Intra- and Inter-Speaker Variation in French Schwa: Implications for Theories of Optionality

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Phonology 2013, November 8–10

Introduction

- Theories of optionality model intra-speaker variation in productions, but rely on empirical studies that don't shed light on this issue.
- Corpus studies reveal population-wide variation and variant frequencies, and native-speaker intuitions do not necessarily reflect production behavior.
- When we model the variation in these sources, what are we modeling? The grammars of different speakers? The multiple grammars that a single speaker controls, i.e. register variation? The variation that a single grammar makes possible?

> - What is the extent of intra-speaker variation?
> - Are frequency patterns constant across speakers?

- We conducted a corpus study of optional schwa deletion in French (e.g. Côté 2001, Dell 1980), focusing on individual behavior rather than the population average.
- **Our results:** the intra-speaker variation described in previous studies is real, but precise frequencies may vary by speaker.

Theories of Variation

- Partial Orders (PO; e.g. Anttila 1997): multiple rankings are available.
- Markedness Suppression (MS; Kaplan 2011): discard violation marks at random.
- Serial Variation (SV; Kimper 2011): the ranking changes between steps in Harmonic Serialism.
- Stochastic OT (S-OT; Boersma & Hayes 2001): added noise can change the ranking.
- Rank-Ordered Model of Eval (ROE; Coetzee 2004, 2006): all candidates that survive to a certain point are viable outputs.

(1)		PO	MS	SV	S-OT	ROE
	Require intra-speaker variation?		✓	✓	✓	✓
	Permit inter-speaker variation in frequencies?	✓			✓	✓

Corpus Study

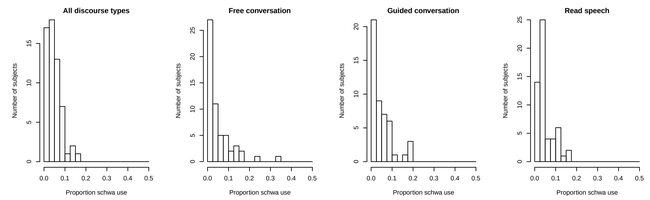
- The PFC corpus (http://www.projet-pfc.net/; Durand et al. 2002, 2009):
  - Identifies individual speakers.
  - Controls for stylistic/register variation.
  - Controls for phonological influences on variation.
- Three contexts examined for speakers from Paris and Canada: __V, CC__C, schwa in clitics
- Mixed-effects logistic regression models for each context, with these factors:
  - Fixed effects: speaker's country of origin; phonological context
  - Random effects: discourse type; speaker's city of origin; speaker's identity

Prevocalic schwa

- Schwa is illicit here (Dell 1980):

(2) *d'une autre*
[dynotr], *[dəynotr]
'of another'

- Corpus: schwa is dispreferred, but not categorically absent:



Frequency of prevocalic schwa by subject

- Random effect of `City` significantly improves the model's performance, but `Speaker` does not.

⇒ There is inter-dialect variation in the rate of schwa's omission in this context as approximated by `City`. But there is no inter-speaker variation beyond this.

CC__C

- Schwa is generally optional here (Côté 2001):

(3) a. *une fenêtre*
[ynfənɛtr] ∼ [ynfnɛtr]
'a window'

b. *Ester le salut*
[ɛstɛrləsaly] ∼ [ɛstɛrlsaly]
'Ester greets him'

- Côté notes three complications:
  - Schwa's omission may not create a CCC cluster in which the middle C is (i) the most sonorous one (4), or (ii) a stop and C_3 is not a continuant (5).
  - These prohibitions weaken if the cluster straddles a prosodic boundary.

(4) a. *la douce mesure*
[ladusməzyr], *[ladusmzyr]
'the sweet measure'

b. *Annik le salut*
[anikləsaly], *[aniklsaly]
'Annik greets him'

(5) a. *la douce demie*
[ladusdəmi], *[ladusdmi]
'the sweet half'

b. *la même demande*
[lamɛmdəmɑ̃d], *[lamɛmdmɑ̃d]
'the same request'

- Tokens involving prosodic boundaries and exceptional clusters are excluded.
  - This required hand coding: 421 tokens (five speakers, Center of Paris region)
  - Resulting set: 240 tokens (171 with ə, 69 without)

	Free Conversation	Guided Conversation	Read Text
Speaker A	0.53	0.88	0.70
Speaker B	0.67	0.46	0.78
Speaker C	0.78	0.77	0.64
Speaker D	0.71	1.00	0.83
Speaker E	0.82	0.50	0.67

Frequency of schwa in CC__C for 5 subjects

- Too little data (so far) for more robust analysis, but intra-speaker variation is clear.

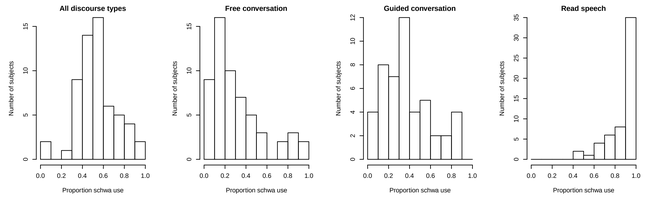
Clitics

- Schwa should be optional here: V#C__C, where C__ is a clitic (Côté 2001).

(6) a. *plein de linguistes*
[plɛ̃dlɛ̃gɥist] ∼ [plɛ̃dəlɛ̃gɥist]
'full of linguists'

b. *Annie le salut*
[anilsaly] ∼ [aniləsaly]
'Annie greets him'

- Few speakers show categorical behavior, regardless of discourse type:



Proportion schwa use in clitics by speaker

- The random effects of `City` and `Speaker` *both* significantly improve the model.

⇒ Intra-speaker variation is attested in this context.

⇒ There is inter-speaker variation here in the rate of schwa omission, both between *and* within dialects.

Implications

- These results support theories that allow intra-speaker variation and inter-speaker differences in frequencies: MS, S-OT, and ROE.
- Other theories need to incorporate ways to allow speaker-specific frequencies.
- The frequency results have another consequence:
  - We must be careful when modeling frequencies derived from a corpus with multiple speakers. The average frequencies across a corpus may represent no actual speaker.

> An individual speaker's grammar is the proper locus for theories of variation. Such theories must leave room for frequency predictions to vary by speaker.

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Acknowledgements Thanks to Derron Borders, Rachel Hayes-Harb, and audiences at the Univ. of Utah for their feedback throughout the development of work.