Haitian Creole determiner-noun fusion
A statistical learning perspective

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Introduction

➪ It is controversial as to whether creoles emerged through the same processes as other languages. (Bickerton 1981, Lefebvre 1986, McWhorter 2018, Mufwene 2008, DeGraff 2003)

➪ Determiner-noun fusion is the phenomenon when string in the lexifier becomes a determiner-less noun of similar meaning in the creole.

- ✪ FR *la pluie* "the rain" ⟶ HC *lapli* "rain"
- ✪ FR *mon oncle* "my uncle" ⟶ HC *mononk* "uncle"

➪ It is present in French and Portuguese-based creoles but not English-based creoles.

Research question

➪ **Did determiner-noun fusion in Haitian Creole emerge through statistical learning, a non-exceptional process?**

Previous explanations

➪ Fusion occurred due to the similarity between French articles and Bantu class morphemes. (Baker 1984)
- Extent of fusion correlates with the percentage of Bantu-speaking slaves.
- Bantu languages do not have articles.

➪ French determiners carry the semantic roles of Bantu class morphemes. (Strandquist 2005)
- The fused words obey Bantu vowel harmony.
- The two types of morphemes satisfy transfer constraints.

➪ Many lexifier factors affect the fusion pattern in Mauritian Creole (Bonami and Henri 2015): etymological age, grammatical gender, initial segment, number of syllables, gross and collocational frequency.

Hypothesis

➪ Backward transitional probability P(*la*|*pluie*) may play a role.
- Forward transitional probability is too low to be differential.

Methods

➪ All fused words and 130 stratified-sampled unfused words are collected from a Haitian Creole-English dictionary. (Targète and Urciolo 1993)

➪ Words are coded for etymon gender, number of syllables, initial segment, gross and collocational frequency. Backward transitional probability is the ratio between collocational and gross frequencies.

➪ Log odds of being fused is modeled using *glm()*.

FUSED ∼ GROSS FREQUENCY + COLLOCATIONAL FREQUENCY + BTP + GENDER + INITIALSEGMENTV + SYLLABLE1

Results

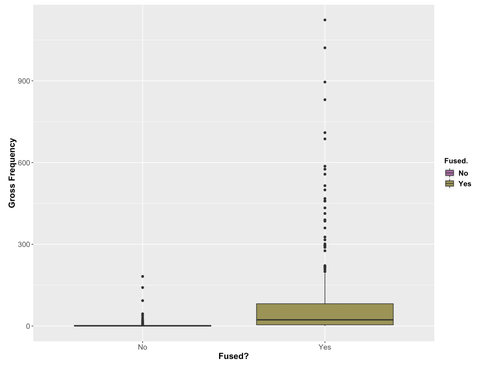

Figure 1: Effect of gross frequency on fusion (p <0.001)

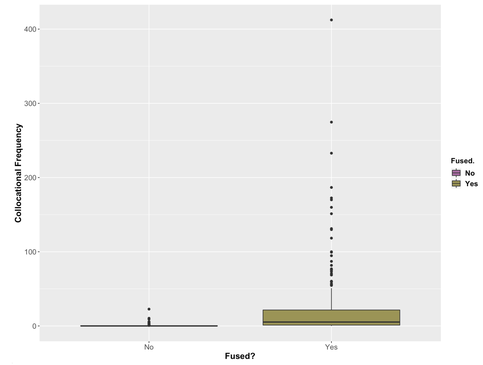

Figure 2: Effect of collocational frequency on fusion (p <0.001)

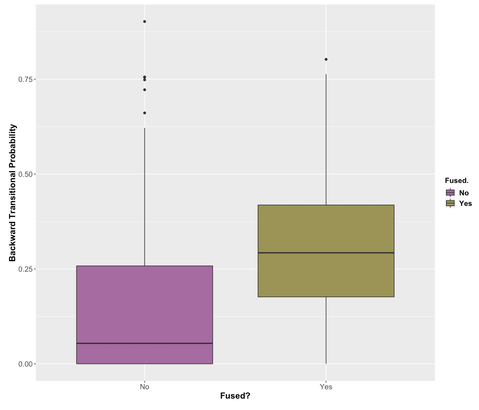

Figure 3: Effect of backward transitional probability on fusion (p <0.001)

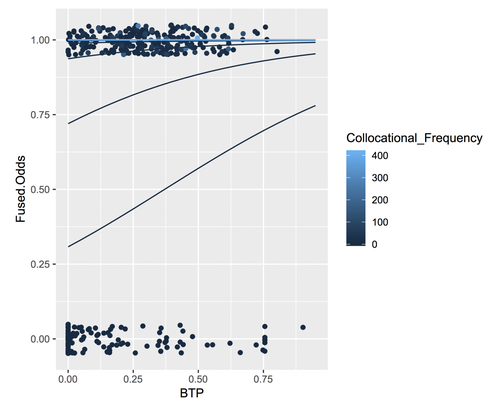

Figure 4: Interaction between collocational frequency and backward transitional probability

➪ Both distributional and conditional statistics predict the fusion pattern in Haitian Creole.

➪ Collocational frequency play a more primary role than backward transitional probability.

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Coefficients:
                          Estimate Std. Error z value Pr(>|z|)
(Intercept)             -3.007832   1.176725  -2.556 0.010585 *
Genderf                  1.025107   1.171588   0.875 0.381589
Genderm                 -0.204743   1.183819  -0.173 0.862690
Initial_SegmentV         2.079214   0.365478   5.689 1.28e-08 ***
Syllable1                1.591480   0.350885   4.536 5.74e-06 ***
BTP                      2.405254   0.740296   3.249 0.001158 **
Collocational_Frequency  0.353338   0.096144   3.675 0.000238 ***
Gross_Frequency         -0.008641   0.008867  -0.974 0.329826
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 491.85  on 385  degrees of freedom
Residual deviance: 282.86  on 378  degrees of freedom
AIC: 298.86

Number of Fisher Scoring iterations: 9
```

Figure 5: Generalized logistic regression model on fusion

➪ Both statistical and phonological factors matter.

Why frequency > transitional probability?

1) **Dictionary biases towards high-frequency items.**
2) **Nature of statistical learning.** (Thiessen and Erickson 2013)
3) **Frequency-dependent transmission** (Morgan and Levy 2016)

Acknowledgements:
➪ Salikoko Mufwene and Lenore Grenoble for their advising and suggestions on the project.
➪ Ross Rauber for his assistance with data collection.
➪ Attendees of the Uniformitarianism in Genetic Creolistics Conference and the Language Variation and Change workshop for their feedback.

Discussion

Why did fusion occur?

➪ Bantu and Kwa noun phrases are noun-first, unlike French.
- ✪ Safwa ***abhantu*** *bhani bhasanu* "five people of mine"
- ✪ Leteh ***o-nyinɛ*** *ɔ-tɔntɔ ɔhɛ a* "the tall red man"

➪ Learners have a transitional probability bias from their L1 (Onnis and Thiessen 2013). Here they have a backward transional probability bias.

➪ Vowel harmony might have been caused by probabilistic phonotactic patterns, a key factor in boundary learning (Mattys and Jusczyk 2001).

Why do English-based creoles not have fusion?

➪ English null determiner is much more prevalent than that of French.

➪ There is weak stress in French compared to in English (Parkvall 2000).

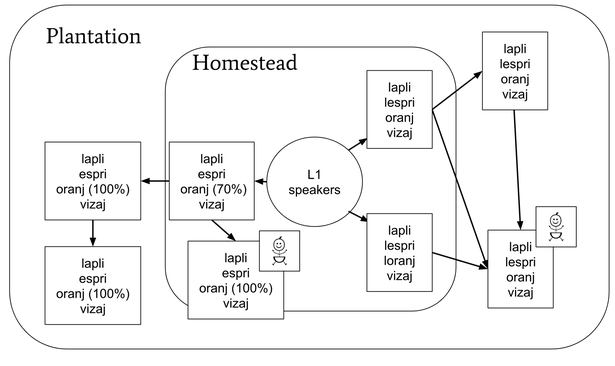
➪ English foot structure is strong-weak while French foot structure is weak-strong. French determiners are in the same foot with the nouns' first syllable, making them easier to be fused (Cutler and Norris 1988)

Adults or children?

➪ Previous works put children at the center of creole emergence (Bickerton 1981, Hudson Kam and Newport 2005) because children tend to overregularize and creoles have more regular features.

➪ Haitian Creole has both inter-token and intra-token inconsistency.
- Inter-token: Both adult and children regularization.
- Intra-token: Sociolinguistic variation due to population structure.

➪ Adults regularized due to 1) diffusion chain (Smith and Wonnacott 2010), 2) pragmatic factors (Perfors 2016) and 3) scattered inconsistency (Hudson Kam and Newport 2009).



Implications

➪ Substrate and superstrate influences, along with general learning mechanisms in both adults and children play a role in creole emergence.

Selected references: **Bonami**, O. & F. Henri. 2015. Prédire l'agglutination de l'article en mauricien. *Faits de langues*. • **Baker**, P. 1984. Agglutinated French articles in Creole French: their evolutionary significance. *Te Reo* 27. • **Strandquist**, R. E. 2005. Article incorporation in Mauritian Creole. • **Hudson Kam**, C. & E. Newport. 2005. Regularizing unpredictable variation: The roles of adult and child learners in language formation and change. *Language learning and development* 1(2). • **Onnis**, L. & E. Thiessen. 2013. Language experience changes subsequent learning. *Cognition* 126(2).