# MICHIF VOT[1]

Nicole Rosen[*], Jesse Stewart[^], Michele Pesch-Johnson[*], Olivia N. Sammons[%]

[*]University of Manitoba, [^]University of Saskatchewan, [%]Carleton University
nicole.rosen@umanitoba.ca, stewart.jesse@usask.ca, peschjom@myumanitoba.ca, sammons@ualberta.ca

## ABSTRACT

VOT in Michif was examined in 446 stops across 10 speakers taken from a collection of semi-directed Pear Stories. Michif is a critically endangered Plains Cree-French mixed language spoken in parts of Canada and the US. The source language for each stop was labelled to test whether French-source and Cree-source stops patterned differently, as has been argued in Bakker, Papen [2]. Results show that VOT patterned remarkably similarly across source languages, despite French distinguishing between voiced and voiceless stops, whereas Plains Cree does not. Our results show that both voiced and voiceless French-source stops are nearly identical, showing a mean difference of approximately 20ms between the two sets, negligibly perceptible. This supports recent research showing that French-source material in Michif has largely assimilated to Plains Cree grammatical structures ([7], [22]).

**Keywords**: Michif, mixed languages, VOT, language contact, Algonquian

## 1. INTRODUCTION

Michif is a severely endangered language still spoken today by an estimated 100-200 Métis people, situated primarily in Manitoba and Saskatchewan in Canada and in North Dakota in United States [11]. Michif is generally classified as a *mixed language*, meaning it cannot be traced back to a single language family [2], [12], [29]. It has been claimed to maintain the phonological grammar of both of its source languages, French and Plains Cree [1], [2], [16]. The goal of this paper is to investigate this claim based on phonetic analysis of voice onset time (VOT) in the Michif stop system, using source language as a variable in the analysis, to ascertain whether the historical source plays a role in determining the vowel space or duration of the particular vowel in Michif. This follows other recent work investigating Michif vowels which found that the Michif vowel system does not seem to rely on historical information, and that historically similar French and Cree vowels pattern together with regards to formant frequencies, employing primarily a Cree-type vowel system with the innovation of two vowels [21].

Testing 'conflict sites' in contact languages (i.e., areas of the grammar which are different in each source language [15]) has been a common way to make claims regarding the status of source language grammars in the new contact language. (cf. [2], [7], [14], [15], [16], [17], [20], [23], [24], [25], [26], [27]). For instance, Rosen [20] investigates word stress in Michif, comparing stress assignment in each of the source languages, then comparing words from each source language within Michif. She finds that Michif word stress follows a single system which is not entirely either the Plains Cree or French systems, but rather an amalgam of the two.

VOT is under investigation here as one of these so-called 'conflict sites', as Canadian French and Plains Cree have very different systems. Canadian French has two sets of contrastive phonemic stops, a short-lag voiceless stop set /p t k/ and long-lead pre-voiced stop set /b d g/ ([9] , [28]). In contrast, Plains Cree has one set of voiceless stops /p t k/, with reported phonetic intervocalic voicing ([30], [31]). Given these different systems, our research question is: *how is VOT manifested in Michif, the new contact language*? We can imagine three resulting scenarios, including a) Plains Cree and Canadian French lexical items patterning as they do in their respective source languages, for a three-way distinction in stops, b) Plains Cree- and Canadian French-source voiceless stops patterning together and contrasting with Canadian French-source voiced stops, for a two-way distinction in stops (as can be construed from Rhodes [18] who says Michif stops reflect French stops), or c) both voiceless and voiced stops in Canadian French patterning with Plains Cree-source stops, for a single set of voiceless stops. In order to investigate this question, we analyze the VOT of Michif stop

[1] We wish to thank Michif speakers Cecile Burroughs, Verna DeMontigny, Edna Fleury, Harvey Fleury, Irene Fleury, Mervin Fleury, Norman Fleury, George Pelletier, Harvey Pelletier, and Marie Tanner for their contributions to the corpus. Special thanks also go to Verna DeMontigny for her help with the transcription and translation. This research was funded in part by the Canada Research Chair in Language Interactions, awarded to Nicole Rosen, as well as by the Endangered Languages Documentation Programme (IGS #0151, 2011–2014) and the Phillips Fund for Native American Research (2014–2015), awarded to Olivia Sammons.

consonants, considering source language as a factor. We outline our methods below.

## 2. METHODS

### 2.1. Speakers

The speech of ten Michif speakers from Manitoba, Canada, five women and five men, was included in this study. All participants acquired Michif from birth and learned English when they started school. Participants were from Gambler Reserve, St. Lazare, Fouillard's Corner, Minnetonas, Binscarth, Russell, and Ste. Madeleine. Participants were between the ages of 61 and 83 at time of recording, and all were bilingual Michif-English speakers. All recordings were completed in 2013 by the fourth author.

#### 2.2. Procedure

Data came from a corpus of *Pear Story* narratives. A native speaker of English gave all instructions in English. Participants were asked to watch a video recording of the *Pear Story* [4] on a Macbook Pro laptop. After the video concluded, each participant was asked to retell the story in Michif from memory. They were then asked to narrate the story a second time, while simultaneously watching the video. Depending on the particular recording situation, either a Marantz PMD661 or Olympus LS-10 digital audio recorder was used, along with either a Countryman E6i earset microphone, a Countryman B3 or Sony ECM-44B lavalier microphone, or a Rode NT4 tabletop microphone. Recordings were made in 16-bit Waveform Audio File Format (WAV) with a sample rate of 44.1 kHz. These recordings were then orthographically transcribed and translated into English using ELAN software [10] by the fourth author, in consultation with a native Michif speaker.

#### 2.3. Analysis

The *Pear Story* narratives were imported into Praat, where labelling and analysis was done by the third author using a semi-automated Praat script. Voice onset were labeled using Praat [3]. Both waveform and spectrograph were displayed to aid in labelling.

VOT refers to the temporal duration from the moment of release of a stop to the onset of voicing in the following vowel [8]. In languages that have contrastive stops, one of the more common cues for differing between long-lag, short-lag, and lead voicing involves average VOT duration. All measurements were completed by the third author. The VOT of 446 stops was analysed in total. Due to the nature of the dataset and the lower overall frequency of French-source items in Michif, the number of stops per place of articulation were not evenly balanced between Plains Cree and French source languages; see Table 1. The resulting output was exported to R [18], which was used to perform descriptive statistics. The primary linguistic factor investigated in this preliminary analysis was the source language of the lexical item (Plains Cree or French). Recall that voiced stops are not phonemic in Plains Cree. The Plains Cree-source voiced stops listed in Table 1 were phonetic realizations in the dataset.

| | Plains Cree-source | French-source | Total |
|---|---|---|---|
| /p/ | 51 | 78 | 129 |
| /t/ | 25 | 9 | 34 |
| /k/ | 204 | 1 | 205 |
| /b/ | (4) | 10 | 14 |
| /d/ | n/a | 26 | 26 |
| /g/ | (4) | 34 | 38 |
| Total | 288 | 158 | 446 |

**Table 1:** Distribution of stops in the dataset

## 3. RESULTS

#### 3.1. Voiceless stops

First, we examine the VOT of the voiceless stops in Michif. Figure 1 shows the distribution with standard deviation of each voiceless stop based on source language. From Figure 1 we see that the distributions for all phonetically similar stops are overlapping with each other. That is, Plains Cree-source /p/ and French-source /p/ overlap to a large degree, with the means within 10ms of each other, and /t/ is even closer. Although due to a lack of Michif items with source-French /k/, we cannot say definitively that French /k/ is overlapping with Plains Cree /k/, the one analysed French /k/ item is within the range of Plains Cree, and the pattern seems likely to hold with the addition of more data. All voiceless stops analysed seem to fall in the range of short-lag VOT, with a positive mean VOT range between 20-45ms.

#### 3.2. Voiced stops

Next, we look at the voiced stops in the dataset. The lack of phonemic voiced stops in Plains Cree makes these somewhat more complicated to compare. However, Plains Cree and Michif report intervocalic voicing of voiceless stops ([30] [31] for Cree, [19] for Michif), and in Michif, there is a further phenomenon which results in the appearance of phonetic initial voiceless stop, as in the example in (1).

(1) [**g**ii-waabamaa-w]
n-kii-waapamaa-w
/ni-kii-waapamaa-w/
1-PAST-see-3
'I saw him.'

In the example in (1), taken from the dataset, the vowel in the first-person prefix /ni-/ deletes in unstressed position, and a voicing assimilation process results in /n/ appearing only as voicing on the initial stem. We analysed the VOT of these phonetic voiced stops where possible, though there were no instances of Plains Cree-source /b/ in the dataset, and just four examples of /d/ and /g/.

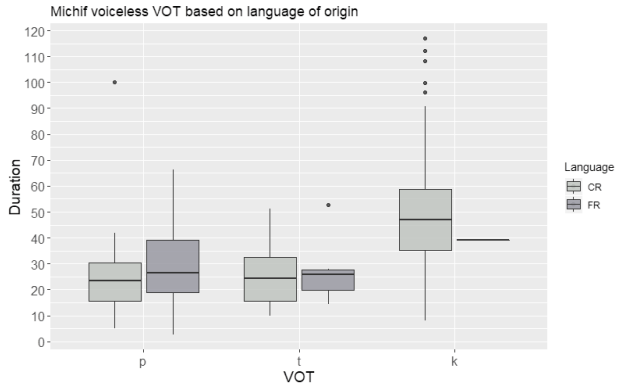


**Figure 1:** VOT of voiceless stops by source language

The results of the voiced stops revealed that voiced stops in the French-source items are rarely prevoiced, contra reports for Canadian French in Quebec ([9], [28]). Rather, VOT for French-source voiced stops are in the short-lag range, with distributions between positive 10-40ms, as seen in Figure 2.

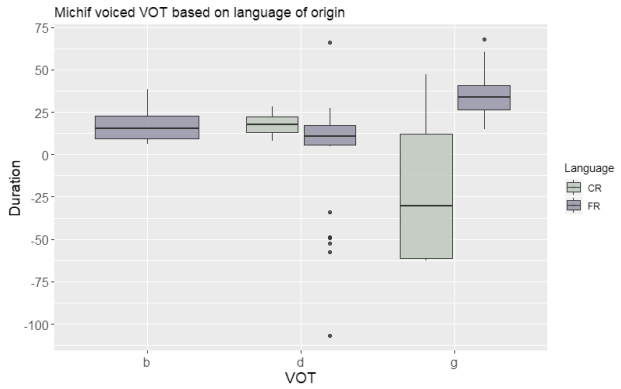


**Figure 2:** VOT of voiced stops by source language

Because Cree-source voiced stops are allophonically conditioned, not phonemic, we have little in the way of generalizations to make about the few examples we have analyzed here. From Figure 2 we can see however that the /d/ is also primarily in the short-lag range, with a number of prevoiced outliers, and we can see that Plains Cree-source phonetic /g/ has lead VOT. However, due to the difference in phonemic status with other stops in the dataset, insufficient tokens, and inconsistent VOT results, we set the Plains Cree-source voiced stops aside for future research. Setting aside then the allophonically conditioned voiced stops, we now turn to comparison of the phonemic contrasts in Michif.

### 3.3. Phonemic contrasts in Michif

Our results show that the VOT values of Plains Cree-source voiceless and French-source voiceless stops are largely overlapping. Interestingly, French-source voiced stops are also remarkably similar in distribution, also falling into the range for short-lag VOT. In addition to the figures given in sections 3.1. and 3.2., we compared the overall means of Cree-source and French-source VOT, finding not only that Cree and French voiceless stops are nearly identical, but somewhat surprisingly, that French so-called voiced stops also have nearly identical VOT as voiceless ones. Table 2 shows the range of VOT between Cree and French stops. Note that for the alveolar set, the Cree voiceless, French voiceless and French voiced stops have only a 1 ms range between the means of the three groups.

| Mean VOT (ms) | Cree voiceless | French voiceless | French voiced | Range |
|---|---|---|---|---|
| p/b | 25 | 29 | 18 | 11 ms |
| t/d | 26 | 26 | 27 | 1 ms |
| k/g | 48 | 39 | 35 | 13 ms |

**Table 2**: Mean VOT by source language.

Given the similarities in mean VOT by source language, we collapsed all stops per source language to compare overall patterns, shown in Figure 3.

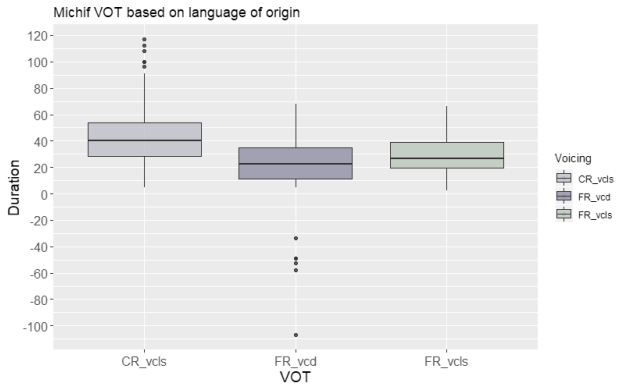


**Figure 3**: VOT by source language

Note that while the outliers in the Cree voiceless group and the French voiced group pull the scale along both the positive and negative ends respectively, the actual range for the standard

deviation of all three groups is within what would normally be considered non-contrastive, with less than 20ms between so-called voiceless and voiced stops. Given the small range between the stops, we argue that all three sets of stops are non-contrastive, at least in terms of VOT. Therefore, an analysis of Michif which posits a single set of Michif stops may be the most accurate. Collapsing all stops based on place of articulation rather than on source language, then, results in Figure 4, showing Michif as a language with a three-way place distinction and a single set of short-lag stops /p t k/.

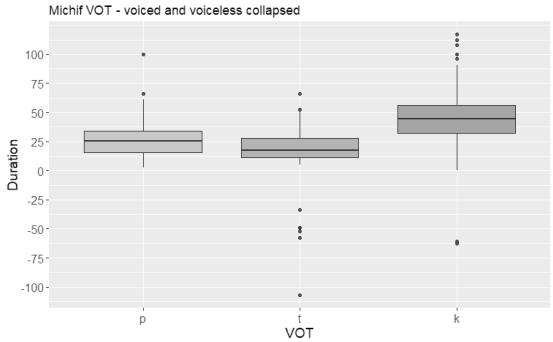


**Figure 4**: VOT by place of articulation

## 4. DISCUSSION

This study is to date the only phonetic analysis of Michif VOT, filling a gap in our descriptive phonetic knowledge of a critically endangered language. Furthermore, this analysis has important implications for how new contact languages establish their phonetic grammar when faced with two different systems with different phonemic inventories. We posited three possible outcomes to our research question in 1.0, and we conclude based on the results of our study that the most accurate analysis is outcome c), all stops in Michif pattern together, for a single set of voiceless stops in the language. This is contra analyses of Michif which posit two distinct phonological grammars ([1], [2]) and supports other work on Michif which finds that the language patterns more like Algonquian languages ([5], [7], [23]). It is interesting to note that this analysis is also not in line with orthographic systems that have been developed by linguists and native Michif speakers, which give two distinctive sets of stops ([6], [13], [22]).

Two aspects of language contact should be mentioned in this study. First, the variety of French which would have been the input to Michif has been argued to be the local Métis French rather than Laurentian French as spoken in Quebec. The one study of local French VOT [21] has shown that there is markedly less prevoicing, like that seen here in the French source data. However, in this case, the voiceless stops remained contrastive with the voiced, showing long-lag values in the 60-80ms range. Therefore, even if the lack of prevoicing is common in local French varieties, these same local varieties still carry two distinctive sets of stops, unlike what we have found for Michif.

The second aspect of language contact is based on the English bilingualism of all speakers surveyed. We could ask whether English has played a role in the VOT system of Michif. While this is certainly possible, the VOT results we have reported for Michif do not resemble in any way those for English, with its long-lag voiceless and short-lag voiced consonants. Therefore, any influences from English do not seem to have changed the underlying Michif VOT system.

The results we have presented are based on ten speakers, balanced by gender, or an estimated 5-10% of the remaining speakers of Michif; a strong corpus for a critically endangered and understudied language. That said, there are some shortcomings in the dataset which must be noted. While the number of tokens of each stop is unbalanced in terms of its source language, note this is reflective of the unbalanced nature of the distribution of the number of vocabulary items from each source language in Michif. As Michif is a polysynthetic language, nouns are often not required in discourse, and as such, there is much less French-source lexical material than Plains Cree. This is reflected in the smaller numbers for items with French voiceless /t/ and /d/. These small numbers made inferential statistical analysis of the results problematic. In future work, we plan to expand the dataset to include more texts, which should reinforce our findings here.

Our findings overall bring into question the treatment of Michif as having two active phonetic grammars, supporting instead analyses which argue that Michif patterns as a member of the Algonquian family, closely related to Plains Cree. Michif may be better analysed then as having incorporated French lexical material, but having adapted this material to primarily Algonquian structures. Interestingly, recent work on other mixed languages have found analogous results. For example, Stewart [22] finds for Media Lengua that while Spanish origin stops have been adopted though lexical borrowings, the language on a whole conforms to its ancestral language's (Quichua) phonological system. Stewart et al [25] also suggests that the ancestral language's phonology plays a major role during mixed language formation for Gurindji Kriol. The present study on Michif VOT therefore supports other recent work in mixed language phonetics showing that ancestral languages tend to play a larger role than colonial languages in mixed language grammars.

## 7. REFERENCES


[1] Bakker, P. 1997. *A language of our own*. Oxford: Oxford University Press.

[2] Bakker, P., R. Papen. 1997. Michif: A Mixed Language based on Cree and French. In Sarah Thomason (ed.), *Contact Languages: A Wider Prespective*, 295–363. Amsterdam: Benjamins.

[3] Boersma, P., D. Weenink. 2018. Praat: doing phonetics by computer [Computer program]. Version 6.0.21, from http://www.praat.org.

[4] Chafe, W. (ed.). 1980. *The pear stories: Cognitive, cultural and linguistic aspects of narrative production*. Norwood, NJ: Ablex Publishing Corp.

[5] Cenerini, C, M-O Junker, N Rosen Mapping dialectal variation using the Algonquian Linguistic Atlas. (2017). *Language Documentation and Conservation*

[6] Flamand, Rita. 2002. *Michif conversational lessons for beginners*. Winnipeg: Métis Resource Centre.

[7] Gillon, C. & N. Rosen. 2018. *Nominal Contact in Michif*. Oxford: Oxford University Press.

[8] Lisker, L, A.S. Abramson, 1964. A cross-language study of voicing in initial stops: acoustical measurements. *Word* 20(3):384-422.

[9] MacLeod, A.A.N., C Stoel-Gammon. 2005. Are bilinguals different: what VOT tells us about simultaneous bilinguals. *Journal of Multilingual Communication Disorders* 3(2): 118 – 127.

[10] Max Planck Institute for Psycholinguistics. 2016. *ELAN*. Nijmegen: The Language Archive. https://tla.mpi.nl/tools/tla-tools/elan/.

[11] Mazzoli, Maria. 2019. Michif loss and resistance in four Metis communities. Kahkiyaw mashchineenaan, "All of us are disappearing as in a plague" Zeitschrift für Kanada-Studien. 96-117.

[12] Meakins, Felicity. 2013. Mixed languages. In Yaron Matras & Peter Bakker (eds.), *Contact languages: A comprehensive guide*, 159–228. Berlin: Mouton de Gruyter.

[13] Papen, R.A. 2005. On developing a writing system for Michif. *Linguistica Atlantica* 26. 75–97.

[14] Papen, R.A. 2003. Michif: One phonology or two? In Yunhee Chung, Carrie Gillon & Rachel Wojdak (eds.), *Papers from the workshop on the structure and constituency in the languages of the Americas*, 47–58. Vancouver: University of British Columbia Working Papers in Linguistics.

[15] Poplack, S. (1993). Variation theory and language contact. In D. Preston, ed., *American Dialect Research*. 251-286. Amsterdam: John Benjamin.

[16] Rhodes, R. 1986. Métchif: A second look. In William Cowan (ed.), *Actes du Dix-Septième Congrès des Algonquinistes*, 287–296. Ottawa: Carleton University.

[17] Rhodes, R. 2009. The phonological history of Métichif. In *Français d'un Continent à l'autre: Mélanges Offerts à Yves Charles Morin* F. Martineau, L. Baronian (ed). Les Voies Du Français 1. 423–442. Québec: Presses de l'Université Laval.

[18] R Core Team (2014). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL http://www.R-project.org/.

[19] Rosen, N. (2007). *Domains in Michif phonology*. Doctoral dissertation. Toronto: University of Toronto.

[20] Rosen, N. (2006). Language contact and Michif stress assignment. *STUF - Sprachtypologie und Universalienforschung* 59(2). 170–190.

[21] Rosen, N. and D. Bérubé. 2018. VOT of French-English bilinguals in Saint-Boniface, Canada. New Ways of Analyzing Variation (NWAV). New York. October 18-21.

[22] Rosen, N., H. Souter. 2015. *Piikishkweetak aa'n Michif!* Second edition. Winnipeg, Manitoba: Louis Riel Institute.

[23] Rosen, N., J. Stewart, O. Sammons. 2016. Effects of language contact in the Michif vowel system. Paper presented at New Ways of Analyzing Variation 45. Nov 3-6, 2016. Vancouver.

[24] Stewart, J. 2014. A comparative analysis of Media Lengua and Quichua vowel production. *Phonetica*, *7*, 159–182. https://doi.org/10.1159/000369629

[25] Stewart, J. 2018a. Voice onset time production in Spanish, Quichua, and Media Lengua. *Journal of the International Phonetic Association*, *48*(2), 173–197. https://doi.org/doi.org/10.1017/S002510031700024X

[26] Stewart, J. 2018b. Vowel perception by native Media Lengua, Quichua, and Spanish speakers. *Journal of Phonetics*, *71*, 177–193.

[27] Stewart, J., Meakins, F., Algy, C., Joshua, A. (2018). The development of phonological stratification: Evidence from stop voicing perception in Gurindji Kriol and Roper Kriol. *Journal of Language Contact*, *11*(1), 71–112.

[28] Sundara, M. 2005. Acoustic-phonetics of coronal stops: A cross-language study of Canadian English and Canadian French. *Journal of the Acoustical Society of America* 118:2, August 2005.

[29] Thomason, S. G. 2001. *Language Contact: An Introduction*. Washington, D.C., United States: Georgetown University Press.

[30] Wolfart, H.C. 1996. Sketch of Cree, an Algonquian language. In I. Goddard (ed.), *Handbook of North American Languages*, vol. 17: Languages, 390–439. Washington, D.C., United States: Smithsonian Institution.

[31] Wolfart, H. C. 1973. *Plains Cree: A grammatical study* (Transactions of the American Philosophical Society, New Series). Vol. 63, part 2. Philadelphia, Pennsylvania: American Philosophical Society