

Linguistic insights from computational modeling of *Plains* *Cree* morphology

Antti Arppe, Lene Antonsen, Trond
Trosterud, Conor Snoek, Dorothy Thunder,
Atticus Harrigan, Jordan Lachler, Jean
Okimâsis & Arok Wolvengrey

21st Century Tools for Indigenous Languages

- Partners
 - University of Alberta, University of Tromsø, Cree Literacy Network
- Co-investigators
 - Antti Arppe, Jordan Lachler, Juhani Järvikivi, Timothy Mills (UofA), Trond Trosterud (UiT)
- Collaborators
 - Dorothy Thunder, Earle Waugh, Sally Rice, David Beck (UofA), Arden Ogg (CLN), Lene Antonsen, Sjur Moshagen (UiT), Ahmad Jawad (Intellimedia), Arok Wolvengrey, Jean Okimâsis (FNUC)
- Students
 - Conor Snoek, Atticus Harrigan
- Labs/research teams
 - Alberta Language Technology Lab (ALTLab), CILLDI, CCP, APhL (UofA), Giellatekno (UiT)
- Community contacts
 - Miyo Wahkohtowin Education Board, Maskwacis, AB
 - Etc.



Arctic peoples subdivided according to language families

Indo-European family
Germanic branch

Uralic family
Finno-Ugric branch
Samoyedic branch

Altaic family
Turkic branch
Tungusic branch

Chukotko-Kamchatkan fam.

Isolated languages
(Ketic and Yukagir)

Eskimo-Aleut family
Inuit group (of Eskimo br.)
Yupik group (of Eskimo br.)
Aleut branch

Na-Dene family
Athabaskan branch
Eyak branch
Tlingit branch

— Arctic circle
— Arctic boundary according to AMAP

Notes:

Areas show colours according to the original languages of the respective indigenous peoples, even if they do not speak their languages today.

Overlapping populations are not shown. The map does not claim to show exact boundaries between the individual language groups.

Typical colonial populations, which are not traditional Arctic populations, are not shown (Danes in Greenland, Russians in the Russian Federation, non-native Americans in North America).

Many shoulders to stand upon

- Cree elders, instructors, language activists, and speakers
- Alberta Elders' Cree Dictionary
 - Earle Waugh et al.
- Maskwacis Cree dictionary
 - Miyo Wahkohtowin Education
- Cree words
 - Arok Wolvengrey
- Cree grammatical descriptions
 - Jean Okimâsis, H. Christoph Wolfart
- Cree text collections
 - H. Christoph Wolfart, Kevin Russell
 - Patricia Demers, Naomi L. McIlwraith, Dorothy Thunder
 - Bloomfield
 - Hopefully many more ...

Alberta Language Technology Lab

21st Century Tools for Indigenous Languages

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21st century tools for indigenous languages: 2013-2016

✦ Sticky ✖ Uncategorized

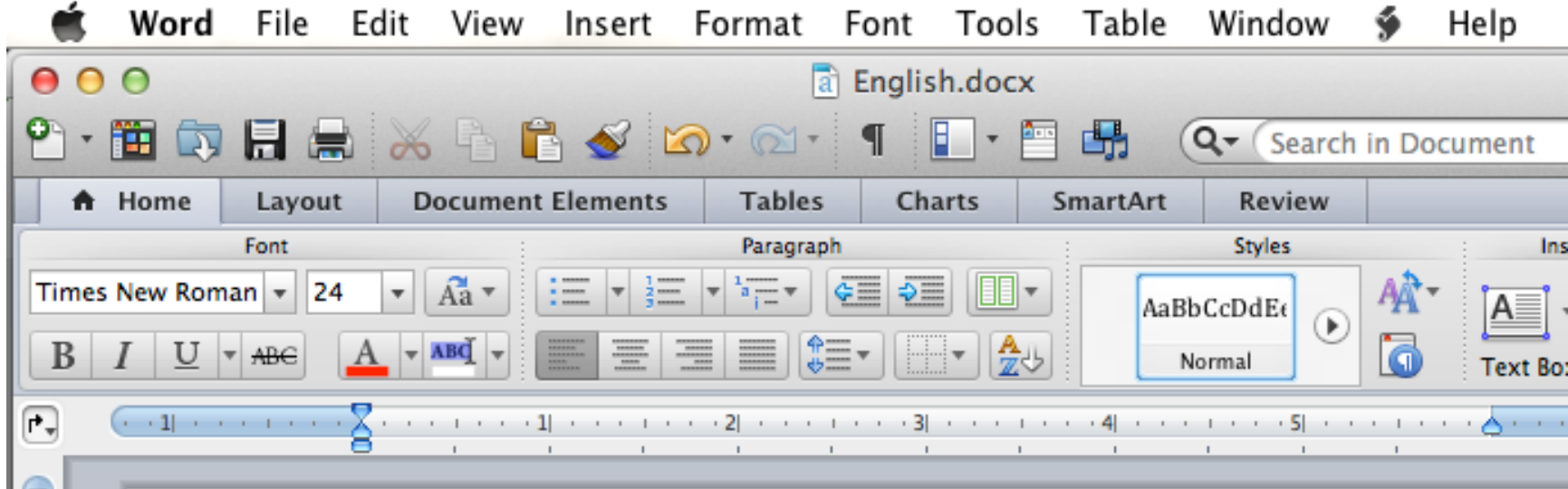
Using *Plains Cree* as the spearhead language, this project will produce tools such as *spell-checkers*, *language teaching and learning software*, and *text-to-speech synthesizers*.

These technologies are available for world's majority languages (e.g. English), but have so been created for only a few minority languages. In providing minority language speakers with these applications the project aims

to facilitate the use of minority languages in all spheres of life by community members.

21CTfIL – Tangible deliverables

- Toolkit
 - Intelligent web-based dictionaries
 - Facilitate language comprehension by native speakers and language learners → ease-of-use
 - spell-checker
 - creation of good-quality texts in that language by its own speakers
 - Intelligent language training and education applications
 - revitalization of knowledge about the language's structure
 - basic text-to-speech synthesizer
 - enabling the visually impaired to access and hear information in their native language
 - linguistic analysis tools
 - research use

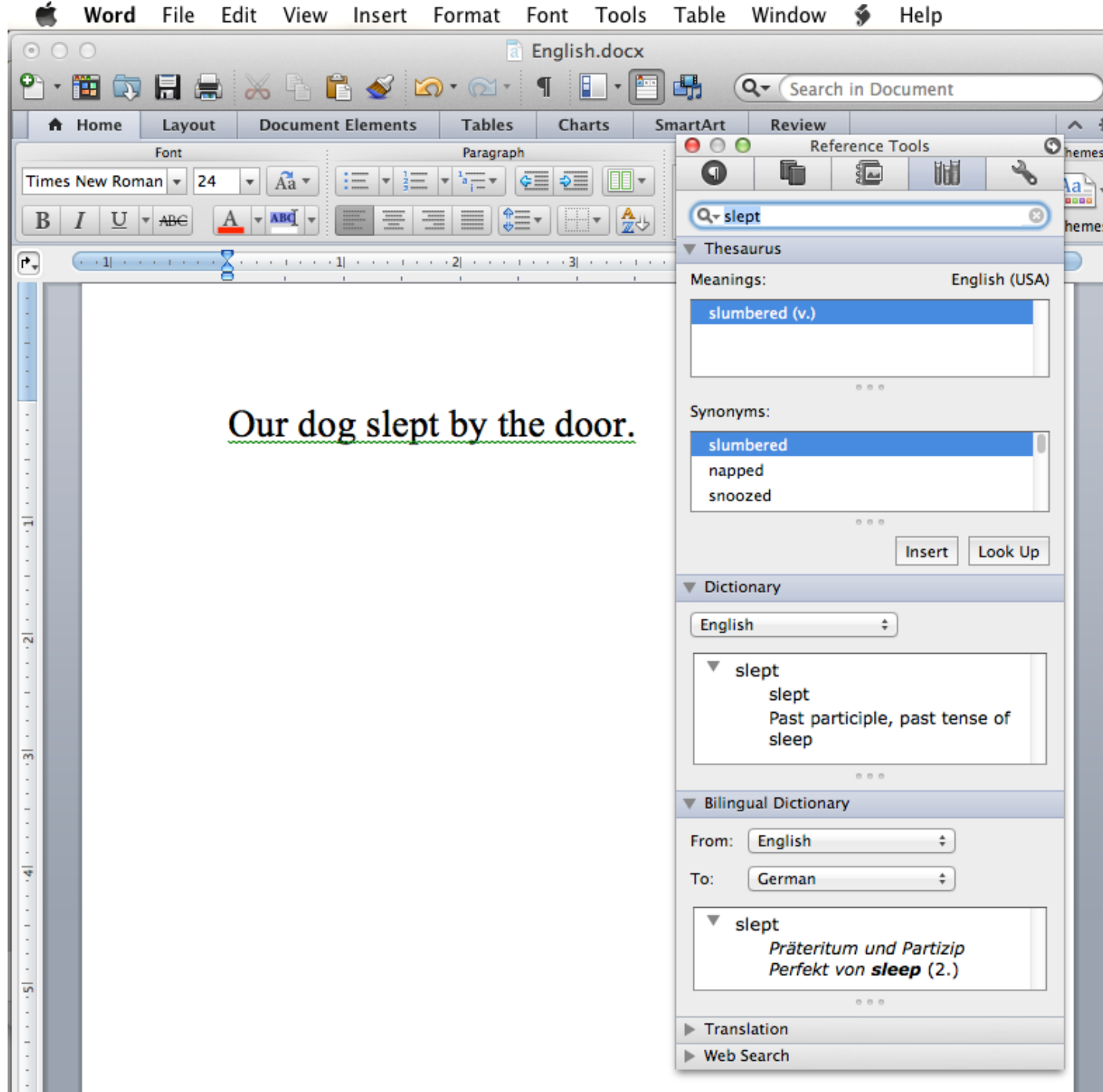


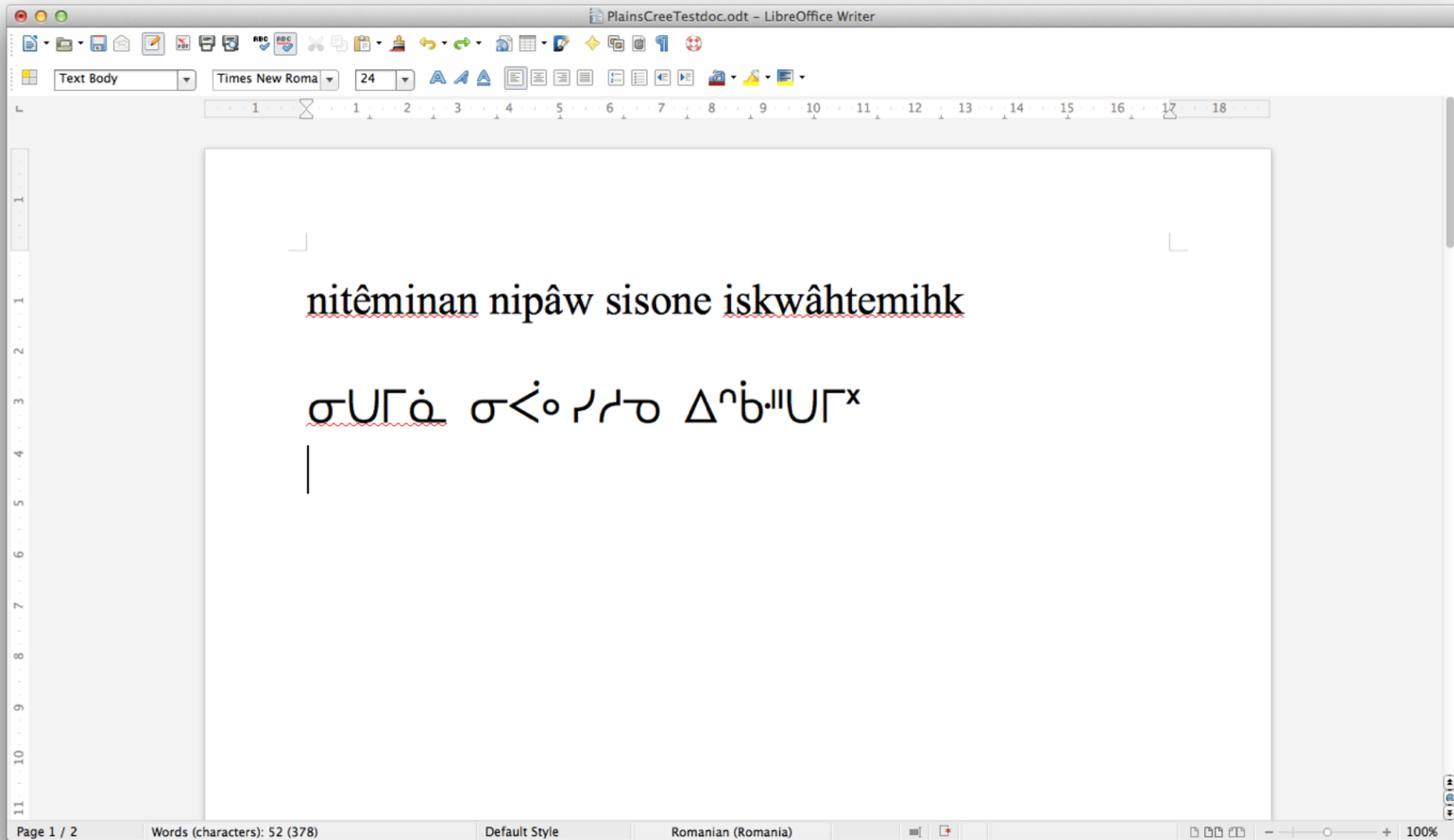
Our dog sleep by the door.

slept
sleep
sleet
sleeps
sleepy

Ignore
Ignore All
Add

AutoCorrect
Spelling...





LibreOffice File Edit View Insert Format Table Tools Window Help

PlainsCreeTestdoc.odt - LibreOffice Writer

Default Style Times New Roma 24

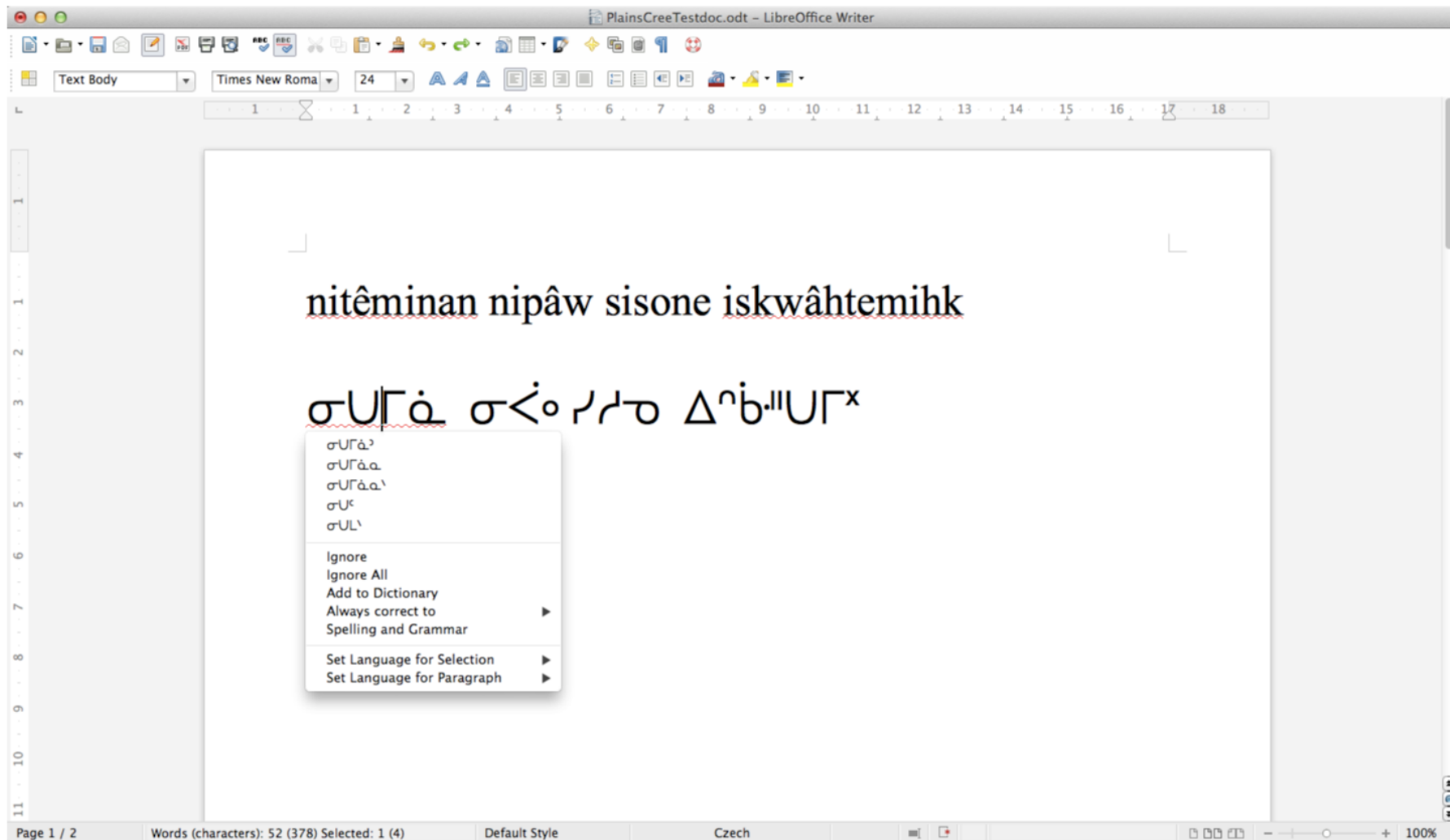
nitêminan nipâw sisone iskwâhtemihk

nitêminân
kitêminaw
nitêminâna

Ignore
Ignore All
Add to Dictionary
Always correct to
Spelling and Grammar

Set Language for Selection
Set Language for Paragraph

Page 1 / 2 Words (characters): 52 (378) Selected: 1 (9) Default Style Romanian (Romania) 100%





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itwêwasinahikana

nêhiyawêwin → âkayâsimowin

NAWASÔNA TÂNISI KÂ-ISI-
NÊHIYAWASINAHIKÊYAN

papêyâhtak nêhiyawasinahikêwin (aâ)

wêhci-masinahikêwin (a → a ~ â)

nêhiyawêwin (wêhci-masinahikêwin) → âkayâsimowin

niteminan

nitona

nitona masinahikêwinihk

nitona nêhiyaw-itwêwin ta-miskaman
âkayâsiwascikêwin (êkwa mîna tânisi kâ-isi-
âniskôpitamihk).

kotaka itwêwasinahikana

pikiskwewina

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crk 🇬🇧

itwêwasinahikana

nêhiyawêwin → âkayâsîmowin

nêhiyawêwin → âkayâsîmowin

itwêwin

nitona

nitona masinahikêwinihk

niteminan is a possible form of ...

NAWASÔNA TÂNISI KÂ-ISI-
NÊHIYAWASINAHIKÊYAN

papêyâhtak nêhiyawasinahikêwin (aâ)

wêhci-masinahikêwin (a → a ~ â)

atim (n)

o dog; horse; beast of burden

nêhiyawêwin : itwêwina / Cree : Words

atim [Texts →](#)
Noun Animate Singular
Possessive: 1st person
exclusive plural

[kotaka itwêwasinahikana](#)

When I was a child I went to school away from my reserve. It was at Prince Albert where I went to school, there was a Residential School there where I went. There was a lot of ill treatment, but I'm not going to talk about that, I'm going to tell a story about my fellow pitiful ones, my fellow students.

[1] *ispîhk* ohci. kistap: *ispîhk* (pcle) — when kinwahamâkosin ohpimê nitiskonikanihk wahamâkosiyân, êkota Residential School ê-kî-itohtahikawiyân. mistahî mânia nikî-kitimâkihihawinân, mâka namôya êwako niwî-âtotên, niwî-âcimâwak nîci-kitimâkisak, nîci-okiskinwahamâkanak.

[illegible]

When I was a child I went to school away from my reserve. It was at Prince Albert where I went to school, there was a Residential School there where I went. There was a lot of ill treatment, but I'm not going to talk about that, I'm going to tell a story about my fellow pitiful ones, my fellow students.

Á

nikî-nitawi-kiskinwahamâkosin

s/he learns; s/he is a student,
s/he attends school; s/he is
taught

[illegible]

$\sigma^x \triangleright \Gamma x \text{ } P^o C \wedge \dot{\sigma}^x \dot{L} a \dot{b}$
 $\Delta \dot{\gamma} x \text{ } \Gamma^o C \Delta \dot{L} a$
 $\text{ } P \cap \dot{L} P \dot{H} \dot{Y}$

When I was a child I went to school away from my reserve. It was at Prince Albert where I went to school, there was a Residential School there where I went. There was a lot of ill treatment, but I'm not going to talk about that, I'm going to tell a story about my fellow pitiful ones, my fellow students.

When I was a child I went to school away from my reserve. It was at Prince Albert where I went to school, there was a Residential School there where I went. There was a lot of ill treatment, but I'm not going to talk about that, I'm going to tell a story about my fellow pitiful ones, my fellow students.

ohpimê (pcle) — off, away, to the side; at another place, elsewhere, somewhere else

Dog Biscuits – Salamô âcimow

[1] ispîhk kê-kî-awâsisîwiyan nîkî-nitawi-kiskinwahamâkosin ohpimê **nitiskonikanihk**

ohci. kistapinânihk mâna kê-kî-nitawi-kiskinwahamâkosiyân,

ê-kî-itohtahikawiyân. mistahi mâna nîkî-kitimâkihihawinân,

niwî-âtotên, niwî-âcimâwak nîci-kitimâkisak, nîci-okiskinwah

nitiskonikanihk

iskonikan (n) — reserve,
reservation; portion; leftover

Δ^Λ^ b̂ p̂ ΔΔ̂r̂Δ̂Δ̂ σ̂p̂ σ̂CΔ̂ P̂P̂Q̂Δ̂L̂d̂r̂ Δ̂Δ̂Λ̂Γ̂ σ̂N̂^d̂σ̂
 P̂ σ̂CΔ̂ P̂P̂Q̂Δ̂L̂d̂r̂Δ̂, Δ̂d̂C Residential School ∇̂ P̂ Δ̂Δ̂ĈΔ̂b̂Δ̂Δ̂x̂ Γ̂^ĈΔ̂ L̂Q̂
 σ̂p̂ P̂N̂L̂P̂Δ̂b̂Δ̂Q̂, L̂b̂ Q̂ĴΔ̂ ∇̂Δ̂d̂ σ̂Δ̂ Δ̂Δ̂Û, σ̂Δ̂ Δ̂r̂L̂Δ̂ Δ̂r̂ P̂N̂L̂P̂Δ̂,
 Δ̂r̂ Δ̂P̂P̂Q̂Δ̂L̂b̂Q̂Δ̂x̂

When I was a child I went to school away from my reserve. It was at Prince Albert where I went to school, there was a Residential School there where I went. There was a lot of ill treatment, but I'm not going to talk about that, I'm going to tell a story about my fellow pitiful ones, my fellow students.

Dog Biscuits – Sala

[1] ispīhk kâ-kî-awâsis
ohci. **kistapinânihk**
ê-kî-itohtahikawiyân.
niwî-âtotên, niwî-âcin

Δ^Λ^ b̂ p̂ ΔΔΔΔΔΔΔΔ
p̂ σCΔ P^PΔΔΔΔΔΔΔΔ
σp̂ p̂ΔΔΔΔΔΔΔΔ, Δb̂ ΔΔΔΔΔΔΔΔ, σΔΔΔΔΔΔΔΔ, σΔΔΔΔΔΔΔΔ, σΔΔΔΔΔΔΔΔ

kistapinân (n) — Prince Albert, SK; literally: place of wealth; meeting place; gathering place
kistapinânihk (n) — Prince Albert, SK; literally: place of wealth; meeting place; gathering place

ikosin ohpimê nitiskonikanihk
osiyân, êkota Residential School
inân, mâka namôya êwako
inwahamâkanak.

Δ^ΔΔΔΔΔΔΔ ΔΔΔΔΔΔΔΔ ΔΔΔΔΔΔΔΔ ΔΔΔΔΔΔΔΔ
ΔΔΔΔΔΔΔΔ ΔΔΔΔΔΔΔΔ ΔΔΔΔΔΔΔΔ ΔΔΔΔΔΔΔΔ

When I was a child I went to school away from my reserve. It was at Prince Albert where I went to school, there was a Residential School there where I went. There was a lot of ill treatment, but I'm not going to talk about that, I'm going to tell a story about my fellow pitiful ones, my fellow students.



itwêwasinahikana

nêhiyawêwin → âkayâsimowin

NAWASÔNA TÂNISI KÂ-ISI-
NÊHIYAWASINAHIKÊYAN

papêyâhtak nêhiyawasinahikêwin (aâ)

wêhci-masinahikêwin (a → a ~ â)

nêhiyawêwin → âkayâsimowin

nikî-nitawi-kiskinwahamâkosin

nitona

nitona masinahikêwinihk

nitona nêhiyaw-itwêwin ta-miskaman
âkayâsiwascikêwin (êkwa mîna tânisi kâ-isi-
âniskôpitamihk).

kotaka itwêwasinahikana

itwêwasinahikana

nêhiyawêwin → âkayâsîmowin

NAWASÔNA TÂNISI KÂ-ISI-
NÊHIYAWASINAHIKÊYAN

papêyâhtak nêhiyawasinahikêwin (aâ)

wêhci-masinahikêwin (a → a ~ â)

nêhiyawêwin → âkayâsîmowin

|twêwin

nitona

nitona masinahikêwinihk

nikî-nitawi-kiskinwahamâkosin is a possible form of ...

kiskinwahamâkosiw (v)

- o s/he learns; s/he is a student, s/he attends school; s/he is taught

nêhiyawêwin : itwêwina / Cree : Words

kiskinwahamâkosiw

[Texts →](#)

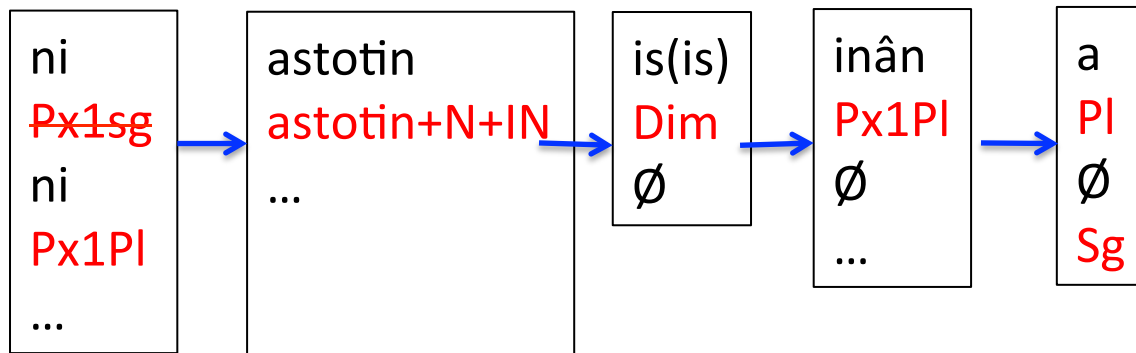
PV/nitawi Verb AI Indicative
Past Subject: 1st person
singular

[kotaka itwêwasinahikana](#)

Finite state transducers – components (Beesley & Karttunen, 2003)

nicascocinisinâna

“surface” form



1. Affixation sequence rules (associated with morphological features)
→ LEXC

$\emptyset \rightarrow t / \text{Poss } V_ < V$
 $t \rightarrow c / _ \text{Dim}$

2. Morphophonological rules → TWOLC

ni...inân
~~Px1Pl~~+....+Px1Pl
~~Px1sg~~+....+Px1Pl

3. Affix agreement rules
“filters” → LEXC

astotin+N+IN+Dim+Pl+Px1Pl

“deep/underlying” form

Modeling affix and stem variation

- In computational modeling, we are trying to model the entire lexicon
- Level of detail and explicitness required for a computational model beyond many grammatical descriptions
 - Individual morphological phenomenon types (possession, locative, plural, obviation) are typically individually explained, but not all their possible combinations are necessarily covered
- Identifying the exhaustive set of all paradigm types covering the entire lexicon is indispensable
 - Specification of the full set of possible affix (sequence) realizations and the associated morphological features for each paradigm/stem type
 - Classification of stems per each word class according to paradigm types
 - But are these abstractions/generalizations “creating” some individual forms which do not in practice exist in the linguistic system? ← rare or pragmatically odd forms

The necessity of fieldwork?

- “missing” theoretically possible morphological forms need to be submitted to fluent native speaker scrutiny
 - But considerable variety among native speaker specialists regarding the acceptability of some non-core inflected forms
 - Individual speakers have only partial experience of the full possible extent of a language

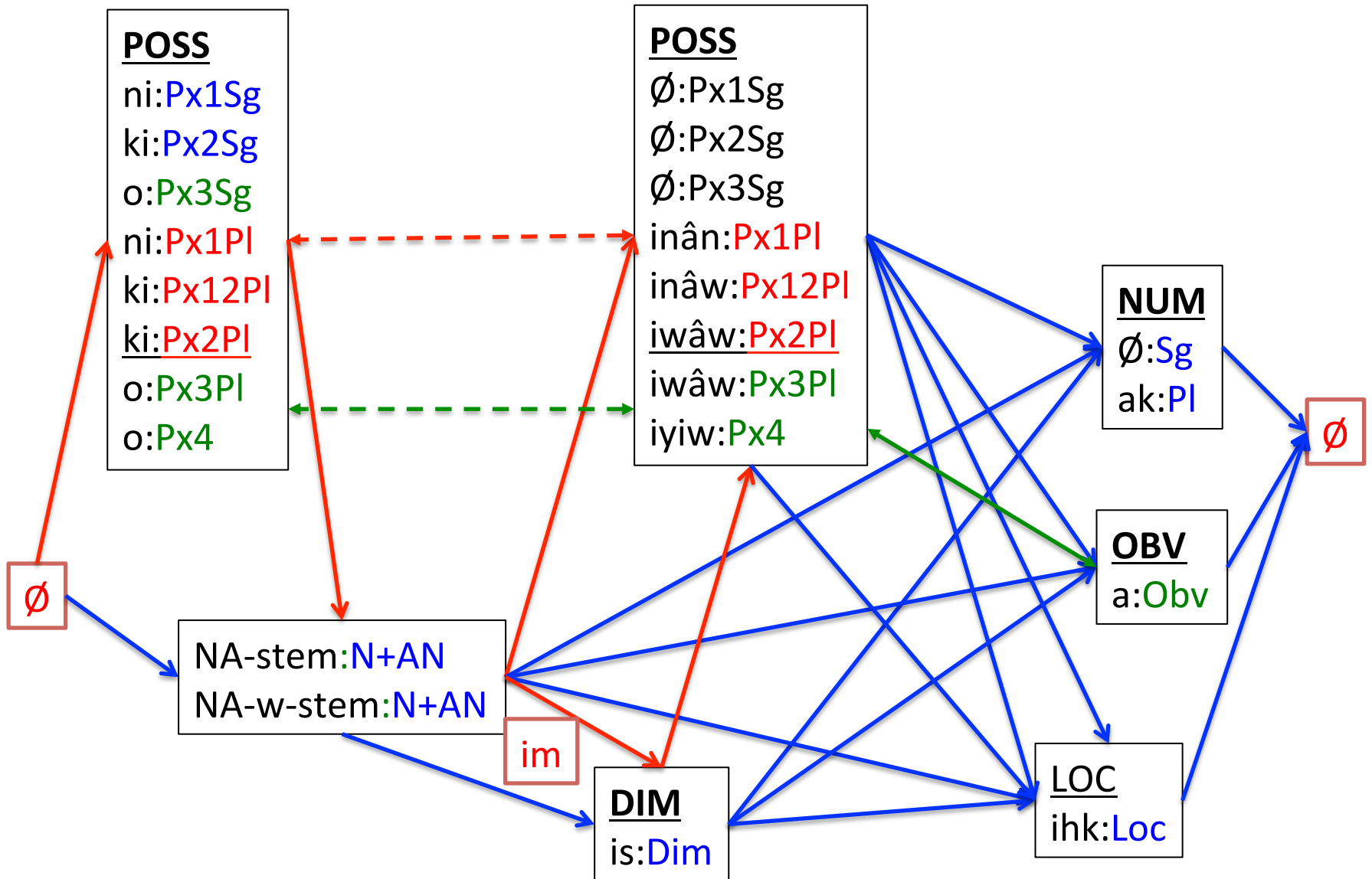
Plains Cree – nominal morphotax

- *stem*+NUM
- *stem*+OBV
- *stem*+LOC

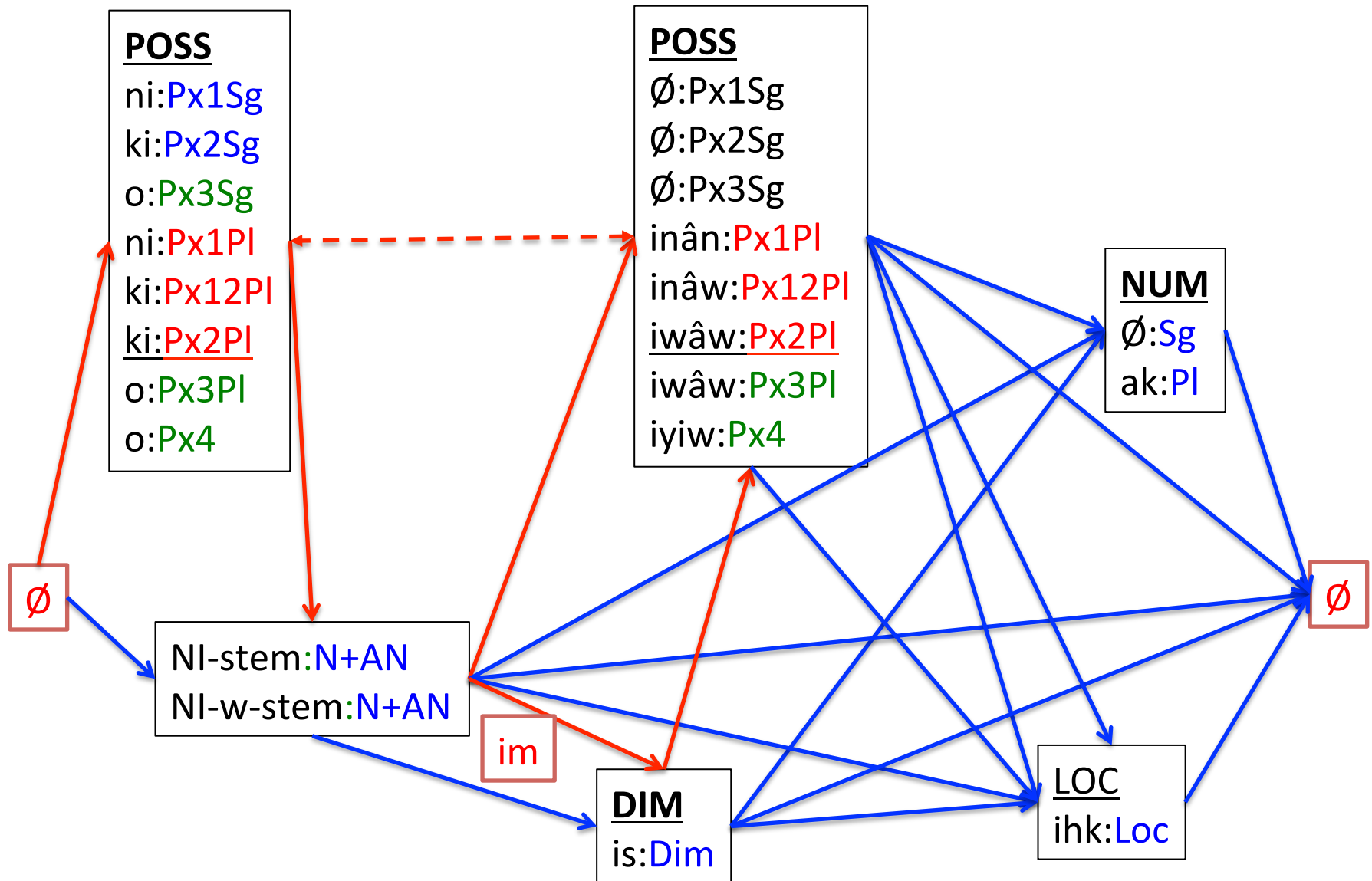
- *stem*+DIM+NUM
- *stem*+DIM+OBV
- *stem*+DIM+LOC

- POSS+*stem*+POSS+NUM
- POSS+*stem*+DIM+POSS+NUM
- POSS+*stem*+DIM+POSS+OBV
- POSS+*stem*+POSS+LOC
- POSS+*stem*+DIM+POSS+LOC

Nominal animate morphotax



Nominal inanimate morphotax



General morphotactic map →
paradigms and variation

Plains Cree nominal paradigm types (Wolvengrey, p.c. 2014)

- Inanimate: 10
 - NI1 C-Initial Regular NI Stem : **cîmân** “canoe, boat”
 - NI1 V-Initial Regular NI Stem : **astotin** “hat, cap”
 - NI2 C-Initial VW NI Stem : **mîkisasâkay** “beaded coat, beaded dress”
 - NI2 V-Initial VW NI Stem : **oskasâkay** “new coat, new dress”
 - NI3 C-Initial Cw NI Stem : **pahkêkin:pahkêkinw-** “leather, rawhide”
 - NI3 V-Initial Cw NI Stem : **askêkin:askêkinw-** “fresh rawhide”
 - NI4 C-Initial Single-Syllable NI Stem : **wâw-** “egg”
 - NI4 V-Initial Single-Syllable NI Stem : **osk-ây-** “new item, new thing”
 - NI4 V-Initial Single-Syllable irregular NI Stem : **ôsi:ôs-** “canoe, boat”
 - NI4w C-Initial Single-Syllable-/w/ NI Stem : **mihkw-** “blood”

NI₁
Consonant-Initial Regular NI Stem
 example: *cīmān*– “canoe, boat”

Nominal inanimate paradigms – affix/feature bundles

		Prefix	NI ₁ Stem	(–im)	Ending	Word	Translation
singular						<i>cīmān</i>	canoe
	1s	ni–		(–im)		<i>nicīmān</i>	my canoe
	2s	ki–		(–im)		<i>kicīmān</i>	your canoe
	1p	ni–		(–im)	–inān	<i>nicīmāninān</i>	our canoe
	2l	ki–		(–im)	–inaw	<i>kicīmāninaw</i>	our canoe
	2p	ki–		(–im)	–iwāw	<i>kicīmāniwāw</i>	your canoe
	3s	o–		(–im)		<i>ocīmān</i>	his/her canoe
	3p	o–		(–im)	–iwāw	<i>ocīmāniwāw</i>	their canoe
	4	o–		(–im)	–iyiw	<i>ocīmāniyiw</i>	another’s canoe
plural					–a	<i>cīmāna</i>	canoes
	1s	ni–		(–im)	–a	<i>nicīmāna</i>	my canoes
	2s	ki–		(–im)	–a	<i>kicīmāna</i>	your canoes
	1p	ni–		(–im)	–ināna	<i>nicīmānināna</i>	our canoes
	2l	ki–		(–im)	–inawa	<i>kicīmāninawa</i>	our canoes
	2p	ki–		(–im)	–iwāwa	<i>kicīmāniwāwa</i>	your canoes
	3s	o–		(–im)	–a	<i>ocīmāna</i>	his/her canoes
	3p	o–		(–im)	–iwāwa	<i>ocīmāniwāwa</i>	their canoes
	4	o–		(–im)	–iyiwa	<i>ocīmāniyiwa</i>	another’s canoes
locative					–ihk	<i>cīmānihk</i>	in the canoe(s)
	1s	ni–		(–im)	–ihk	<i>nicīmānihk</i>	in my canoe(s)
	2s	ki–		(–im)	–ihk	<i>kicīmānihk</i>	in your canoe(s)
	1p	ni–		(–im)	–ināhk	<i>nicīmānināhk</i>	in our canoe(s)
	2l	ki–		(–im)	–ināhk	<i>kicīmānināhk</i>	in our canoe(s)
	2p	ki–		(–im)	–iwāhk	<i>kicīmāniwāhk</i>	in your canoe(s)
	3s	o–		(–im)	–ihk	<i>ocīmānihk</i>	in his/her canoe(s)
	3p	o–		(–im)	–iwāhk	<i>ocīmāniwāhk</i>	in their canoe(s)
	4	o–		(–im)	–iyihk	<i>ocīmāniyihk</i>	in another’s canoe(s)
dim					–is(is)*	<i>cīmānis</i>	small canoe

*The Diminutive derivation will also convert any /t/ present in the stem (and usually the prefix as well) to [c] (i.e. /t/ > [c]).

All derived diminutive verbs become regular stems of the appropriate animacy.

Plains Cree nominal paradigms types (Wolvengrey, p.c. 2014)

- Animate: 10
 - NA1 C-Initial Regular NA Stem : **pahkwêsi**kan “bannock”
 - NA1 V-Initial Regular NA Stem : **asi**kan “sock”
 - NA2 C-Initial V-Glide NA Stem : **kih**c-ô**ki**niy “tomato”
 - NA2 V-Initial V-Glide NA Stem : **aya**piy “net”
 - NA3 C-Initial C-/w/ NA Stem :
masina**hi**kanâ**ht**ik:**masina****hi**kanâ**ht**ikw- “pencil”
 - NA3 V-Initial C-/w/ NA Stem : **aski****h**k:**aski****h**kw- “kettle, pail”
 - NA4 C-Initial Single-Syllable NA Stem : **niska**:**nisk**- “goose” (and **siht**- “spruce”)
 - NA4 V-Initial Single-Syllable NA Stem : **êsa**:**ês**- “clam; shell”
 - NA4w C-Initial Single-Syllable-/w/ NA Stem : **wâh**kwa:**wâh**kw- “roe, fish eggs; lump of roe”
 - NA4w V-Initial Single-Syllable-/w/ NA Stem : **ih**kwa:**ih**kw- “louse”

Nominal animate paradigms – affix/feature bundles

NA₁

Consonant-Initial Regular NA Stem

example: *pahkwēsikan*– “bannock”

		Prefix	NA ₁ Stem	(-im)	Ending	Example	Translation
singular						<i>pahkwēsikan</i>	bannock
	1s	ni–		(-im)		<i>nipahkwēsikanim</i>	my bannock
	2s	ki–		(-im)		<i>kipahkwēsikanim</i>	your bannock
	1p	ni–		(-im)	–inān	<i>nipahkwēsikaniminān</i>	our bannock
	2l	ki–		(-im)	–inaw	<i>kipahkwēsikaniminaw</i>	our bannock
	2p	ki–		(-im)	–iwāw	<i>kipahkwēsikanimiwāw</i>	your bannock
plural					–ak	<i>pahkwēsikanak</i>	bannocks
	1s	ni–		(-im)	–ak	<i>nipahkwēsikanimak</i>	my bannocks
	2s	ki–		(-im)	–ak	<i>kipahkwēsikanimak</i>	your bannocks
	1p	ni–		(-im)	–inānak	<i>nipahkwēsikaniminānak</i>	our bannocks
	2l	ki–		(-im)	–inawak	<i>kipahkwēsikaniminawak</i>	our bannocks
	2p	ki–		(-im)	–iwāwak	<i>kipahkwēsikanimiwāwak</i>	your bannocks
obviative					–a	<i>pahkwēsikana</i>	bannock(s)
	1s	ni–		(-im)	–a	<i>nipahkwēsikanima</i>	my bannock(s)
	2s	ki–		(-im)	–a	<i>kipahkwēsikanima</i>	your bannock(s)
	1p	ni–		(-im)	–ināna	<i>nipahkwēsikanimināna</i>	our bannock(s)
	2l	ki–		(-im)	–inawa	<i>kipahkwēsikaniminawa</i>	our bannock(s)
	2p	ki–		(-im)	–iwāwa	<i>kipahkwēsikanimiwāwa</i>	your bannock(s)
	3s	o–		(-im)	–a	<i>opahkwēsikanima</i>	his/her bannock(s)
	3p	o–		(-im)	–iwāwa	<i>opahkwēsikanimiwāwa</i>	their bannock(s)
	4	o–		(-im)	–iyiwa	<i>opahkwēsikanimiwiwa</i>	another’s bannock(s)
locative					–ihk	<i>pahkwēsikanihk</i>	in the bannock(s)
	1s	ni–		(-im)	–ihk	<i>nipahkwēsikanimihk</i>	in my bannock(s)
	2s	ki–		(-im)	–ihk	<i>kipahkwēsikanimihk</i>	in your bannock(s)
	1p	ni–		(-im)	–ināhk	<i>nipahkwēsikanimināhk</i>	in our bannock(s)
	2l	ki–		(-im)	–ināhk	<i>kipahkwēsikanimināhk</i>	in our bannock(s)
	2p	ki–		(-im)	–iwāhk	<i>kipahkwēsikanimiwāhk</i>	in your bannock(s)
	3s	o–		(-im)	–ihk	<i>opahkwēsikanimihk</i>	in his/her bannock(s)
	3p	o–		(-im)	–iwāhk	<i>opahkwēsikanimiwāhk</i>	in their bannock(s)
	4	o–		(-im)	–iyihk	<i>opahkwēsikanimihihk</i>	in another’s bannock(s)
dim					–is(is)*	<i>pahkwēsikanis</i>	small piece of bannock

*Remember the Diminutive derivation /t/ > [c]

Nouns classified according to paradigm types in *Cree: Words* (Wolvengrey 2001)

NI-1 **acâwêwikamikos** little store, shop

NI-1 **acikâsimin** evergreen berry;
kinnikinnick berry, ground cedar berry

NI-3 **acikâsipakwa:acikâsipakw-** bearberry
leaves; plant-like evergreen (mixed with
tobacco); *Arctostaphylos uva-ursi*

NI-1 **acimomêyisimin** cactus berry, red
berry from a cactus; literally: "little dog-
feces berry"

NI-1 **ahcahkowin** spirituality

NI-2 **ahcâpahciy** bowstring

NI-3 **ahcâpâhtik:ahcâpâhtikw-** bow stick,
stick previously used as a bow

NI-2 **ahcâpiy** bow

NI-2 **ahkâmasiniy** round stone for breaking
bones

...

NA-1 **acâhkos** star

NA-1 **acihkos** caribou calf, fawn

NA-1 **acihkosis** caribou calf, fawn

NA-1 **acimosi** pup, puppy; small dog

NA-1 **acos** arrow, little arrow

NA-1 **acosis** arrow, little arrow

NA-3 **ahcahk:ahcahk-** soul, spirit

NA-1 **ahpihc** tobacco

NA-1 **ahpihcis** pouch, tobacco pouch

NA-1 **ahpiht** pouch, tobacco pouch

NA-2 **ahtay** pelt; fur, animal skin

NA-2 **akahkway** bloodsucker

NA-1 **akahkwayimin** spiral shell

NA-3 **akask:akask-** knobbed arrow,
knob-shaped arrowhead

...

Plains Cree nominal paradigms types (Wolvengrey → FST)

- Both the animate and inanimate types can be reduced to a smaller set (LEXC), using some 20 morphophonological rules (TWOLC)
 - “regular” stem variation (joiner **-t-** before initial Vowel vs. Consonant)
 - Stem variation involving final **-w** based on Wolvengrey dictionary lemma/stem data
 - Diminutive: **/t/** → **/c/**
 - regular changes a morpheme junctions
 - etc.

“New” possible variation and subparadigms

- Determinants of *-im-* affix in possessive forms
- Determinants of short vs. long diminutive affix *-is* vs. *-isis*
- animate nouns and the locative form
 - e.g. *atimohk*
- animate nouns and the distributive form
 - groups of people and buffalos but not any other animals (bears, beavers, geese, etc.) or plants (trees)?
- mass nouns → only singular

Plains Cree noun model – post-stem animate suffix combinations

- Possessive: $\emptyset$, Diminutive: **-is**
 - Possessive: $\emptyset$, Diminutive: **-isis**
 - **Possessive: $\emptyset$, Diminutive: **-isis** & **-is****
 - Possessive: **-im-**, Diminutive: **-is**
 - Possessive: **-im-**, Diminutive: **-isis**
 - Possessive: **-im-**, Diminutive: **-is** & **-isis**
 - **Stem: **-w**, Possessive: **-im-**, Diminutive: **-is****
-
- Kinship terms: generic form (**someone's X**)
 - Kinship terms: no attested generic form (**Sg1 possessor**)
 - **ôho**: absolute declension, Possession: **none**, Diminutive: **none**
 - Number: **only singular** (only one wife/husband)
-
- **atim** and **mistatim**: Diminutive, Possessive

Plains Cree noun model – post-stem inanimate suffix combinations

- Stem: $\emptyset$, Possessive: $\emptyset$, Diminutive: **-is**
- Stem: $\emptyset$, Possessive: $\emptyset$, Diminutive: **-isis**
- **Stem: $\emptyset$, Possessive: $\emptyset$, Diminutive: -is- & -isis-**
- Stem: $\emptyset$, Possessive: **-im-**, Diminutive: **-is**
- Stem: $\emptyset$, Possessive: **-im-**, Diminutive: **-isis**
- Stem: $\emptyset$, Possessive: **-im-**, Diminutive: **-is** & **-isis**

- **Stem: -w, Possessive: -im-, Diminutive: -is, only Sg (1-syllable)**
- **ôsi** (irregular)
- **Stem: Inalienable, Number: Only Sg**

Less clear cases

- Possibly determined by semantic groupings not explicitly specified in lexical resources
- Possibly even determined at the lemma level
- Or possibly an indication of general or areal/dialectal variation
- Resolution?
 - Specification through corpora
 - Specification through native speaker judgments
 - Allowing for variation?

Locatives and grammatical vs. semantic animacy

- Types
 - inanimate: 184 vs. animate: 22
- Tokens
 - inanimate: 1381 vs. animate: 180
- Animate + Locative
 - 40 **ayihk** aya+N+AN+Loc ‘one, person’, aya+N+IN+Loc ‘one, thing’, ayihk+Pcle ‘ah’
 - 24 **minahikohk** minahik+N+AN+Loc ‘pine’
 - 23 **kistikânihk** kistikân+N+AN+Loc ‘garden, seed’
 - 18 **mîtosihk** mîtos+N+AN+Loc ‘tree’
 - ~~9 **êyikohk** êyik+N+AN+Loc ‘ant’, êyikohk ‘when’~~
 - 9 **mistikohk** mistik+N+AN+Loc ‘tree, stick’
 - 8 **ospwâkanihk** ospwâkan+N+AN+Loc ‘pipe’
 - 5 **kônihk** kôna+N+AN+Loc ‘snow’
 - 5 **kotawânihk** kotawân+N+AN+Loc ‘camp-fire’
 - ~~4 **kihci-kîsikohk** kihci-kîsikow+N+AN+Loc ‘angel’, kihci-kîsik+N+IN+Loc ‘heaven’~~
 - 3 **wîhkihkasikanihk** wîhkihkasikan+N+AN+Loc ‘cake’
 - 3 **pôsiwinihk** pôsiwin+N+AN+Loc ‘train’
 - 3 **pahkwêsikanihk** pahkwêsikan+N+AN+Loc ‘bannock, bread, flour’
 - 3 **otâpânâskohk** otâpânâsk+N+AN+Loc ‘wagon’
 - 3 **ocâpânâskosihk** otâpânâsk+N+AN+Der/Dim+N+AN+Loc ‘buggy’
 - 3 **ocâpânâskosihk** ocâpânâskos+N+AN+Loc ‘buggy’
 - 3 **mistaskihkohk** mistaskihk+N+AN+Loc ‘kettle’
 - 3 **maskimocisihk** maskimocis+N+AN+Loc ‘bag’ vs. ‘bean’
 - 3 **awasowi-kotawânâpiskohk** awasowi-kotawânâpisk+N+AN+Loc ‘stove’
 - 3 **askihkosihk** askihkos+N+AN+Loc ‘little pail’
 - 3 **askihkosihk** askihk+N+AN+Der/Dim+N+AN+Loc ‘little pail’
 - 2 **îwahikanihk** îwahikan+N+AN+Loc ‘pounded meat’

Distributives and animate nouns

- people/communities
- animals (anthropomorphic uses?)
 - **mostosonâhk** ‘among the buffaloes’
 - **maskonâhk** ‘among the bears’
 - **amiskonâhk** ‘among the beavers’
 - **sîsîpinâhk** ‘among the geese’
 - **kinosênâhk** ‘among the fish’
- plants/trees
 - **mistikonâhk** ‘among the trees’

Mass nouns (only singular?)

- **anômin** "oatmeal; rice"
- **astinwân** "sinew"
- **âmôsiipâskwat** "honey; literally: "bee (maple) sugar""
- kinikinik "shrub mixture (red willow bark and green leaves) used as traditional tobacco for the pipe"
- **kohkôsiwiyin** "bacon"
- **kôna** "snow"
- **mihko** "blood"
- **pihko** "soot, ashes, wood ashes, dust"
- **wîko** "kidney fat"
- **wîni** "bone-marrow; his/her bone-marrow"
- **wîsakat** "pepper"
- **wîsi** "belly-fat"
- Others? Might plural forms be possible sometimes?

Lessons learnt

- Fieldwork as a part of computational modeling is extremely time-consuming
- Grasping the full morphotax encompassing all morphological phenomena is the necessary starting point for computational modeling
- Well-structured lexicographical resources – full paradigms and accordingly classified words – are indispensable
 - Fieldwork resulting in such resources should be encouraged
 - N.B. caveats of the practical reality of full paradigms
- Modeling “regular” structural paradigm variation exposes semantic/lexical paradigm variation → evidence of areal/dialectal variation

Thank you! hay-hay! Kiitos!

kakwêcihkêmwina?