



Analyzed Nishnaabemwin Dbaajmowin

Symposium on American Indian Linguistics - American Indian Language Technology
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Indigenous Language Families in Canada



Figure 1. Approximate distribution of language groups at time of first European contact (adapted from Goddard 1999)

INDIGENOUS LANGUAGES IN CANADA

Language group		Speakers
Inuit family		37,715
Na-Dene family	Dene family	18,775
	Tlingit language	120
Algonquian family		143,885
Iroquoian family		1,485
Siouan family		4,600
Pacific North-west area	Salishan family	2,865
	Wakashan family	1,065
	Tsimshianic family	1,725
Unclassified languages	Haida	130
	Ktunaxa	120
	Beothuk	(extinct)

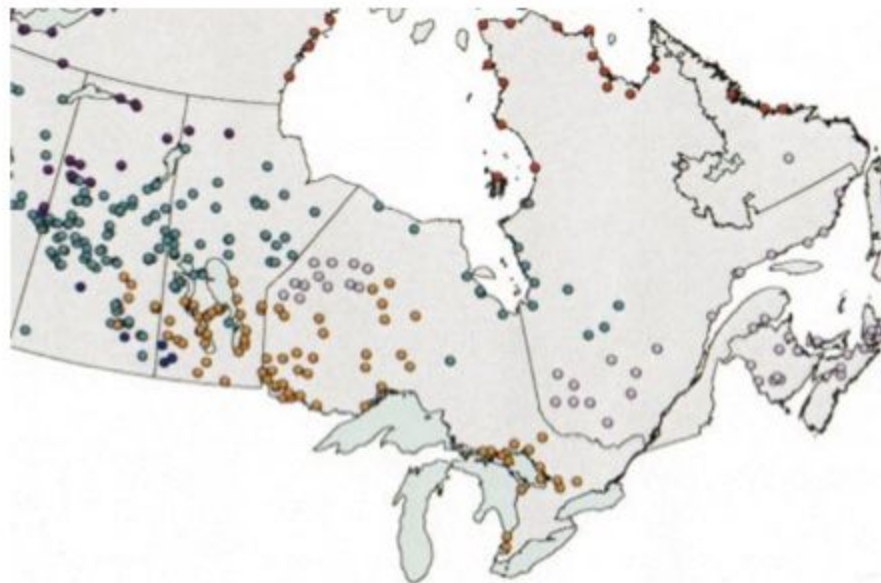
Table 2. Indigenous language groups and speakers in Canada (2016 census)

- Ojibwe 30 000 speakers in Canada with more in USA
- Cree 100 000 speakers across si provinces (2016 census)

INDIGENOUS LANGUAGES IN CANADA

Cree-Innu-Naskapi dialects	Ojibwe dialects
Plains Cree (AB, SK)	Saulteaux (SK, MB)
Woods Cree (SK, MB)	Lac Seul Ojibwe (MB, ON)
Swampy Cree (SK, MB, ON)	Oji-Cree (MB, ON)
Moose Cree (ON)	Southwestern Ojibwe (MB, ON)
Atikamekw (QC)	Central Ojibwe (ON)
East Cree (QC)	Odawa (Ottawa) (ON)
Naskapi (QC, NL)	Eastern Ojibwe (ON)
Innu (Montagnais) (QC, NL)	Algonquin (ON, QU)
	Nipissing (ON, QU)

Table 5. Cree-Innu-Naskapi and Ojibwe dialects (MacKenzie 1980; Rhodes 20



Anishinabek Nation

aka Union of Ontario Indians

39 First Nation Communities approx. 65000 pop

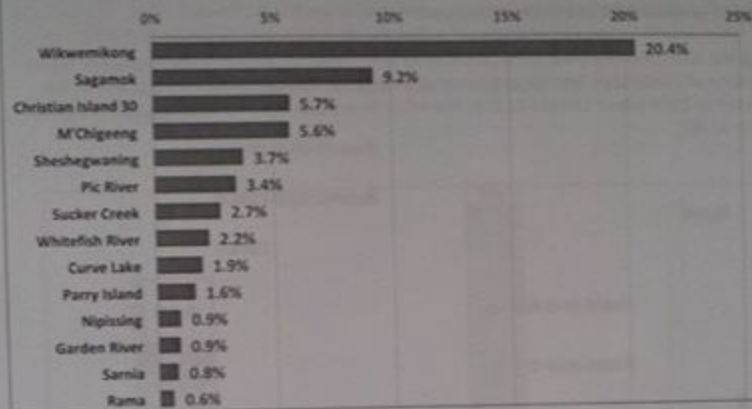


Union of Ontario Anishinabek Report 2016 Census

Anishinabek Nation Socio-Demographic Profile

July 20, 2018

Percent Who Usually Speak Ojibway at Home,
Selected Anishinabek Nation Communities, 2016 Census
(Where the percentage is greater than 0.0)



Language Knowledge

More than 12% of the population living in Anishinabek Nation Communities identify Ojibway as the language they first learned, but only 4% currently use Ojibway as their primary language in the home. Ojibway is most used in the Huron region where 19% identify it as their mother tongue and 7% say it is the most frequent language used at home. Aboriginal language use is not as common within the Anishinabek region as it is in Ontario generally.

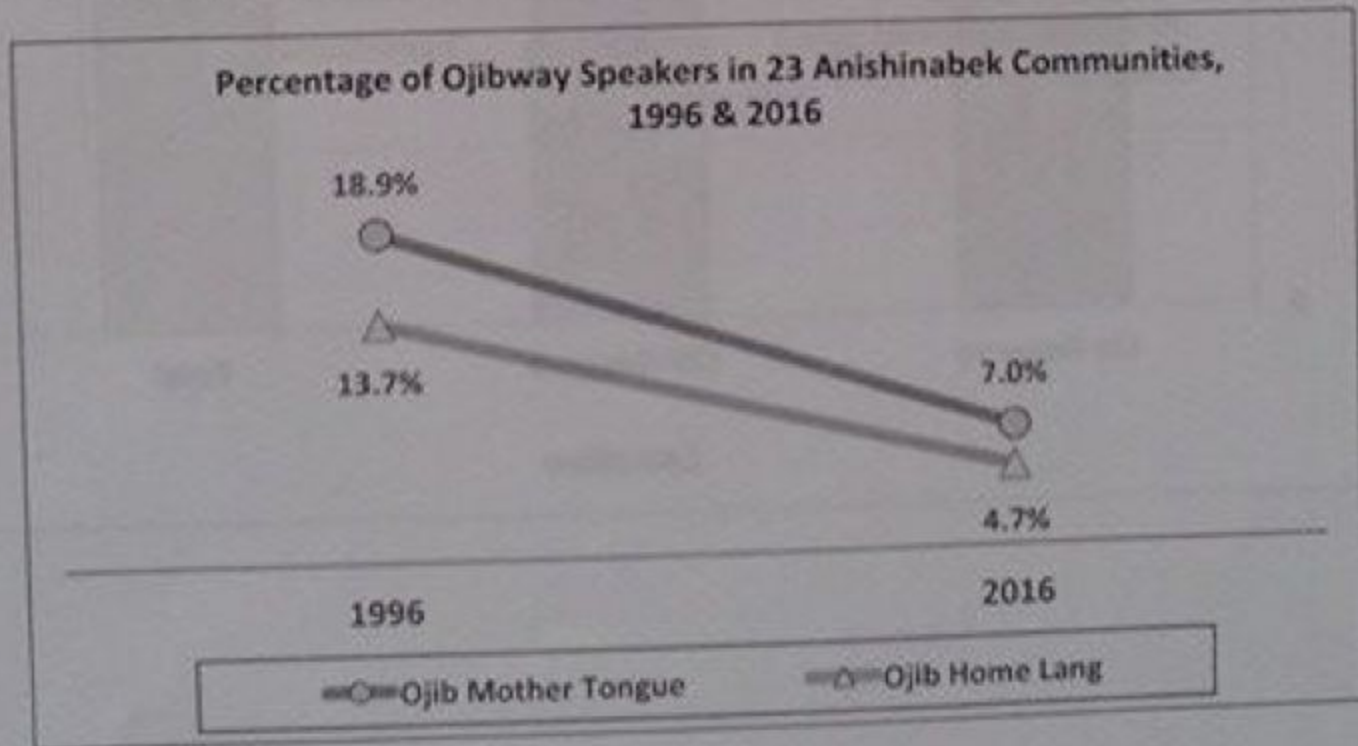
Table 2
Aboriginal Language Knowledge in Anishinabek Regions, 2016

Language Knowledge or Use	ANISHINABEK REGION				
	Anishinabek Total	South East	South West	Huron	Superior
Mother Tongue					
Any aboriginal language	13.8%	5.9%	3.3%	21.0%	4.1%
Ojibway	12.6%	5.7%	3.0%	19.1%	3.6%
Language Used At Home					
Any Aboriginal language	4.8%	1.5%	0.3%	7.9%	0.6%
Ojibway	4.2%	1.5%	0.3%	6.8%	0.6%

Source: 2016 Census of Canada

Ojibway is used at home by a small a minority of the population, even in those communities where it is strongest. The highest level of use of Ojibway is in Wikwemikong, where it is the home language of 20% of the residents, and in Sagamok, where it is the home language of 9% of residents. In the majority of Anishinabek Nation communities no one identifies Ojibway as the language usually spoken in the home.

Over the last 20 years the percentage of Ojibway speakers in Anishinabek Nation communities has declined by about 60%. In the 23 communities for which data were available in both 1996 and 2016 the percentage of residents who usually speak Ojibway at home fell from about 14% to 5%. By 2016 only 7% of the residents of these communities identified Ojibway as the first language they learned.

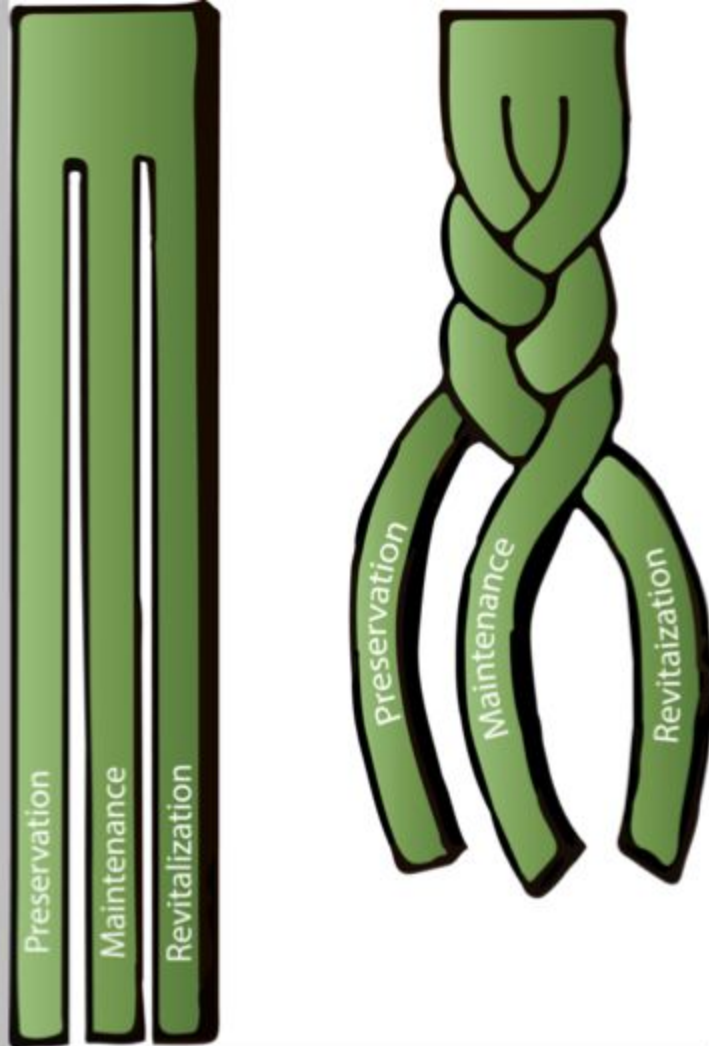


Braiding Three Strands

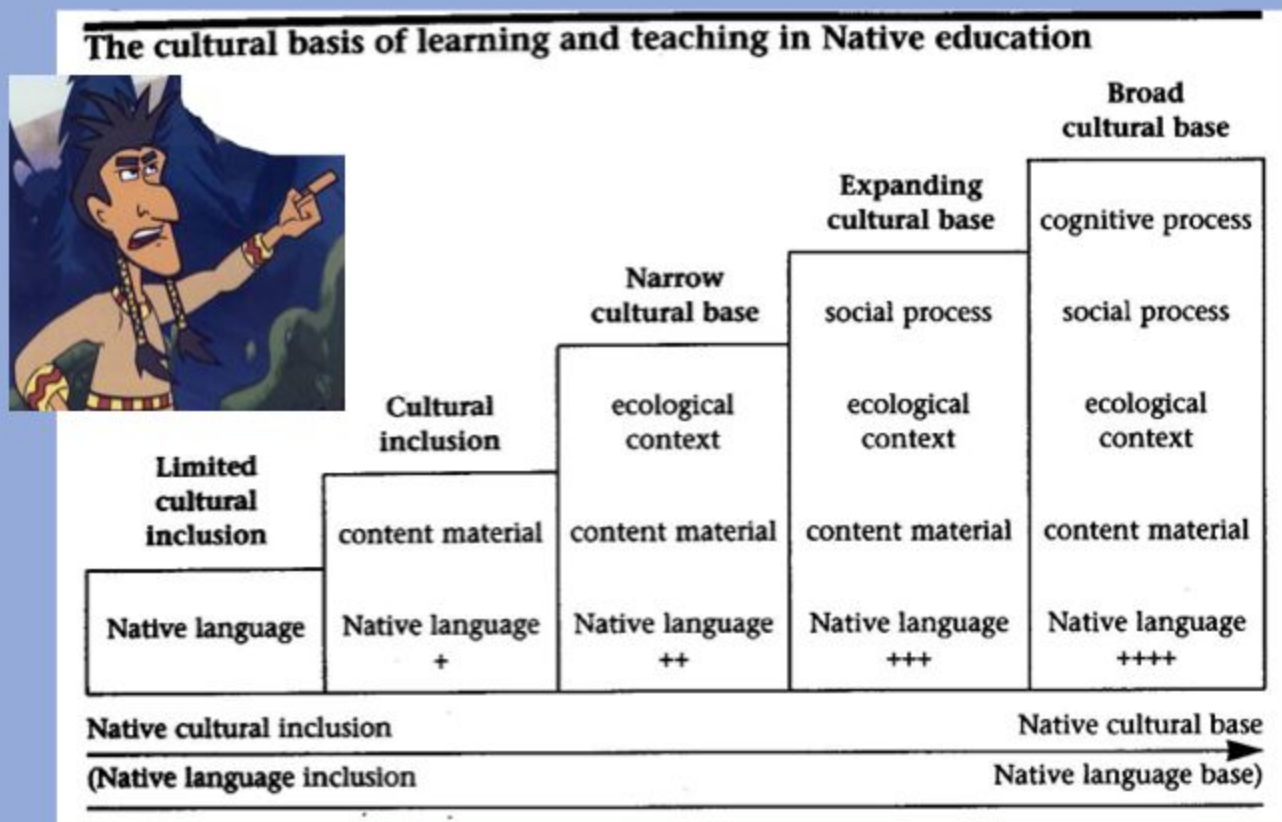
Preserve: Record your speakers, correctly document their words, create a database of topics

Maintain: SPEAK your language, WRITE your language

Revitalize: Create new words, create new spaces to use your language, compose new stories



Arlene Stairs 1995





Elder Interviews

The Anishinaabemowin Revival Program (ARR) has recorded numerous elders and has digitized videos that were recorded under the auspices of M'Chigeeng TV 22. ARR will be adding more videos as they are digitized, edited and transcribed.

The purpose of providing video interviews is to provide language learners with samples of natural speech in various settings. Each video will have an Ojibwe transcript and an Ojibwe Glossary. No English translation is provided. The reason for this is to allow teachers the opportunity to test their students' knowledge. It is also to provide advanced learners an opportunity to hone their translation skills. However every highnaabe word said in the video is included in the glossary, therefore each word has an English translation. Lastly, each word is listed in its third person (he or she) form but not in various other conjugations (plural forms, past forms, etc), that is left for the learner and teacher to cover.

Medicines and Plants Used

NISHNAABE TISGAN - INDIAN OYE

MOOJMO MSHKIKI - HEALING MEDICINE

Encounters with the Spirit

NIKAANABA - MY BROTHER

NDAAKAENIENKAA WI WIISH - THAT WATER SWIRLS

MEHIEZHII YAA JIIBAATIGODONG - LION AT THE CROSS WALK

SHETAANBEZEA - HE IS SWEATING PROFUSELY

SHII NIKEE - YOU'RE GOING TO FALL THROUGH

Historical

THE APPRENTICE

NIKAANOW - NIGHT THUNDER

Customs/Practices

SHINTOON WIINGAKHE - CLEANING SWEETGRASS

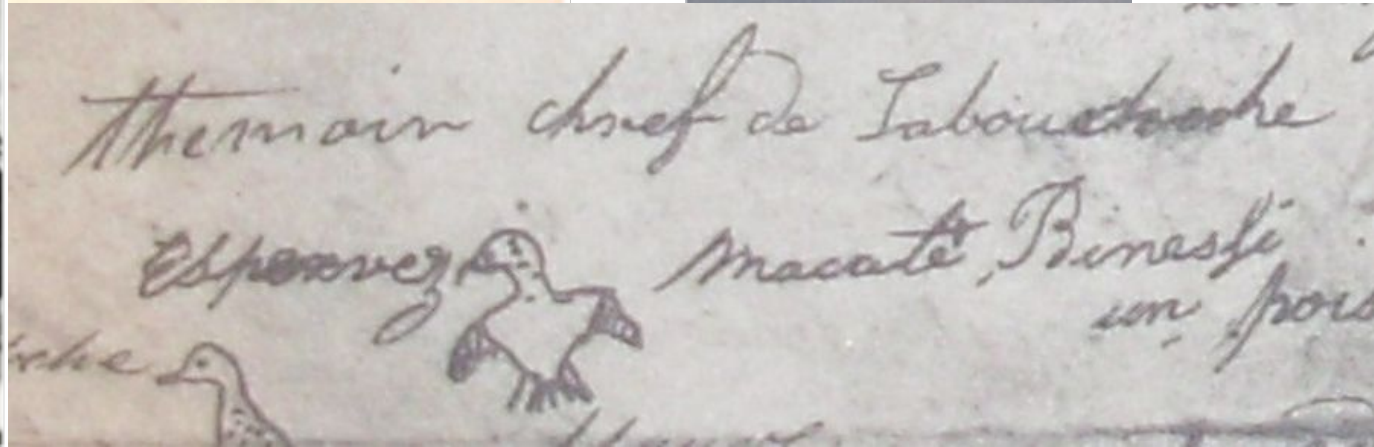
SHIIBAASHODONG - SETTING THE NET

WAANAASHKESH EZHI-SHONING - DEER BEING SKINNED

GAA-ZHI-DESHANG NODODON - NOW I GOT MY CLAN

SETE-NICAMAASHAAN - TRADITIONAL SPILE

Fred Ettawageshik: Piipiigwe, Espervez, Sparrow Hawk, American Kestrel



Fred Ettawageshik's Handwriting

why some trees have knobs on them
and the birches grow in clumps -
"wendji bkogwad anin mtigog - gaie
wigwaské-mijig wendji missoksiwod." 96

Megwa nanabojo ab-mundang odji-man
while nanabojo he was carrying on his shoulder boat

mtigong pitaksin-nik miur ga-pag-nigod.
on tree it bumped against so that it threw him

Apitchigo gindj-kadesi, ga-bzigwiid dash,
very much he became angry after getting up then

Megwaa Nenbozhoo
gaa-bmoondang
ojiimaan mtigoong
bitaaksin'nig mii iwi
gaa-pagnigod. Aapiji
go gii-nshkaadzi
gaa-bzigwiid dash



State of Play at Little Traverse Bay

26 county service area in northern Michigan

Instructors hired from Wikwemikong First Nation

Online language sessions, immersion courses at Bay Mills Community College (32 students)

Ettawageshik recordings available at tribal library, Moodle

Word-of-the-day with audio, at least 1 dozen books with audio

Enhancing an Online Dictionary with Analyzed Texts

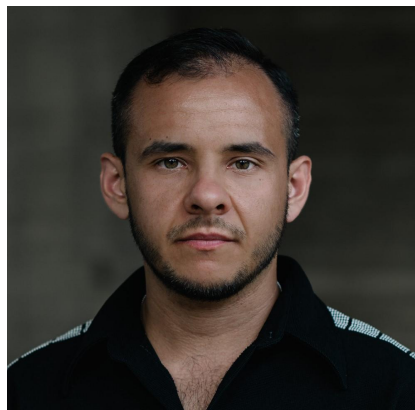


Gchi-Miigwech!



NATIONAL
ENDOWMENT
FOR THE
HUMANITIES

Thanks to Holden Madagame, Little Traverse Bay Language Department, Rand Valentine, Mary Ann Corbiere, Marie-Odile Junker (not pictured), Delasie Tokornoo (not pictured), and the National Endowment for the Humanities - Documenting Endangered Languages program





Overview

Review current online dictionary

- Features entries with example sentences

- Incomplete links between examples and dictionary

Illustrate upgrades

- Machine analysis to add links between examples and dictionary

- Show standalone texts with analysis

- Glossaries

- DIY analyzer site

Dictionary Review



Major Resources

Anishinaabemowin is pretty well documented

Some of the more visible resources:

Reference grammars (Bloomfield 1958, Valentine 2001)

Text collections (Nichols 1988, Medler 1998)

Print dictionaries (Baraga 1858, Rhodes 1985, Nichols and Nyholm 1995)

Online dictionaries (<https://ojibwe.lib.umn.edu/>, <https://www.freelang.net/online/ojibwe.php>)

Nishnaabemwin Online Dictionary: <https://dictionary.nishnaabemwin.atlas-ling.ca/>

Type something you want to look up..

English to Nishnaabemwin

Nishnaabemwin to English

Advanced Options

Results


Credits

Help

Browse

Welcome to the Nishnaabemwin Dictionary !

How to use this dictionary

1. Type something you want to look up:
2.
 - Select **English to Nishnaabemwin** if the word you typed is an English keyword
 - Select **Nishnaabemwin to English** if the word you typed is an Odawa or Ojibwe word
3. Click on the 
4. Under the *Results* tab select an entry to see more information about that entry
5. The default is to search for words beginning with whatever you type. Click on **Advanced Options** above to expand search parameters.

Dictionary+Example Corpus

Not enough to know a word's meaning, need to know how to use it!

Illustrate **words** with example sentences

Currently: Top line = Nishnaabemwin, bottom line = English

Entries

1

ggaanzmaa *vta*

1 encourage smb., urge smb., exhort smb. 2 order smb. up [in euchre]

ggaanzmaa *vta*

1. encourage smb., urge smb., exhort smb.

EXAMPLES

Mii-sh ge nii pii gii-ggaanzomgwaa ndooshkniigiimag.

That's when I exhorted my men. - SO1971.rs

Ngii-ggaanzmaa maanoo wii-gjitoot; "Gnamaa gsha go gdaa-gshkitoon," ngii-naa.

I urged her to try [doing] it; "Who knows, you might be able to do it," I told her. - MC2005.cs



Corpus-Dictionary Linkage

Only 1/3 of words in database are identical to dictionary entry

Remaining words need explicit link to dictionary entry

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1

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Gaps in Linkage

Current linkage has many gaps

If we look up *shkiniigi* 'young man'...

Entries

1

ggaanzmaa *vta*

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ggaanzmaa *vta*

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Failed examples

No examples appear for *shkiniigi* ‘young man’

Even though an example with *ndooshkiniigiimag* ‘my young men’ clearly exists!

Entries

3

shkiniigi na

youth, hired hand, young man

lim att

shkiniigi vai

[person] be young

CL, M'Ch, Sg, Wk, Wp

shkiniigish na

teenage boy, young man, youth

CL, M'Ch, Sg, Wk

shkiniigi *na*

youth, hired hand, young man

INFLECTION

PL **shkiniigwak**

FULL VOWEL FORM

Enhancements

Solution: Dictionary+Corpus+Analysis

Solution: Enhance examples with machine analysis

Originally: Nishnaabemwin, free English translation

Enhanced with: Isolated words, grammatical analysis (with explanation!), terse word-by word translation

4

Mii-sh ge nii pii gii-ggaanzomgwaa ndooshkniigiimag.

That's when I exhorted my men. SO1971.rs

Animate Noun
Plural (more than one)
Possessor
First person (I/me/my)

Mii-sh	ge	nii	pii	gii-ggaanzomgwaa	ndooshkniigiimag?
ADV	ADV	NAD POS:1	ADV	?	NA PL POS:1 THMPOS
consequently/so	additionally/additionally	wife	timely	?	youth/juvenile

Success and Bugs

Success: *ndooshkniigiimag* 'my young men' linked to *shkiniigi* 'young man'

Bug (analyzer failed): *gii-ggaanzomgwaa* "should be" *gii-ggaanzmagwaa*

Change analyzer to allow *gii-ggaanzomgwaa*/offer alternative spelling

Bug (word misidentified): *nii* = *niin* 'I' \neq *niiw* 'my wife' -> correct by hand

- 4 | **Mii-sh ge nii pii gii-ggaanzomgwaa ndooshkniigiimag.**
That's when I exhorted my men. SO1971.rs

Mii-sh
ADV
consequently/so

ge
ADV
additionally/additionally

nii
NAD POS:1
wife

pii
ADV
timely

gii-ggaanzomgwaa
?
?

ndooshkniigiimag
NA PL POS:1 THMPOS
youth/juvenile



Beyond Example Sentences

We can also make standalone pages showing whole stories

Story: Gnahmaading

- 1 | **Mii sa maaba ya'aa mkwa,**
And so this bear here,

Mii
ADV
thus

sa
IPC
?

maaba
NA (PRON>NA)
this

ya'aa
NA
?

mkwa
NA
bear

- 2 | **nayii gnamaadim Nishnaabeg ya'aa go naa,**
it is forbidden for the Nishnaabeg,

nayii
NI
?

gnamaadim
VTA S:X RCPL
forbid

Nishnaabeg
NA PL
Aboriginal

ya'aa
NA
?

go
IPC
?

naa
IPC
emphasis



Alternate Format: Glossaries

Printed texts have space limits

Learners may need to work without the analysis

Fluent readers do not want or need analysis

-> Move analyses into a glossary (Al's forthcoming book)

ngwaawaa	2	VTA	1 trap smb. [with a device]
daa-n'gwaawaan	3+PV	daa+ngwaawaa+VTA+ThmDir+3+4	
wii-paa-n'gwaawaad	PV/wii+PV/bbaa	+ngwaawaa+VTA+Cnj+ThmDir+3+Pl	
ni'ii	7	NI	1 what whatchamacallit
nihii		ni'ii+NI	
nigkwaakzi	1	VAI	1 be a wooden object of such a size
nigkwaakzidig		nigkwaakzi+VAI+3+Dub	
niish	1	Num	1 two
niizh		niish+Num	



Linguist in a Box

Teachers/learners should not need me to get an analysis!

-> A web app that applies analyzer to Nishnaabemwin text: <https://bowersd.github.io/textAnalysis/>

(Please excuse its current ugliness)

Get analyses of Nishnaabemwin words

Analyze Words

Click on the "Browse..." button, and select a plain text* file. This will be analyzed and the analysis will be downloaded to your computer.

Browse...

No file selected.



Text Input

Manual text input produces the usual pieces of analysis

Get analyses of Nishnaabemwin words

Original Material: ndooshkniigiimag

Narrow Analysis: 1+shkiniigi+NA+ThmPos+Pl

Broader Analysis: 'NA Pl Pos:1 ThmPos'

Dictionary Entry: shkiniigi

Terse Translation: 'youth/juvenile'



File Upload

File upload triggers analysis of entire file, downloads result to computer

Click on the "Browse..." button, and select a plain text* file. This will be analyzed and the analysis will be downloaded to your computer.

Bgoji-Nishnaabensag_Oji.txt

```
17
Mii oodi gaa-ndinag wa semaa.
mii      oodi      gaa-ndinag      wa      semaa
mii+Adv  oodi+Adv  PV/gaa+ndinaa+VTA+Cnj+ThmNul+1+3  wa+Pron+NA  semaa+NA
'Adv'    'Adv'      'VTA S:1 0:3 Cnj PV/gaa 3'      'NA (Pron>NA)' 'NA'
mii      oodi      ndinaa      wa      semaa
'thus'   'there'   'get'      '?'      'tobacco'
```



Low cost, small footprint

Web page is static, which has important benefits

Code behind site is hosted for free on GitHub

- > No server costs!

The analyzer is loaded into the user's browser

- All analysis happens on user's device, so files never leave user's device

- > Security by immobility (data is at least as secure as your browser)

- > Data sovereignty will not be compromised



Conclusion

Our current technology has greatly expanded what our labor can accomplish

There is much more work to do:

- Fix analyzer bugs

- Segment audio recordings so people can listen

- Make analyses of the relationships between words in a sentence (aka, syntax)

- Expand range of texts

- Fill in missing vocabulary domains

Start small, let success build on success

Extra Slides



Future of Web App

Debugging tools

- Suggest corrections for un-analyzed words

- Allow manual correction before download

Allow translations to be uploaded

Load different analyzers (e.g: for alternate spelling practices)

Provide different output formats (e.g: glossaries, include narrow or broad analysis)

Mobile version

Live Mock Ups

Next slides show screenshots of material not yet on dictionary site, but you can access them here:

<u>short example</u>	<u>long example</u>	<u>web app</u>
		



Ndaa'aagmishkaa wi nbiish (*that water swirls*)

Miinwaa ngoding ni...ndabinoojiinshiwi. Maanda ziibi, gchi-ziibi maanda gii-aawan, maanda be..be... {Evelyn: maanpii maanda}

Enh, gchi-ziibi zhiwi gii-aawan wi. Mii dash wi oodi iiebiie. r...anda eo...mii go gnabaj go maanda; gii-mgadewaa go wi ziibi.

Ndataag...gaa-shkwaa-skoonwiyaang niibing, ndi

gchi-ziibi

Nga-gweji-bkinaadmi oodi wene ntaam oodi mbaneyiin

gdoshing. Ndoo-niiwmi: bezhig maaba kwez

ziibi (N) – river

an, genii ndoo-brother –nwiikaane...nwiikaanenaanig. Mii

oodi maanda aazhgan e-teg zhonda, maanda,

gchi-ziibi (N) – great

ngii-waamdaan oodi zaagbiig. Gaa'sh go naa genii

aaabenziin wi. Maage mtigosh zyaagbiigwenh

river

genii. Aa'sh, ndoodminmi; ndi-daakmaadgaami go zhiwi.

gnwiindmaa gego zhiwi – ngoji go four feet g

{long pause} Mii wi nihii maanda ziibi bemjiwang zhonda,

Mii maa aa'aazhoog ndaptoomi zhiwi, bgizyaang niibing. Mii'sh maa gii-waabndamaanh gegoo zaagwiindeg oodi nbiishing. Gaa'sh

gegoo genii ndi-nend-zii genii; aa'sh ndadminmi you know. Mii'sh wi kina gaa-shkwaa-dkambatoowaang – kina go – mii gii-maajijwang

wi nbiish, wi ziibi maa yaawaang. Gwetaag sa naa e-naagmishkaag wi nbiish! Mii'sh gego oodi bi-dgo...bi-niisaakiiwyed na'aa

mdimoowenh. Bi-ndanewaan niwi niijaansenyin you know. Gwetaag...gaa'sh maamdaa wii-dkambatoowaang. Gwetaankamig go naa

maanda enaagmishkaag, you know, nbiish, baabgwaadam go. "Nbiish maanpii...gaawii maamdaa wii-dkambatoowaang. Nbiish

maanpii ndaa'aagmishkaa," ndi-naanaa sa. "Yaa-aa!" kida sa wa mdimowenh. "Gjiba'weg!" kida. "Wiya zhiwi yaa," kida sa. Mii'sh go

gewii zhiwi bi-dgoshing. Endgwen'sh go ji-gii-waamdang wi. Mii sa kina gii-gjiba'weyaang, naa. Gwetaag go naa e-naagmishkaag wi

nbiish! Nihii'sh kwa maa gii-dbaajigazoo yaad mshibzhii. Nihii'sh go naa, ngii-zhiingenmignaa'sh iidig zhiwi; e-yaagbanc iidig zhiwi.

Ngii-zhiingenmignaa'sh maa nji-damnawaang, you know, ngii-konaazhkaagna dash. Mii gaa go wiikaa miinwaa zhiwi gnagenh

ngii-damno-siimi. Gaa go wiikaa. Mii go zhiwi gii-boontaayaang go wi.

Miinwaa'sh ko giiyenh gii-noondwaad ziibing mdwe-bkobiigwaashkininid. Gegeti go'sh go zhiwi gii-zegwiindmaa zhiwi, naa.

Mii dash go iidig wa. Kojiing go naa niibing naamdabwad – "Gzhaate; kojiing naamdabdaa," kidwag'sh.

Mii'sh ko giiyenh gii-noondwaad ziibing mdwe-bkobiigwaashkininid. Gegeti go'sh go zhiwi gii-zegwiindmaa zhiwi, naa.

Gii-mnidoonaagwod sa go naa. Mii'sh miinwaa... aapji dash go... mshibzhii go giwi, gaa-bwaanag mshibzhii. Mii miinwaa zhiwi –

mii'sh miinwaa...nanda ni'iin naa...nanda ni'iin... Maanda go naa ni...bemaab, bemaab...bemaabkising Evelyn: bemaabkaag. Enh,

bemaabkaag zhiwi. Ooshti oodi nihiiing nikeyaa gaaming – ooshti oodi nikeyaa – manj ezhi-zhnikaadegwenh wi, ooshti oodi ni'iing

nikeyaa... Mii oodi gaa-bi-njibdeg wi shkode, gchi-shkode gwa. Mii niniibaa...eshkwaa-aabta-dbakak go naa maanda; bngan go naa.

Maanda'sh bemaabkaag oodi, maanda go gidaaki zhiwi. Aapji go zhiwi nihii, naagwod go wi nihii – ge...gegoo zhiwi zhayaangag, you

Ndaa'aagmishkaa wi nbiish (that... Korp

sapir.artsm.ualberta.ca/korp/#corpus=debaasge_gii_bi_dnoki Search

Simple Extended **Advanced**

CQP query:
[pos = "v.*"]

Search

KWIC: hits per page: 25 sort within corpora: not sorted Statistics: compile based on: word

KWIC Statistics **Word picture**

Hit	Total	Debaasg...	Gchi-oga...	Gii-bmi-Z...	Gnahma...	Mchigling...	Mshibzhii...	Nbaanaa...	Ndaahaa...
Σ	4,352.4 (25)	5,141.4 (2)	6,329.1 (2)		2,924.0 (1)		2,762.4 (1)	8,421.1 (4)	
kidwag	696.4 (4)								
yaawag	696.4 (4)	2,570.7 (1)			2,924.0 (1)				
goojing	348.2 (2)		6,329.1 (2)						
yaawaad	348.2 (2)							2,105.3 (1)	
zhiingen...	174.1 (1)								
yaasiwag	174.1 (1)	2,570.7 (1)							
bbaa-yaa...	174.1 (1)								
waabmaa...	174.1 (1)								
nishnaab...	174.1 (1)								

Statistics of occurrences of Verbs across all texts (N.B. analyzer not yet complete)

Ndaa'aagmishkaa wi nblsh (that... x Korp x +

sapir.artsm.ualberta.ca/korp/#corpus=debaasge_gii_bi_dnokild_mch

Search

Simple Extended **Advanced**

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KWIC Statistics Word picture

Results: 25

Show context

DEBAASGE GII-BI-DNOKIID MCHIGIING (does not support extended context)

Zhaazhi gimaag oodi **yaawag**, odowaawaan gewiinwaa.
T: Yeah, gaawii geyaabi **yaasiwag** giwi.

GCH-OGAA (does not support extended context)

. Mii go giiwenh e-maawnji-shpiming **goojing** wa giizis, mii ji-mmigaadegin si
mii wa giizis maawaanji-dbashiish go **goojing** - aapji maa go naa zaasaabzom

GNAHWADING (does not support extended context)

aa nayii shki-kwe, binoojiinyag nayii **yaawag**, pii dash wi nso-giizis dash wi n

MSHIBZHI YAA JIBWAATOGGOANG (does not support extended context)

iiknsh wyaannomog, oodi Jiiyaatik **bdakshing**, niisaaki zhiwi - - wi gete-miika

NBAANAABE-KWEK (does not support extended context)

ondamaanh wi nbaanaabekweg iidig **yaawaad** .

" Yaawag go gewiinwaa zhiwi mnidoog n

Mii sa **dbaajmowaad** wi.

Baatenoon

Corpus

Debaasge gii-bi-dnokiid Mchigiing

text attributes

title: Debaasge gii-bi-dnokiid Mchigiing
language: otw

Occurrences of Verbs across all texts (N.B. analyzer not yet complete)



Role of Ettawageshik Recordings & Transcriptions

Teachers in course level X teach vocabulary, grammar of texts T

Getting feet wet: prioritize thematic elements (accessible via English translation)

Prioritize particles, adverbs, nouns, basic declarative sentences

At level Y introduce verbs, more advanced nouns, imperative sentences, questions, conjunct vs independent

Show how structure of words sets up main information of sentence

At level Z introduce more advanced verbs, particle sequences, word order



Obstacles

Spelling is hard: Nishnaabemwin developed a major vowel deletion rule, so you need to know 2+ forms of many words, figure out where to delete

Many consonant clusters are often simplified in some forms but not in others

Different orthographic systems are often used, even whitespace can differ!



Aadsookaanan Inventory

Stories feature elements of history, customs, humor, personal narratives, folklore

18 Stories in *M'Chigeeng Dbaajmowinan* (*Stories from M'Chigeeng*, Corbiere forthcoming)

(N words)

19 Stories from *Art of Tradition* (Kurath, Ettawageshik & Ettawageshik 2009)

Revised by A. Corbiere, some overlap with *Ottawa Stories from the Springs* (Webkamigad 2015)

(N words)

Abbreviation Explanation

Explanations of grammatical abbreviations on mouse hover!

23 J: Enh, maaba sa gaa-nsaad niwi, mii dash maaba gaa-gnawaabmaad.

J: Yes, this one that killed him [the bear], then this one [girl] stared at him.

J	Enh	maaba	sa	gaa-nsaad	niwi	mii	dash	maaba	gaa-gnawaabmaad
?	INTERJ	NA (PRON>NA)	IPC	VTa S:3 O:3OBV CNJ PV/GAA	NA (PRON>NA)	ADV	ADV	NA (PRON>NA)	VTa S:3 O:3OBV CNJ PV/GAA
?	yes	this	?	kill					

Transitive Verb with an Animate object

Subject: Third person (he/she/him/her/his/hers)

Object: Obviative ('fourth person', a way of distinguishing third persons from each other)

Conjunct order (used in questions, relative clauses, if-then statements)

A preverb of gaa +

24 T: wa kwezens na?

T: That girl?

T	wa	kwezens	na
?	NA (PRON>NA)	NA	INTERJ
?	?	girl	?



Technological Resources

Morphological analyzer

Conservative core

Relaxable to manage different spelling conventions/difficulties spelling

Interlinked with online dictionary

Incorporate into search function?

Interlinear texts, Lemmatization, Updates to dictionary



Linguist in a box

Web page where a text is fed in, and an analysis is produced

Still need to review the analysis

All data stays on user's computer (side benefit: free to host!)

Updates:

- Pick your analyzer, corrections for common analyzer mistakes

- Editing tools (identify meaning of missing word, dictionary queries)

- Greater user-friendliness in grammatical summaries



Results of Analysis

Decomposition of each word into component parts (morphological analysis)

Identification of the dictionary entry for each word (lemmatization)



Analytical Process

Automatic digital analyzer that encodes how words are constructed [LINK TO GITHUB](#)

Python scripts to apply analyzer to stories

Hand review of analyzer failures (~25%-10% of words)

Nishnaabemwin word not understood: Different spelling? Word not in dictionary? Other analyzer inadequacy?

Nishnaabemwin word given incorrect analysis: rarer, easiest to catch if meaning clearly does not match translation



End Products

Glossaries for each story in *M'Chigeeng Dbaajmowinan*

Classroom-ready teaching tool!

Dictionary pages display example sentences drawn from the stories

Analysis can be revealed

Other words in sentence are linked to relevant dictionary page

N new words will be added to dictionary



On Beyond Zebra

Dedicated pages and interface for stories

Read entire texts, not just excerpted sentences

Encode sentence structure

Encode root-internal structure

Search for all contexts that a word appears in (helps reveal shades of meaning)

Compare the different editions of stories

(original 1940's recordings, Webkamigad transcription, Corbiere transcription)

Sound excerpts



Expanding Capacity (Linguist in a box)

Using the analyzer is a major bottleneck

- Make it a web application!

Then all you need is to vet the output

- Add basic vetting capabilities to the application!

 - Analyzer failure

 - Misanalysis

Residue requires expertise (last major bottleneck)



The academy alone cannot fix this, but it can help

Academia is oriented around teaching and research (disseminating answers, asking new questions)

Lofty, respectable and important goals (setting aside critiques of larcenous imperial behavior)

But not conducive to an all hands on deck response to the emergency of language loss

Conservation biologists do not staff wildlife preserves!

Academics can supply expertise

linguists in a box to automate bottlenecks

targeted training to increase expertise and tackle higher bottlenecks

More needed: support for people willing to work for little pay and no thanks against steep odds



Bibliography

Nishnaabemwin online dictionary

Kurath Ettawageshik & Ettawageshik 2009

Webkamigad 2015