Against a split phonology of Michif

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The Michif Language

- A mixed language spoken in Western Canada, North Dakota, Montana
- Developed among bilingual speakers of Cree and Canadian French
- Composed (primarily) of French nouns and Cree verbs – hence “mixed" rather than creole

The Michif Language

- Currently less than 1,000 speakers of Michif
- Most speakers bilingual in English and Michif, but speak no Cree or French
- Communities are increasingly shifting to English (Bakker 1997)

Phonology

- Research on Michif phonology has generally focused on the question, does Michif have one phonology or two?
- E.g. Evans (1982); Rhodes (1977); Bakker (1994, 1997); Papen (2003, 2011); Rosen (2007)...

Split phonology?

- Bakker's claim: two separate systems of phonemes and phonological rules, corresponding to the etymologically French and Cree parts of Michif
- Evans notes that such a split system is "rather unique among languages" (Evans 1982)
- Rosen (2007) views the facts as the product of historical accident, which does not necessitate a split phonology

This study

We investigate the split phonology claim with two case studies:

- The productivity of liaison
- Phonetic vowel contrasts

The data

- Data for both case studies is taken from a Michif language learning CD, “Learn Michif by Listening" (Bakker and Fleury 2004)
- The CD consists of twenty tracks of short wordlists, and two narrative passages
- Wordlists are read by one Michif speaker, Norman Fleury
- Narrative used here is read by another speaker, Julius Grant

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Liaison

There are two questions of interest:

- Is the French liaison rule productive in Michif?
- If so, is it restricted to only the etymologically French portion of Michif?

Not productive, but stratified

- Bakker (1997) argues that liaison is not currently productive in Michif
- He argues for a split phonology, citing inventory differences and rules which operate on only one etymological class
  - e.g. vowel length distinctive in only Cree part, palatalization of /t, d/ happens only in French part

Productive & stratified

- Papen (2011) argues that liaison IS productive in Michif
- He agrees that the phonology is split, because liaison is only productive in the French part:
  "La liaison ainsi que l'élision sont des règles phonologiques qui ne s'appliquent qu'à la composante française du mitchif. [. . .] Ces règles sont donc d'excellents indices que la phonologie du mitchif doit nécessairement être stratifiée." (2011, 241)
  Liaison as well as elision are phonological rules which apply only to the French component of Michif. These rules are therefore excellent clues that Michif phonology must by necessity be stratified. (Trans. Prichard)

Productive & stratified

- Papen admitted however that as comprehensive as his dictionary study was, it did not afford many appropriate environments to test whether liaison is productive outside of the French portion of Michif

Productive & unified?

- To investigate this question, I turned to the two narrative passages on the language learning CD, looking for instances of potential French + non-French liaison
- In about 7 minutes of fluent speech, only two tokens of this environment were found
- Both were in The Three Bears story
  - Recording of Julius Grant, a Michif speaker from the Turtle Mountain Reservation in North Dakota.

Three Bears story

Abaen **tout ashtaw** ☞ itwayw, li manzhee aah cheepatapiwak
well all placed she.said the food aah *they.sat.down*

mwaenhchi aywee-meechishouchik. Nawachikou sitay shoo ooma.
just.ready to-eat. *sort-of it-was hot this*

Ekwayawk kee-pooni-keeshtaypoow ooma ilitray trou shoo
just finished-cooking this was too hot

pamoyaen kaw-meechishouchik. Ahawn, itwayw Pawpaw, itwayw:
impossible that-they.eat.it. *Okay, said papa said:*

Abaen, iprawn **en pchit walk** ☞, itwayw.
well, will.take a small walk *he.said.*

Well, she placed all the food. They sat down, just ready to eat. It was kind of hot. She had just finished cooking this. It was too hot. They could not eat it. OK, papa said. We will take a small walk, he said.

How unusual are these tokens?

- Louisiana French provides a useful comparison
- Brown (2003) found that liaison did not occur between French words and unintegrated non-French words
- So these two examples from Michif mean:
  - Either *walk* and *ashtaw* have been phonologically integrated
  - Or the liaison rule is operating outside of the French portion

Productive & unified?

In conclusion:

- Yes, there are only two tokens
- But they are two tokens which *should not exist* according to all previous argumentation, and cast doubt upon the split phonology hypothesis
- So further investigation of spoken data is merited

Another claim about Michif Phonology:

- Vowel length is distinctive in Cree part (and not in French part) (Bakker 1997, p. 8)
- Specifically: Phonetic range of phonemes differ in two parts, for example long and short /i/ = French [i] vs [ɪ] but Cree [iː] vs [i] (Bakker 1997, pp. xiii–xiv)

Comparable Vowels

Four sets of vowels correspond between the French and Cree inventories:

	French	Cree
<ii>	[i]	[iː]
<i>	[ɪ]	[i]

	French	Cree
<uu>	[u]	[uː]
<u>	[ʊ]	[u]

	French	Cree
<ee>	[e]	[eː]
<e>	[ɛ]	[e]

	French	Cree
<aa>	[ɑ]	[aː] or [ɑː]
<a>	[a]	[a]

Data Information

- Single Speaker: Norman Fleury – b. 1949
- No normalization
- Data from Michif-English word lists
- 1314 vowels (breakdown for each on following slides)

Methods

- Roughly hand aligned and then automatically aligned with FAVE-align, FAVE-extract to extract vowel formants (FAVE: Rosenfelder et al. (2011))
- Spelling-to-phoneme dictionary created by hand
- Etymological origin coded by hand
- R for plots, stats, and models (R Development Core Team 2010)

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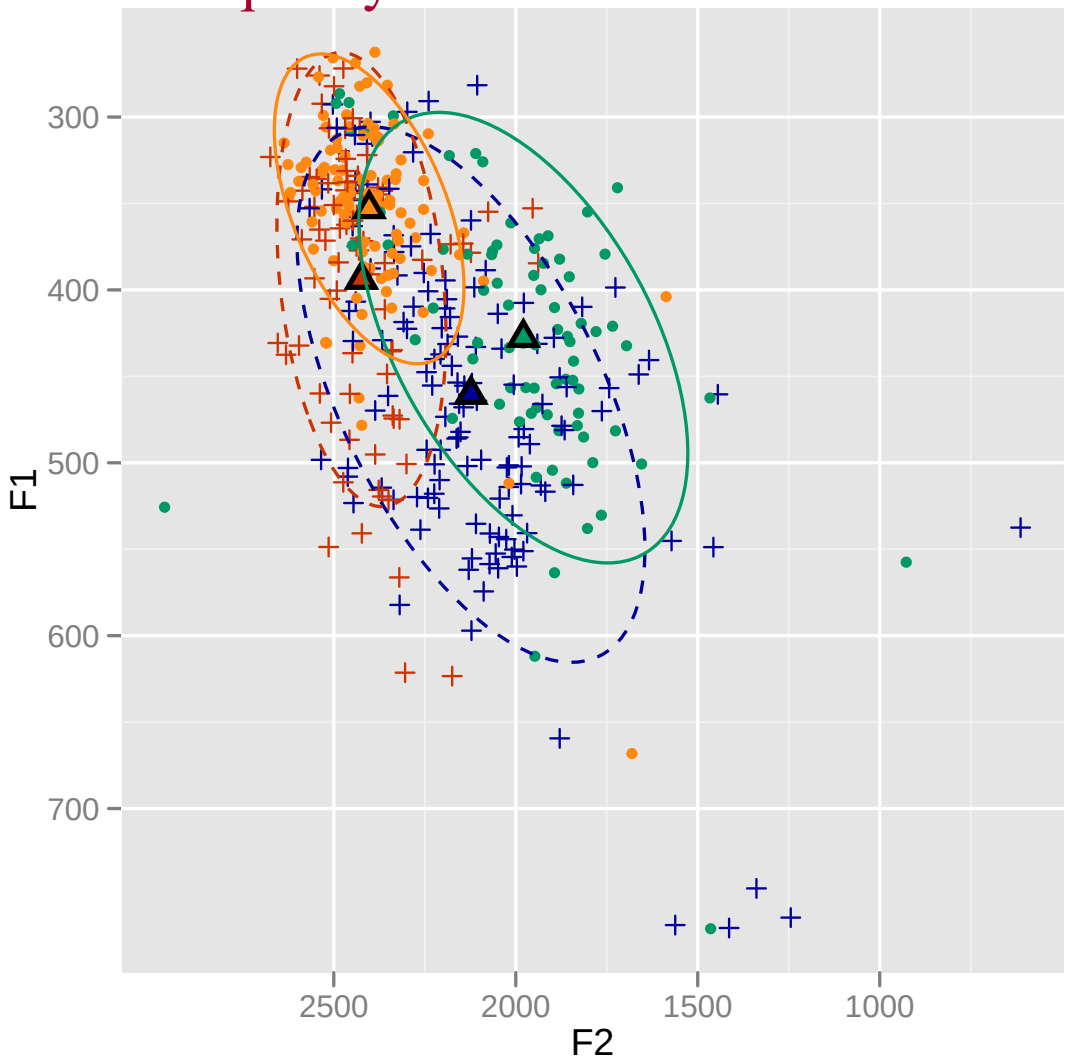
i-ii quality



Counts

	<i>	<ii>	Total
Cree	138	80	218
French	79	102	181
Total	217	182	399

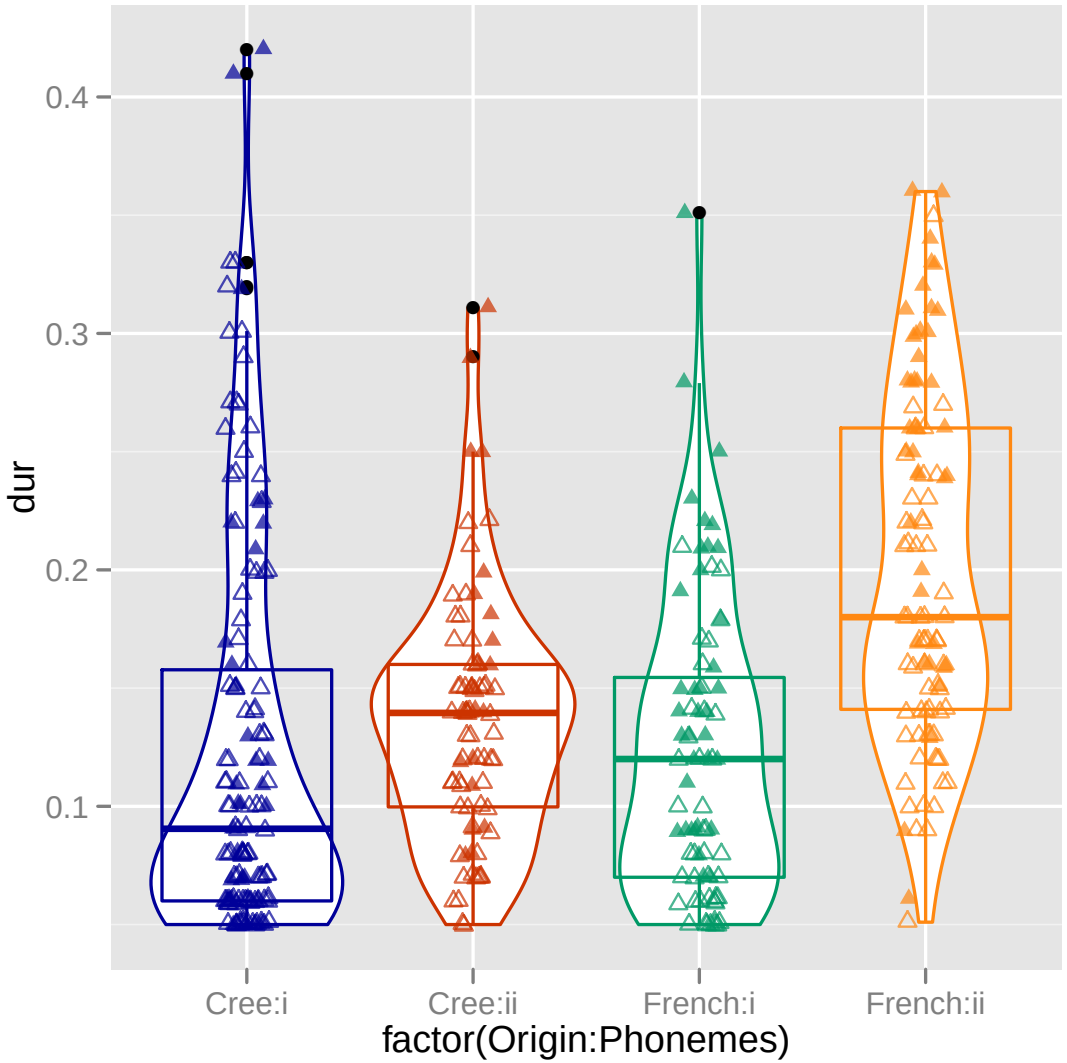
Pairwise Wilcoxon rank sum test p-values for F1

	Cree:i	Cree:ii	French:i
Cree:ii	3.7e-07***	—	—
French:i	0.00419**	0.00389**	—
French:ii	< 2e-16***	0.00048***	4.8e-12***

Pairwise Wilcoxon rank sum test p-values for F2

	Cree:i	Cree:ii	French:i
Cree:ii	< 2e-16***	—	—
French:i	1.2e-06***	< 2e-16***	—
French:ii	< 2e-16***	0.26	< 2e-16***

i-ii quantity



Counts

	<i>	<ii>	Total
Cree	138	80	218
French	79	102	181
Total	217	182	399

Stress == 1

△ FALSE

▲ TRUE

factor(Origin:Phonemes)

Cree:i

Cree:ii

French:i

French:ii

Pairwise Wilcoxon rank sum test p-values for dur

	Cree:i	Cree:ii	French:i
Cree:ii	0.0031**	—	—
French:i	0.2536	0.1100	—
French:ii	1.8e-13***	7.0e-09***	4.5e-11***

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Summary of i-ii

Perhaps different?

- All four vowels are distinguishable by quality
- Cree <i> and <ii> vowels are slightly lower and fronter than the French vowels
- Both French and Cree phonemes are distinguishable by duration

- If taken as a single system, <i> and <ii> are distinguishable both by duration and F1/F2.
- This suggests that the distinction in Michif could be one either of length or quality (or perhaps both)

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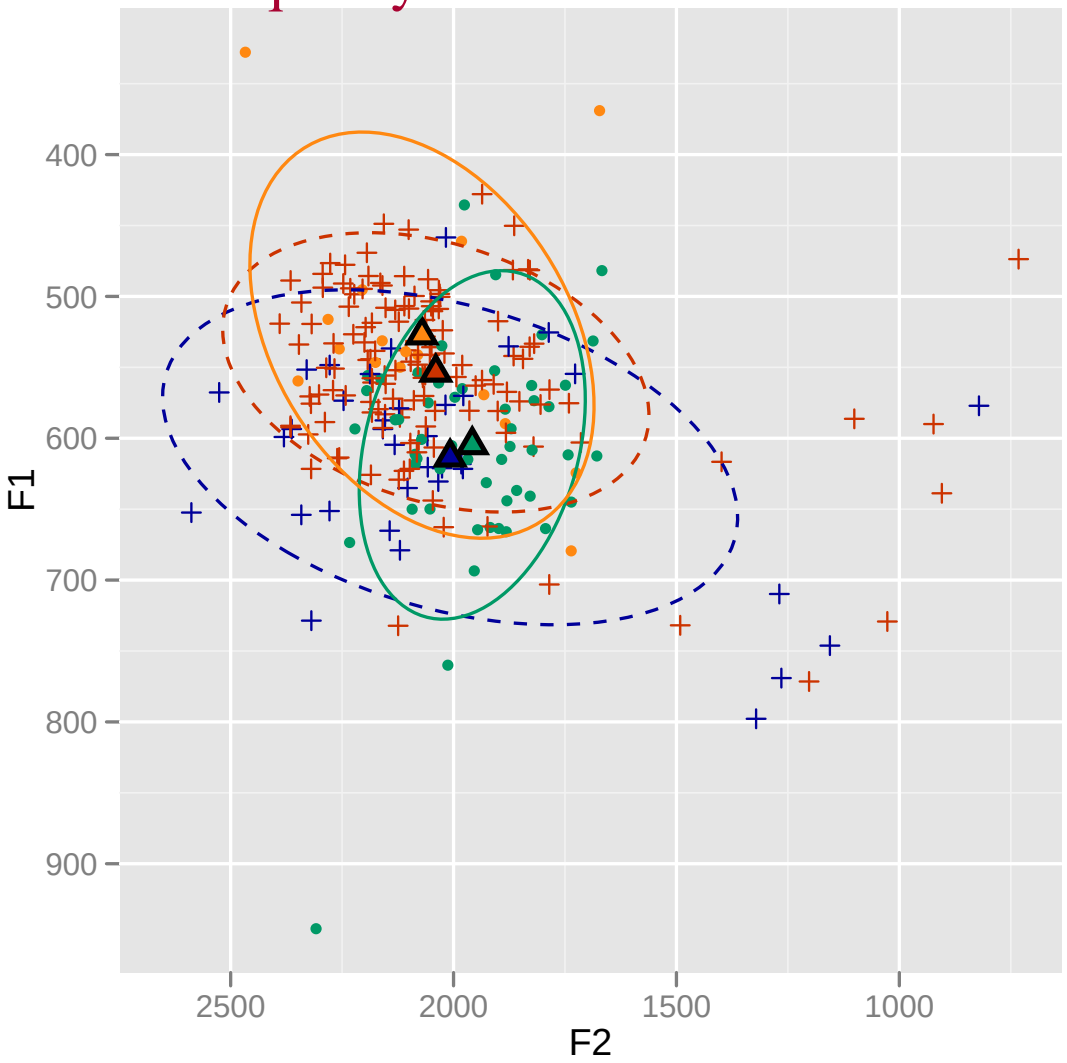
e-ee quality



Counts

	<e>	<ee>	Total
Cree	37	134	171
French	53	16	69
Total	90	150	240

factor(Origin:Phonemes)

- Cree:e
- Cree:ee
- French:e
- French:ee

Pairwise Wilcoxon rank sum test p-values for F1

	Cree:e	Cree:ee	French:e
Cree:ee	6.4e-06***	—	—
French:e	0.7449	1.9e-06***	—
French:ee	0.0019**	0.7449	0.0019**

Pairwise Wilcoxon rank sum test p-values for F2

	Cree:e	Cree:ee	French:e
Cree:ee	1.000	—	—
French:e	0.04139*	0.00013***	—
French:ee	1.000	1.000	0.17102

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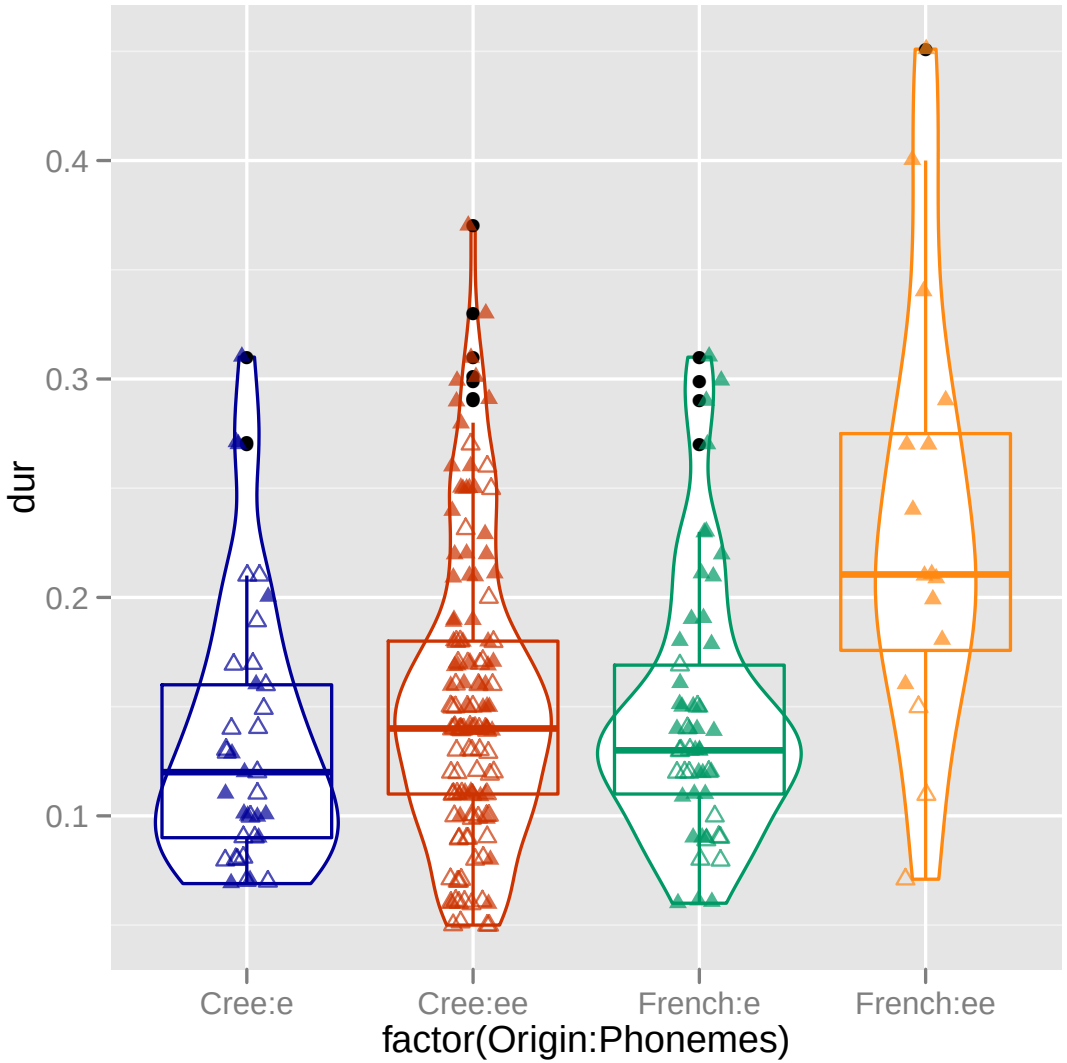
e-ee quantity



Counts

	<e>	<ee>	Total
Cree	37	134	171
French	53	16	69
Total	90	150	240

Stress == 1

FALSE

TRUE

factor(Origin:Phonemes)

Cree:e

Cree:ee

French:e

French:ee

Pairwise Wilcoxon rank sum test p-values for dur

	Cree:e	Cree:ee	French:e
Cree:ee	0.2368	—	—
French:e	0.4032	0.4613	—
French:ee	0.0017**	0.0027**	0.0027**

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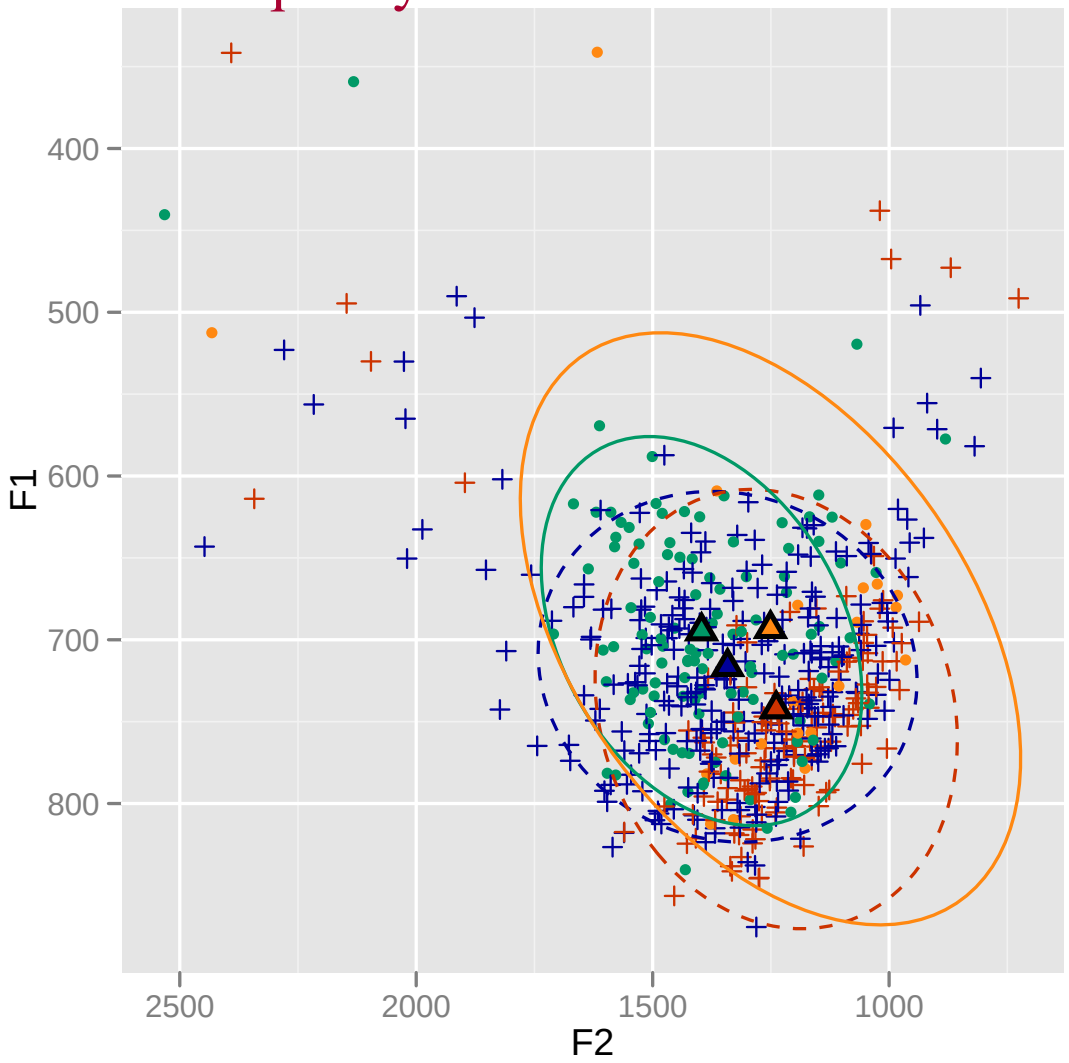
Summary of e-ee

Not different

- <e> and <ee> of both classes are distinguishable by F1, no difference between French and Cree.
- Only F2 difference between French <e> and Cree <ee>
- Only exceptional French <ee> is longer than all others

- If taken as a single system, <e> and <ee> are distinguishable both by duration and F1/F2.
- Again, this suggests that the distinction in Michif could be one either of length or quality (or perhaps both)

a-aa quality



Counts

	<a>	<aa>	Total
Cree	272	137	409
French	115	21	136
Total	387	158	545

factor(Origin:Phonemes)

- Cree:a
- Cree:aa
- French:a
- French:aa

Pairwise Wilcoxon rank sum test p-values for F1

	Cree:a	Cree:aa	French:a
Cree:aa	5.5e-07***	—	—
French:a	0.012*	3.1e-10***	—
French:aa	1.000	0.035*	1.000

Pairwise Wilcoxon rank sum test p-values for F2

	Cree:a	Cree:aa	French:a
Cree:aa	9.1e-07***	—	—
French:a	0.01074*	2.4e-13***	—
French:aa	0.02342*	0.63384	0.00043***

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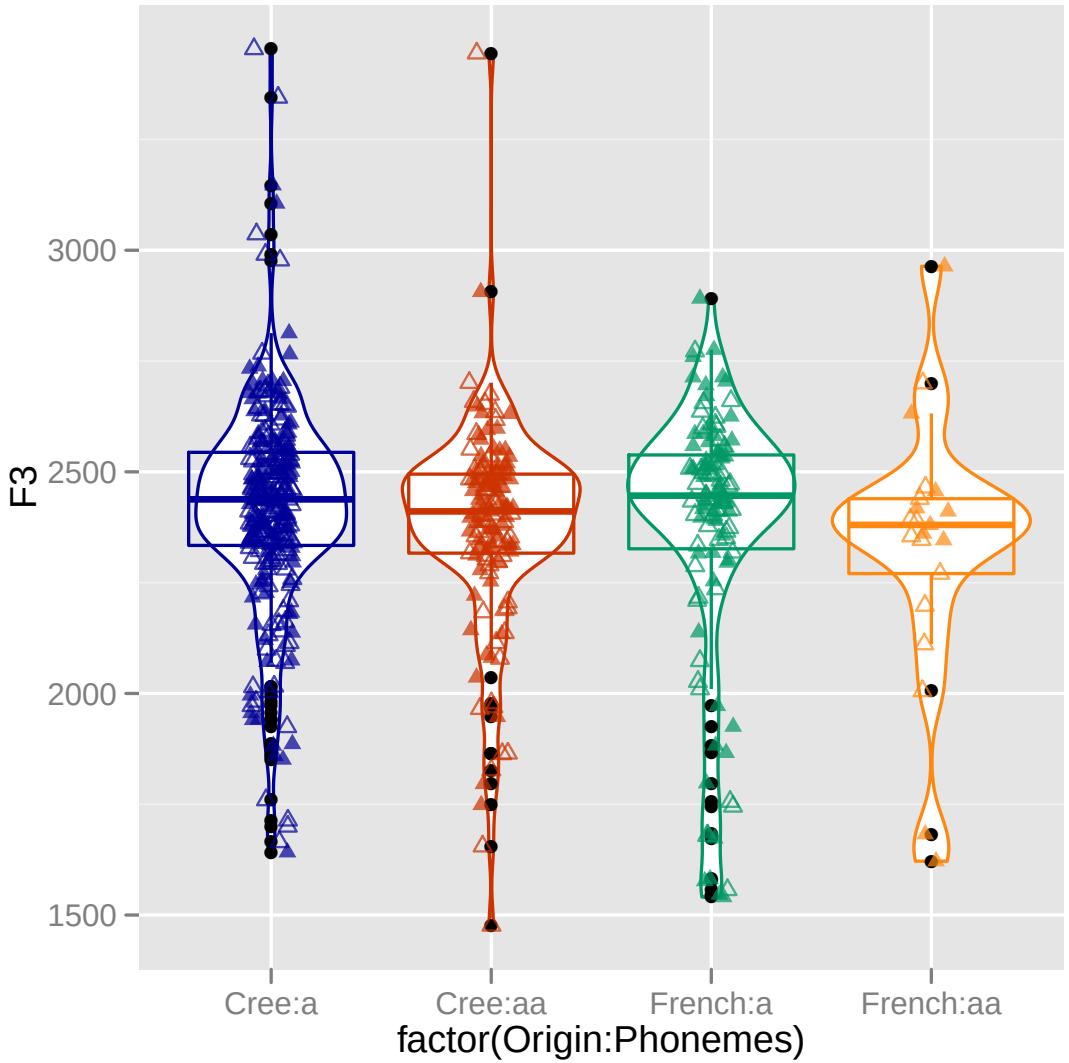
a-aa quality (roundness)



Counts

	<a>	<aa>	Total
Cree	272	137	409
French	115	21	136
Total	387	158	545

Stress==1

△ FALSE

▲ TRUE

factor(Origin:Phonemes)

Cree:a

Cree:aa

French:a

French:aa

Pairwise Wilcoxon rank sum test p-values for dur

	Cree:a	Cree:aa	French:a
Cree:aa	0.46	—	—
French:a	0.87	0.46	—
French:aa	0.46	0.59	0.46

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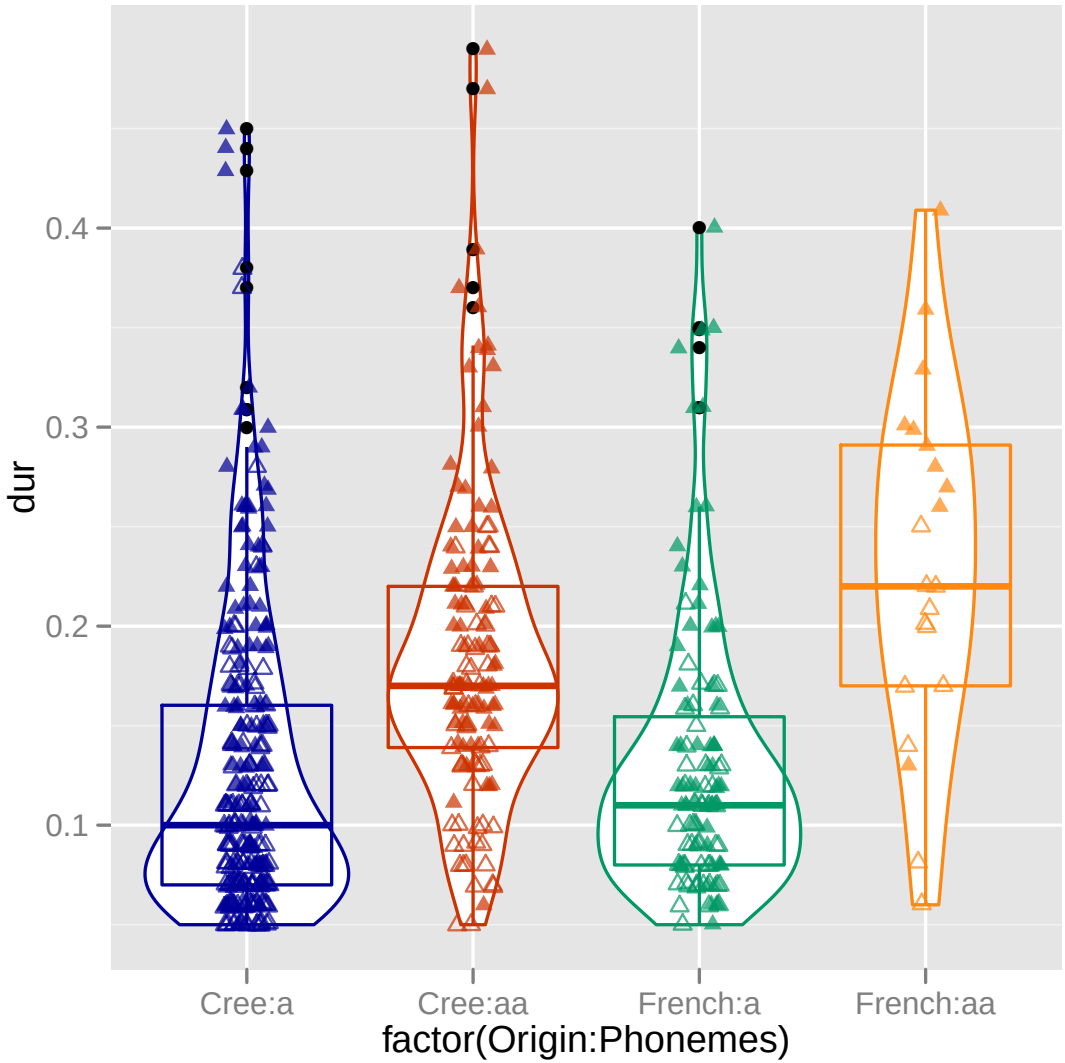
a-aa quantity



Counts

	<a>	<aa>	Total
Cree	272	137	409
French	115	21	136
Total	387	158	545

factor(str1)

△ FALSE

▲ TRUE

factor(Origin:Phonemes)

Cree:a

Cree:aa

French:a

French:aa

Pairwise Wilcoxon rank sum test p-values for dur

	Cree:a	Cree:aa	French:a
Cree:aa	2.6e-14***	—	—
French:a	0.237	1.0e-10***	—
French:aa	3.6e-06***	0.019*	6.6e-06***

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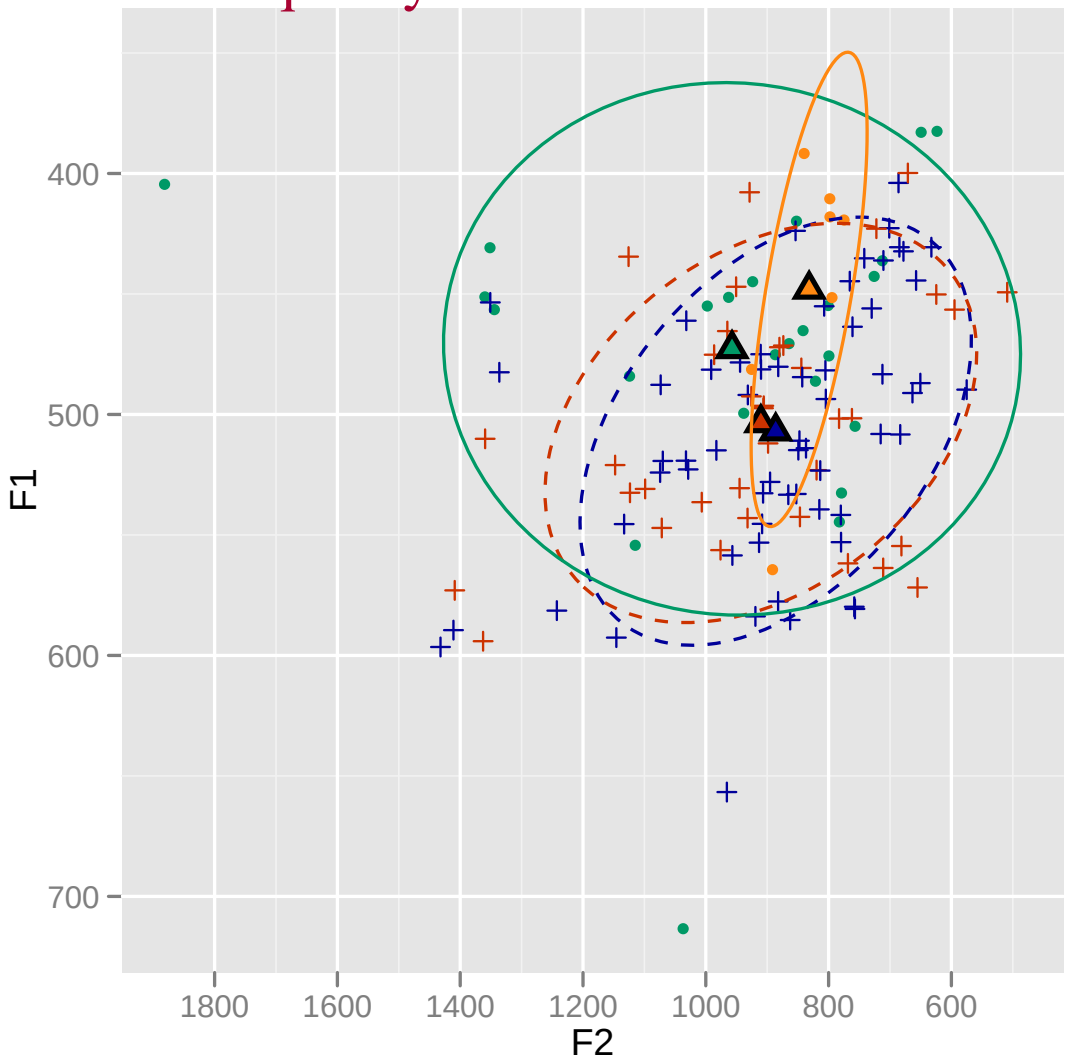
Summary of a-aa

Not Different.

- Difference in both quality and quantity for both Cree and French vowels
- (No F3 difference)

- If taken as a single system, difference in quality is fairly small, but difference in quantity is large.
- This suggests that the distinction in Michif <a>/<aa> could be one of length.

u-uu quality



Counts

	<u>	<uu>	Total
Cree	62	36	98
French	25	7	32
Total	87	43	130

factor(Origin:Phonemes)

- Cree:u
- Cree:uu
- French:u
- French:uu

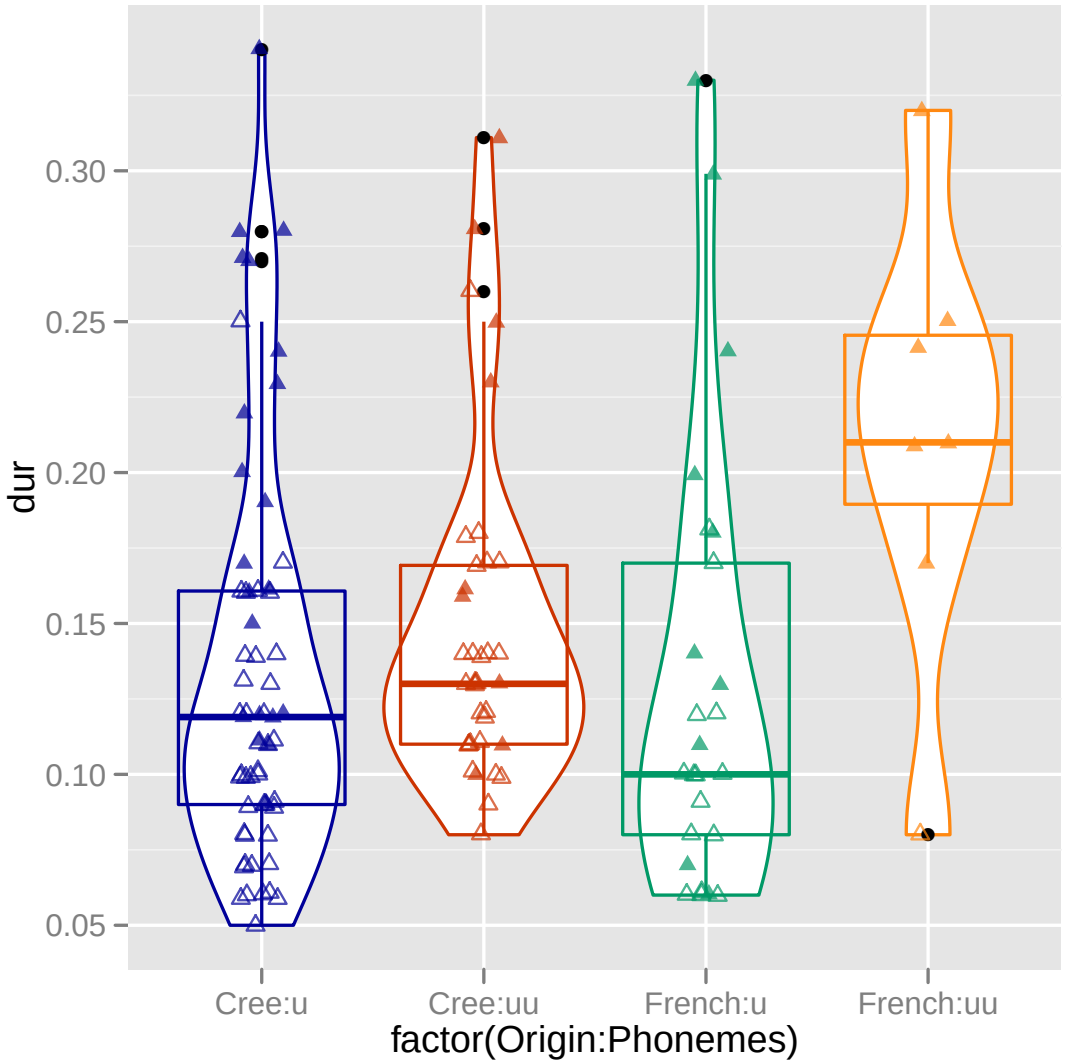
Pairwise Wilcoxon rank sum test p-values for F1

	Cree:u	Cree:uu	French:u
Cree:uu	0.944	—	—
French:u	0.019*	0.041*	—
French:uu	0.041*	0.079	0.522

Pairwise Wilcoxon rank sum test p-values for F2

	Cree:u	Cree:uu	French:u
Cree:uu	1	—	—
French:u	1	1	—
French:uu	1	1	1

u-uu quantity



Counts

	<u>	<uu>	Total
Cree	62	36	98
French	25	7	32
Total	87	43	130

factor(Origin:Phonemes)

Cree:u
Cree:uu
French:u
French:uu

Stress == 1

△ FALSE
▲ TRUE

Pairwise Wilcoxon rank sum test p-values for dur

	Cree:u	Cree:uu	French:u
Cree:uu	0.140	—	—
French:u	0.606	0.140	—
French:uu	0.084	0.134	0.093

Summary of u-uu

Not enough data.

- Not enough data to show significant differences
- If taken as a single system, difference in quantity is significant.

Summary of Descriptive Statistics

- <i>/<ii> may show a difference between French and Cree vowels
- other vowels do not
- This suggests <i>/<ii> finding might fake

- <i>/<ii> and <e>/<ee> are best described with both quality and quantity differences
- <a>/<aa> and <u>/<uu> are best described with quantity differences

Statistical Model

Simple binomial model to predict phoneme with phonetic factors:

- F1
- F2
- F3
- Residual(duration~stress)

Makes a discrete choice between <x> and <xx>

Coefficients for <i> and <ii>

French <i> and <ii>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	−2.906	0.00366	**
F1	−0.087	0.93065	
F2	4.194	2.74e−05	***
F3	−0.885	0.37604	
Res(dur~str)	3.030	0.00245	**

French <i>/<ii>:
Quality and Quantity

Cree <i> and <ii>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	−4.787	1.69e−06	***
F1	−1.060	0.2892	
F2	4.538	5.67e−06	***
F3	−2.040	0.0413	*
Res(dur~str)	0.158	0.8747	

Cree <i>/<ii>:
Quality only

Unified <i> and <ii>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	−5.127	2.95e−07	***
F1	−3.158	0.00159	**
F2	5.677	1.37e−08	***
F3	1.704	0.08841	.
Res(dur~str)	3.121	0.00181	**

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Coefficients for <e> and <ee>

French <e> and <ee>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	1.228	0.21931	
F1	−2.822	0.00477	**
F2	−0.006	0.99529	
F3	0.604	0.54555	
Res(dur~str)	2.925	0.00345	**

French <e>/<ee>:
Quality and Quantity

Cree <e> and <ee>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	4.194	2.74e−05	***
F1	−4.298	1.72e−05	***
F2	−1.334	0.182	
F3	0.304	0.761	
Res(dur~str)	1.571	0.116	

Cree <e>/<ee>:
Quality only

Unified <e> and <ee>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	4.366	1.26e−05	***
F1	−5.412	6.24e−08	***
F2	−1.258	0.20833	
F3	0.875	0.38180	
Res(dur~str)	3.179	0.00148	*

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Coefficients for <a> and <aa>

French <a> and <aa>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	1.816	0.06930	.
F1	−3.139	0.00169	**
F2	−1.907	0.05649	.
F3	0.363	0.71630	
Res(dur~str)	4.842	1.28e−06	***

French <a>/<aa>: Quality and Quantity

Cree <a> and <aa>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	0.195	0.84572	
F1	1.738	0.08229	.
F2	−3.280	0.00104	**
F3	−0.731	0.46469	
Res(dur~str)	4.111	3.94e−05	***

Cree <a>/<aa>: Quality and Quantity

Unified <a> and <aa>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	0.459	0.646	
F1	0.459	0.646	
F2	−4.101	4.11e−05	***
F3	−0.047	0.962	
Res(dur~str)	5.617	1.94e−08	***

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Coefficients for <u> and <uu>

French <u> and <uu>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	1.025	0.306	
F1	−0.689	0.491	
F2	−0.639	0.523	
F3	−0.834	0.404	
Res(dur~str)	0.753	0.451	

NS

Cree <u> and <uu>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	−0.743	0.4574	
F1	−0.173	0.8624	
F2	0.678	0.4979	
F3	0.766	0.4435	
Res(dur~str)	1.936	0.0529	.

NS

Unified <u> and <uu>

Coefficient	z-value	Pr(>|z|)	
(Intercept)	−0.743	0.4575	
F1	0.131	0.8959	
F2	0.155	0.8768	
F3	0.494	0.6214	
Res(dur~str)	2.557	0.0105	*

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Statistical Model Conclusions

- Where there were differences between French and Cree vowels, it was in the opposite direction than hypothesized
- No evidence for two etymological classes
- The unified system suggests Michif phonemes sensitive to both quality and quantity

Conclusions

Liaison

- Might expect that liaison would not occur between words in different phonological modules
- Liaison does occur between etymologically French and Non-French words
- Evidence that Michif does not have two phonologies

Conclusions

Inventory

- Taken together, vowels are not strongly differentiable into etymological classes
- Where model shows different weights between French and Cree, it is in the opposite of expected (Cree with quality, French with quantity)
- No evidence that there is a split phonology
- Unified system looks to be sensitive to both quality and quantity

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Conclusions

We find no evidence for a split phonology in Michif

Possibilities for Further Work

- More data would be wonderful
  - Multiple speakers for variation
  - More transcribed recordings for auto-extraction and data for specific phonological processes
- Speaker judgments or psycholinguistic tasks

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Thank you!

- Thanks to Peter Bakker for supplying the "Learn Michif" CD
- Thanks to Robert Papen for pointing us to useful resources
- Thanks to Gillian Sankoff for helpful comments on this work

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