

Towards a spoken dictionary of Maskwacîs Cree

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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 ALTLab 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)
- achahkos ᐱᓕᓴᓂᑦ n A **star**.
- achihtin ᐱᓕᓴᓂᑦ v phrase It does not fit through.
- achim ᐱᓕᓴᓂᑦ v Tell about him.
- achimaw ᐱᓕᓴᓂᑦ v A **story** is told about him.
- achimew ᐱᓕᓴᓂᑦ v phrase He is telling a story about him.
- achimewak ᐱᓕᓴᓂᑦ v They are telling a story about him or them.
- achimoh ᐱᓕᓴᓂᑦ v You tell a story
- achimok ᐱᓕᓴᓂᑦ v All of you tell a story.
- achimostamaew ᐱᓕᓴᓂᑦ v He tells a story for him or them.
- achimostamaw ᐱᓕᓴᓂᑦ v Tell a story for him.
- achimostamawaw ᐱᓕᓴᓂᑦ v A story is told for him.
- achimostatowak ᐱᓕᓴᓂᑦ v They are telling each other stories.
- achimostaw ᐱᓕᓴᓂᑦ v Tell him a story.
- achimostawaw ᐱᓕᓴᓂᑦ v He was told a story.
- achimostawew ᐱᓕᓴᓂᑦ v He is telling him or them a story.
- achimostawewak ᐱᓕᓴᓂᑦ v They are telling stories to them.
- achimostawihk ᐱᓕᓴᓂᑦ v All of you, tell him a story.
- achimostawik ᐱᓕᓴᓂᑦ v All of you tell me a story.
- achimostawin ᐱᓕᓴᓂᑦ v Tell me a story.
- achimostawinan ᐱᓕᓴᓂᑦ v Tell us a story.
- achimow ᐱᓕᓴᓂᑦ v He told a story.
- achimowak ᐱᓕᓴᓂᑦ v They are telling stories.
- achimowin ᐱᓕᓴᓂᑦ n A story. A news forecast.
- achiwinam ᐱᓕᓴᓂᑦ v He **shrinks** or decreases it with his hands.
- achiwipayin ᐱᓕᓴᓂᑦ v It shrinks
- achiwipayiw ᐱᓕᓴᓂᑦ phrase He shrinks. Animate.
- achosis ᐱᓕᓴᓂᑦ n An **arrow**.

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

**Jerry
Roasting**

**Louise
Wildcat**

**Patricia
Johnson**

**Rose
Makinaw**

**Megan
Bontogon**

**Atticus
Harrigan**





kitokan = ᐅᑕᑲᑦ (2820): Your hip bone.

miskan = ᑭᑲᑦ (4071): A bone.

miskanhkan = ᑭᑲᑎᑲᑦ (4073): A wooden leg.

asiniy wacikan = A leg cast.

misokan = ᑭᑲᑦ (4092): The tailbone (Plains Cree). Short form of

mispikekan = ᑭᑲᑭᑲᑦ (4095): The rib.

mispikeyekan = ᑭᑲᑭᑲᑲᑦ (4096): The rib bone.

mistikwanikan = ᑭᑲᑎᑲᑦᑲᑦ (4139): The skull.

mitihtimanikan = ᑭᑲᑎᑲᑲᑲᑦ (4170): The shoulder joint.

mititiman = ᑭᑲᑲᑲᑦ (4173): The shoulder blade.

ᑭᑲᑲᑲᑦ (4174): T

ᑭᑲᑲᑲᑦ = ᑭᑲᑲᑲᑦ (4675) by falling or an accid

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u	u	u	u
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p	p	p	p
h	h	h	h
z	z	z	z

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

**Jerry
Roasting**

**Brian
Lightning**

**Harley
Simon**

**Rosie
Rowan**

**Mary Jean
Littlechild**

**Arlene
Makinaw**



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-built 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

RapidWords

- **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

RapidWords

- **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 = ᐱᓯᕐᕐᕐ (371) An ice chisel.
- asiswayahtik = ᐱᓯᕐᕐᕐᔭᑦᑎᑦ (372) An ice chisel handle.
- ayakoneham = ᐱᙵᑦᑎᑦᐱᑦ (707) He covers it with snow.
- ayakonehwaw = ᐱᙵᑦᑎᑦᐱᑦᑎᑦ (708) He is covered under the snow.
- ayakonehwew = ᐱᙵᑦᑎᑦᐱᑦᑎᑦᑎᑦ (709) He covers him or them completely with snow.
- ayakonew = ᐱᙵᑦᑎᑦᑎᑦ (710) He is drifted over with snow.
- cahkas = ᑭᑦᑎᑦ (859) Ice-cream.
- eh akwatacak = ᑎᑦᐱᑦᑎᑦᑎᑦ (1037) The ground is frozen.
- eh mispok = ᑎᑦᑎᑦᑎᑦᑎᑦ (1049) It is snowing.
- eh mistkwamiwik = ᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦ (1050) It is icy.
- eh papewstinowik = ᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦ (1077) It is drifting snow.
- eh papiwakonepayik = ᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦ (1078) It is gusting snow.
- eh saskahk = ᑎᑦᑎᑦᑎᑦᑎᑦᑎᑦ (1085) It is like a chinook. The snow is soft because it's melting.

Maskwacîs dictionary → Snow, Ice

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

Maskwacîs dictionary → Snow, Ice

- **nohte mispon** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (5142) It is going to snow.
- **pakamisin** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (5886) He slips on the ice or some slippery surface.
- **panahakoneu** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (5977) He clears away snow.
- **papestinowin** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (6020) There are snowdrifts caused by the wind.
- **piwan** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (6674) It is a blizzard. The snow is falling heavy.
- **piwanayaw** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (6675) The weather condition is like a blizzard.
- **ponimispon** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (6741) It stops snowing.
- **saskan** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (7029) It is slushy (as the snow is melting fast).
- **sisikan** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (7338) Sleet.
- **soniskwataham** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (7420) He skates on the ice.
- **soniskwatahikana** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (7421) Skates.
- **soniskwatahike** = ᑭᑯᑦᑭᑦᑭᑦᑭᑦ (7422) Skate.

Maskwacîs dictionary → Snow, Ice

- **soniskwatahikew** = ᓂᓯᓂᓐᓂᓐᓂᓐᓂᓐ (7423) He skates and maneuvers on the ice.
- **soskwachiwe** = ᓂᓯᓂᓐᓂᓐᓂᓐ (7448) Go sliding.
- **soskwachiwetan** = ᓂᓯᓂᓐᓂᓐᓂᓐᓂᓐ (7449) Let's go sliding.
- **soskwachiwew** = ᓂᓯᓂᓐᓂᓐᓂᓐᓂᓐ (7450) He slides. E.g. A hill or playground.
- **tihkisikan** = ᓂᓯᓂᓐᓂᓐᓂᓐ (7900) The last snowfall of winter.
- **tihkisiw** = ᓂᓯᓂᓐᓂᓐᓂᓐ (7901) He melts. He is thawed; as snow.
- **timikonin** = ᓂᓯᓂᓐᓂᓐᓂᓐ (7912) A snow drift. V - The snow is deep.
- **timikoniw** = ᓂᓯᓂᓐᓂᓐᓂᓐ (7913) There is a lot of snow.
- **twaham** = ᓂᓯᓂᓐᓂᓐᓂᓐ (8016) He breaks the ice.
- **twahikan** = ᓂᓯᓂᓐᓂᓐᓂᓐ (8017) An object used to break the ice.
- **twahikew** = ᓂᓯᓂᓐᓂᓐᓂᓐ (8018) **He makes a hole in the ice.**
- **twahipan** = ᓂᓯᓂᓐᓂᓐᓂᓐ (8019) A water hole in the ice.
- **twasin** = ᓂᓯᓂᓐᓂᓐᓂᓐ (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 ᠨᠦᠳᠤᠰᠤᠨ (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 = acahkosahk
 - heaven and earth = kihcikisihkohk 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* = ᐱᓗᑦᑐᑦᐸᑦᓴᑦ (707) He covers it with snow.
 - *ehyakonehaman 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 elicitor
 - 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/grand-mother 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
- Oracy-literacy
 - Phonemically faithful transcription during recordings → Leaving orthographical 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

Search



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



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