a story for him or them.</td>
</tr>
<tr>
<td>achimostamaw</td>
<td>Tell a story for him.</td>
</tr>
<tr>
<td>achimostamawaw</td>
<td>A story is told for him.</td>
</tr>
<tr>
<td>achimostatowak</td>
<td>They are telling each other stories.</td>
</tr>
<tr>
<td>achimostaw</td>
<td>Tell him a story.</td>
</tr>
<tr>
<td>achimostawaw</td>
<td>He was told a story.</td>
</tr>
<tr>
<td>achimostawew</td>
<td>He is telling him or them a story.</td>
</tr>
<tr>
<td>achimostawewak</td>
<td>They are telling stories to them.</td>
</tr>
<tr>
<td>achimostawihk</td>
<td>All of you, tell him a story.</td>
</tr>
<tr>
<td>achimostawik</td>
<td>All of you tell me a story.</td>
</tr>
<tr>
<td>achimostawin</td>
<td>Tell me a story.</td>
</tr>
<tr>
<td>achimostawinan</td>
<td>Tell us a story.</td>
</tr>
<tr>
<td>achimow</td>
<td>He told a story.</td>
</tr>
<tr>
<td>achimowak</td>
<td>They are telling stories.</td>
</tr>
<tr>
<td>achimowin</td>
<td>A story. A news forecast.</td>
</tr>
<tr>
<td>achiwinam</td>
<td>He shrinks or decreases it with his hands.</td>
</tr>
<tr>
<td>achiwipayin</td>
<td>It shrinks.</td>
</tr>
<tr>
<td>achiwipayiw</td>
<td>He shrinks. Animate.</td>
</tr>
<tr>
<td>achosis</td>
<td>An arrow.</td>
</tr>
</tbody>
</table>
Recording process

• Maskwacîs Cree Dictionary words grouped meaning-wise into sets from a similar domain ← *RapidWords* meaning groups
  – Undertaken by three UofA undergraduate volunteers (Megan Bontogon, Elizabeth Pankratz & Sarah Lamarche) during summer of 2014

• informal discussion for each meaning group
  – are all the relevant ideas and words represented in the meaning group, are some missing?
  – gradually a shift towards coming up with sentences that present natural uses of one or more of the words under discussion
  – recording of individual words spoken carefully in isolation by one or more native speaker → twice by each speaker
  – recording of example sentences spoken carefully by one native speaker → twice by each speaker
Recording sessions

- 2-4 fluent native Cree speakers
  - each discussant recorded individually with a head-mounted microphone
- 1 discussion facilitator/elicitor
- 1 technician/transcriber/record-keeper

- Facilitator (and technician) could be one of the Cree speakers
- technician should be able to concentrate on ensuring the quality of the recordings and keeping track of covered lexical items

Roles of the facilitator and technician became merged ↔ attention can be shifted between writing down new words and example sentences, and then carefully recording these separately in batches (focusing on recording quality)

2-4 people from Miyo Wahkohtowin Education, 1-2 from UofA
Maskwacîs Cree speakers

- 113 Mary Jean Littlechild
- 84 Louise Wildcat
- 83 Jerry Roasting
- 74 Harley Simon
- 73 Annette Lee
- 66 Arlene Makinaw
- 64 Rosie Rowan
- 43 Rose Makinaw
- 43 Kisikaw
- 33 Betty Simon

- 28 Brian lightning
- 18 Brian Lee
- 11 Linda Oldpan
- 7 Miriam Buffalo
- 4 Norma Linda Saddleback
- 4 Debora Young
- 4 Renee Makinaw
- 3 Ivy Raine
- 2 Paula Makinaw

- All C1 speakers, learnt English only in (residential) school
Post-recording activity

• recordings should be **backed-up** in multiple locations immediately/the same day

• **transcription** and **identification** of words and sentences in the recordings
  – UofA Linguistics & Native studies students
  – Miyo participants

• **validation** of the transcriptions
  – Miyo fluent native speakers, e.g. elders and language instructors

• integrating recorded words and sentences as well as their transcriptions as part of a **web-based Cree dictionary**
Maskwacîs dictionary & RapidWords

• RapidWords dictionary
  – originally intended for the generation of a comprehensive dictionary for a language from scratch
  – covering all essential domains of life (anywhere in the world)
    • 1 Universe, creation
    • 2 Person
    • 3 Language and thought
    • 4 Social behavior
    • 5 Daily life
    • 6 Work and occupation
    • 7 Physical actions
    • 8 States
    • 9 Grammar
  – global focus on any human community → some semantic domains not relevant everywhere → some semantic domains may require more detail somewhere, e.g. in the case of Cree/Maskwacîs
  – Words sometimes hard to classify in a single domain → possibility to classify word under multiple (=two) domains → in-build robustness in the recordings though repetition
RapidWords

• Universe, Creation
  – 1.1 Sky
  – 1.2 World
  – 1.3 Water
  – 1.4 Living things
  – 1.5 Plant
  – 1.6 Animal
  – 1.7 Nature, environment
• **1.1 Sky**
  – 1.1.1 Sun
  – 1.1.2 Air
  – **1.1.3 Weather**
• **1.2 World**
  – 1.2.1 Land
  – 1.2.2 Substance, matter
  – 1.2.3 Solid, liquid, gas
• **1.3 Water**
  – 1.3.1 Bodies of water
  – 1.3.2 Movement of water
  – 1.3.3 Wet
  – 1.3.4 Be in water
  – 1.3.5 Solutions of water
  – 1.3.6 Water quality
• **1.4 Living things**
  – 1.4.1 Dead things
  – 1.4.2 Spirits of things
1.1.3 Weather
  – 1.1.3.1 Wind
  – 1.1.3.2 Cloud
  – 1.1.3.3 Rain
  – 1.1.3.4 Snow, ice
  – 1.1.3.5 Storm
  – 1.1.3.6 Lightning, thunder
  – 1.1.3.7 Flood
  – 1.1.3.8 Drought
Maskwacîs dictionary → Snow, Ice

• (1) What words refer to different kinds of snow?
  – snow (n), sleet, sleety, hail, hailstorm, snowstorm, ice storm, blizzard, snow flurry

• (2) What does the snow do?
  – snow (v), fall, snowfall, drift, blow, cover (the ground), blanket (v), snow in

• (3) What words refer to a piece of snow or ice?
  – snowflake, hailstone, block of ice, ice cube

• (4) What words refer to snow or ice on the ground?
  – ice, drift, snowbank, blanket, snow cover, dusting, icicle, sheet of ice, iceberg, glacier

• (5) What words refer to snow on a mountain?
  – glacier, snowcap, snowfield, avalanche

• (6) What words refer to frost (frozen dew)?
  – frost

• (7) What do people do with snow?
  – shovel, plow
Maskwacîs dictionary → Snow, Ice

• (8) What do people make with snow?
  – snowball, snowman, igloo
• (9) What tools do people use with snow?
  – ice axe, snow shovel, snowplow
• (10) What words refer to moving on snow or ice?
  – ski, skate, sled, sleigh, sledge, snowshoes, skis, ice-skates, slide, slip
• (11) What words refer to water turning into ice?
  – freeze, frozen, ice over/up
• (12) What words refer to snow and ice turning into water?
  – melt, melt water, thaw, slush, turn to slush
• (13) What words refer to frozen ground?
  – permafrost
• (14) What words describe a time when it snows?
  – snowy
• (15) What words describe something that has snow or ice on it?
  – snowy, snow covered, icy, frosty
Maskwacîs dictionary ➔ meaning classifications: Overall frequencies

- 863  1. Universe, creation
- 1124  2. Person
- 889  3. Language and thought
- 664  4. Social behaviour
- 937  5. Daily life
- 744  6. Work and occupation
- 2256  7. Physical actions
- 1323  8. States
- 164  9. Grammar
Maskwacîs dictionary ➔ meaning classifications: Weather

- 9 (General) weather
- 43 Wind
- 52 Snow, Ice
- 10 Cloud
- 8 Storm
- 6 Lightning, Thunder
- 1 Drought
- 0 Flood
Maskwacîs dictionary ➔ Snow, Ice (52)

- **asisway** = ᐄᓐᒻ ᓴ (371)  An ice chisel.
- **asiswayahtik** = ᐄᓐᒻ ᓴᖅ (372)  An ice chisel handle.
- **ayakoneham** = ᐗᓕᓑᖏ (707)  He covers it with snow.
- **ayakonehwaw** = ᐗᓕᓑᖏ • (708)  He is covered under the snow.
- **ayakonehwew** = ᐗᓕᓑᖏ • (709)  He covers him or them completely with snow.
- **ayakonew** = ᐗᓕᓑᓄ (710)  He is drifted over with snow.
- **cahkas** = ᖃᓄᖅ (859)  Ice-cream.
- **eh akwatacak** = ᓄ ᐱ·ᑕᓰ (1037)  The ground is frozen.
- **eh mispok** = ᓄ ᓂ (1049)  It is snowing.
- **eh mistkwamiwik** = ᓄ ᓂ/ᖅ (1050)  It is icy.
- **eh papewstinowik** = ᓄ ᓹ (1077)  It is drifting snow.
- **eh papiwakonepayik** = ᓄ ᓹ (1078)  It is gusting snow.
- **eh saskahk** = ᓄ ᖃ (1085)  It is like a chinook. The snow is soft because it's melting.
Maskwacîs dictionary → Snow, Ice

- **ehikwaskamikatik** = \(\nabla^\parallel \Delta b \cdot \circ b \Gamma b \cap \) (1133) It is early frost. The frost is on the grass and leaves.
- **ehkawahkoneht** = \(\nabla^\parallel b \prec \ll b \cdot \circ \ll\) (1187) He falls down because the snow is too deep.
- **kawakonew** = \(b \prec \cdot d \circ\) (2004) Heavy snow made him fall.
- **kona** = \(d \sigma\) (2922) Snow.
- **konapoy** = \(d \sigma \succ\) (2923) Water melted from snow.
- **konikamik** = \(d \sigma - b \Gamma\) (2924) An igloo.
- **koniwıw** = \(d \sigma \Delta \cdot \circ\) (2925) He is covered with snow.
- **mahkakonakaw** = \(L^\parallel b d \sigma \cdot b \circ\) (3306) The snowflakes are big.
- **maniwepahwaw** = \(L \sigma \nabla \cdot \prec \ll \cdot \circ\) (3545) He is knocked off. Animate, snow.
- **mispon** = \(\cap^\nabla \succ\) (4098) It is snowing.
- **misponayaw** = \(\cap^\nabla \prec d \cdot \circ\) (4099) It is snowy (flurries).
- **misposin** = \(\cap^\nabla \succ\) (4100) It snows a little.
- **misposkin** = \(\cap^\nabla \succ \hat{\rho}\) (4101) It snows often.
- **mowakonew** = \(\cap \prec \cdot d \circ\) (4378) He eats snow.
Maskwacîs dictionary → Snow, Ice

- **nohte mispon** = 𐑯𐑧 𐑥 𐑩 𐑫 𐑬 𐑩 (5142)  It is going to snow.
- **pakamisin** = 𐑡 𐑧 𐑩 𐑥  (5886)  He slips on the ice or some slippery surface.
- **panahakonew** = 𐑱 𐑧 𐑥 𐑩 𐑰 𐑦 𐑳  (5977)  He clears away snow.
- **papestinowin** = 𐑲 𐑧 𐑥 𐑩 𐑬 𐑩  (6020)  There are snowdrifts caused by the wind.
- **piwan** = 𐑳 𐑧  (6674)  It is a blizzard. The snow is falling heavy.
- **piwanayaw** = 𐑳 𐑧 𐑥 𐑰  (6675)  The weather condition is like a blizzard.
- **ponimispon** = 𐑱 𐑧 𐑥  (6741)  It stops snowing.
- **saskan** = 𐑱 𐑧  (7029)  It is slushy (as the snow is melting fast).
- **sisikan** = 𐑱 𐑧  (7338)  Sleet.
- **soniskwataham** = 𐑱 𐑧 𐑧 𐑧 𐑦  (7420)  He skates on the ice.
- **soniskwatahikana** = 𐑱 𐑧 𐑧 𐑧  (7421)  Skates.
- **soniskwatahike** = 𐑱 𐑧 𐑧  (7422)  Skate.
Maskwacîs dictionary ➔ Snow, Ice

- **soniskwatahikew** = $\rho^\sigma$:$\cdot$:$\mathcal{C}^\mathcal{D}$:$\Psi$ (7423)  He skates and maneuvers on the ice.
- **soskwachiwe** = $\rho^\sigma$:$\cdot$:$\nabla$:$\cdot$ (7448)  Go sliding.
- **soskwachiwetan** = $\rho^\sigma$:$\cdot$:$\nabla$:$\cdot$:$\mathcal{C}$ (7449)  Let's go sliding.
- **soskwachiwew** = $\rho^\sigma$:$\cdot$:$\nabla$:$\cdot$ ($7450$)  He slides. E.g. A hill or playground.
- **tihkisikan** = $\bigcap$:$\mathcal{P}$:$\rho$:$^b$ (7900)  The last snowfall of winter.
- **tihkisiw** = $\bigcap$:$\mathcal{P}$:$\rho$:$^o$ (7901)  He melts. He is thawed; as snow.
- **timikonin** = $\bigcap$:$\Gamma$:$d$:$\sigma$:$^3$ (7912)  A snow drift. V - The snow is deep.
- **timikoniw** = $\bigcap$:$\Gamma$:$d$:$\sigma$:$^o$ (7913)  There is a lot of snow.
- **twaham** = $\mathcal{C}$:$\bigcap$:$^c$ (8016)  He breaks the ice.
- **twahikan** = $\mathcal{C}$:$\bigcap$:$\Delta$:$^b$ (8017)  An object used to break the ice.
- **twahikew** = $\mathcal{C}$:$\bigcap$:$\Delta$:$\Psi$ (8018)  He makes a hole in the ice.
- **twahipan** = $\mathcal{C}$:$\bigcap$:$\Delta$:$^c$ (8019)  A water hole in the ice.
- **twasin** = $\mathcal{C}$:$\cdot$:$\Psi$ (8020)  He falls through the ice.
Recording sessions structure

• Three types of data
  – “old” Maskwacîs Dictionary words
  – “missing”/new Cree words
  – Example sentences/phrases

• Three types of tasks
  – Reviewing “old” words
  – Coming up with “new” words
  – Coming up with example sentences
  – Bonus: English metalinguistic commentary + “pedagogical” moments

• Originally interleaved ➔ later on “old” vs. “new” words in batches, with example sentences interleaved

• Elicitation materials and transcription projected on screen/wall
Reviewing “old” Maskwacîs Cree words

• Some Maskwacîs Dictionary Cree words not fully recognized

• Conjunct verb forms (with ê-/eh) preferred
  – Felt by speakers more appropriate for the English translation in the Maskwacîs dictionary using present (non-progressive) tense, in comparison to the independent verb forms used as lexical entries
Filling in “missing” words / lexical gaps

• Starting elicitation questions with abstract scientific concepts not fruitful
  – 1) What words refer to the weather?
    • weather, weather conditions, atmospheric (conditions)

• English prompt words sometimes lead to attempts at literal translations for each
  – (49) What does the snow do?
    • snow (v) = mispon / emispok
    • fall = ??
    • snowfall = ??
    • drift = timikonin ∩Γdσ^3 (7912): A snow drift. V - The snow is deep
    • blow
    • blanket: emswekoneyak: snow covers land completely
    • cover (the ground) = ??
Filling in “missing” words / lexical gaps

- English synonymy (← Anglo-Saxon + French + Greek + Latin loanwords) often not reflected in Cree in a meaningful way
  - (2) What words describe the weather when it is good?
    - clear (weather) ≈ miyo-kisikaw
    - good (weather) ≈ miyo-kisikaw
    - fair (weather) ≈ miyo-kisikaw
    - fine (weather/day) ≈ miyo-kisikaw
Filling in “missing” words / lexical gaps

• English synonymy (Anglo-Saxon + French + Greek + Latin loanwords) often not reflected in Cree in a meaningful way
  – (1) What words refer to everything we can see?
    • universe = kisikohk
    • creation = otoyinkewin
    • cosmos = acahkosahek
    • heaven and earth = kihcikisihkohek ekwa askihk
    • everything that exists: pokokikway ka-yamakeyahk ehayamakahk

• Some English lexicalization patterns not apparent in Cree
  – Be wide vs. become wide(r) vs. make wide(r) vs. become gradually wide(r) vs. make gradually wide(r) vs. etc.

• Some terms translatable only as phrases
  – atheist = namoya emanitomit ~ godless / one who does not believe in G/god ~ word vs. phrase?
Example sentences

• The most difficult activity
  – Interleaving sentences and phrases with reviewing/coming up with words often interrupts the process
  – Individual Cree words typically equaling multiword English sentences
  – Clusters of similar words do not naturally result in example sentences
  – Reduced to lesser focus
Example sentences

• Different strategies
  – Impromptu combination of semantically related words sometimes works → but often banal and/or longer than natural
    • *pipohki namoya ikohk pisim kisisikew maka nipihki (pisim) ayiwat-kisisikew.*
    • “In the winter the sun does not warm but in the summer it does.”
  – Questions/explanations
    • why/when would you say/use a particular Cree word?
    • *ayakoneham* = ᐃᓄᒃᑯᑎᒃᑎᑐᑦ (707) He covers it with snow.
    • *ehayakonehaman ekosi ekaya ka-ahkwatik* (1:05:09)
    • “You cover the ice hole with snow so it does not freeze”
Example sentences

- Different strategies
  - Testing and correcting Cree sentences created beforehand by eliciton
    - Could you say: X?
  - Short stories based on speaker recollections
    - “Pig that thought it was a dog, as it always ran after cars. ...
  - Picture prompts
    - Describe what is happening / what can be seen in the picture
Initial reflections

• RapidWords
  – Core vocabulary, i.e. “low-hanging fruit”, already collected
  – Thus, coming up with rather concepts took more time
• Speaker experience/expectations
  – Not just collecting words, but discussing their nuances
  – Remembering words from one’s childhood – the words that one’s mother/grandmother used
  – Some speakers very fluent orally, but not as familiar with orthographical standard
• Speaker-elicitor setting: presence of English
  – Interrupts monolingual flow of Cree
  – Influences English example sentences
  – Difficult to keep English as prompts only
  – Yields English explanations of word meaning and use
• Oralcy-literacy
  – Phonemically faithful transcription during recordings → Leaving orthopgraphical standardization to later
  – While first gists of example sentences are spontaneous and natural, their careful pronunciations influenced by word boundaries in transcription.
Results of first pass

• 300 recording sessions @ 2h x 3 speakers
• 26122 Cree words
  – 10953 Maskwacîs Dictionary words ← repetitions
  – 15169 “new” words
• 2268 “sentences”
• 6 recordings of carefully pronounced words/sentences
  – 3 speakers x 2 repeats
<table>
<thead>
<tr>
<th>Transcription</th>
<th>Translation</th>
<th>Recordings</th>
</tr>
</thead>
<tbody>
<tr>
<td>wâwa</td>
<td>clutch (eggs)</td>
<td><img src="image" alt="Recordings" /></td>
</tr>
</tbody>
</table>
Next steps

• Annotation
  – Automating word/repetition identification
  – Matching recordings with transcriptions from elicitation sheets
• Validation
  – Assessing recording snippet quality
  – Identifying whether there are even better “old” words for lexical gaps
  – Recording independent forms in addition to current conjunct ones
• Publishing on-line
  – Gradually, as materials become validated
  – As such as a searchable database of spoken Maskwacîs Cree
  – Integrated within the new on-line Cree dictionary: itwêwina
  – Transcribing Cree and English metalinguistic description and explanations
• Generally
  – Involving young/new community speakers/learners of Cree
hay hay