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French schwa a non-unitary phenomenon

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*Alors là, oui d'accord, mais mais mais la **seconde**, oui la **seconde** partie du jeu est une partie de de calcul purement mental.*

(svarv1, informal conversation)



seconde 'second-FEM' [sœgõd] with schwa
[sgõd] without schwa

Of all the vowels attested in the world's languages, French schwa is probably the one over which most ink has been spilled in publications on phonology. **All conditions taken together make schwa « a problematic vowel ».** And almost all conditions are controversial, even schwa's identity.

(Verluyten 1988:1, our translation)

Yes, problematic. But is there more to the discussion?

[T]his study is confined to 'standard' French, represented by such conservative sources as Fouché 1956 and Grevisse 1959. While **the description of this norm may (or may not) generalize easily to other dialects, this is not considered relevant to the present description.** Similarly, many speakers who consider their language to be 'standard French' may well deviate from this norm in more or less significant ways. Such idiolectal variation is, again, treated as not directly relevant to the description of the particular form of speech discussed here.

(Anderson 1982:534, Footnote *)

The end of the “armchair vs. corpus battle” (Fillmore 1994)

- **A beneficial interplay**
 - The rich 20th century theoretical literature can shape and guide extensive data collection
 - Systematic data collection can form a solid testing ground for past and future theory-driven work
- **A complementary dataset needed?**
 - Early criticism (Chomsky 1965) and novel technologies → refined standards concerning representativeness, size and structuring of corpora
 - Intuitions as a window into grammaticality of structure

(Xiao 2008)

Outline

- Schwa in “armchair linguistics”
 - Establishment of a theoretical foundation
- Schwa in “corpus linguistics”
 - The PFC programme (and complementary projects)
- Concluding remarks
 - The next step

The definition of French schwa

- Traditional approach
 - Segment corresponding to orthographic <e>
 - Three types: a) obligatory presence, b) alternation, c) obligatory absence
 - a) *squelette* b) *s(e)maine, doucement/autrement*, c) *samedi*
- Modern approaches
 - “A vowel that alternates with Ø in the same lexical and morphological context” (Côté 2000:80)
 - Two types: a) underlying, b) epenthetic
 - a) *s(e)maine*, b) *doucement/autrement*
 - Obligatory presence and absence ← restructuring of the underlying form

Theoretical highlights

Abstract segmental approaches

- Schane (1968), Dell (1985[1973])
 - Abstract underlying schwas, preventing deletion of final consonants
 - Close relationship between phonological and orthographical representations
petit ‘small-MASC’ /pətit/ → [pəti] vs. *petite* ‘small-FEM’ /pətit+ə/ → [pətit]

Concrete segmental approaches

- Morin (1978), Tranel (1981)
 - No abstract underlying schwas, reanalysis of phonological representations
 - Non-opaque, but reduces the pan-variety and pan-stylistic strength of the analysis

Neo-normativist approaches

- Encrevé (1988), Laks (2005)
 - Orthography, directly or via normative pronunciation, could further mold lexical representations, adding a tier encoding orthographic information

Theoretical highlights

Structural approaches

- Anderson (1982)
 - Schwa is an underlying syllable nucleus, the *zero allophone*
 - Deletable empty nuclei postulated in word-initial, -medial, and -final syllables
 - Spelled out as [œ]
- Eychenne (2006)
 - Schwa is an empty vocalic node
 - Deletion: VOC-V >> MAX-VOC
 - Spelled out as [œ] or other
- Scheer (1999, 2000, 2005)
 - Schwa is an undeletable nucleus in a CVCV structure
 - Uninterpreted phonetically when properly governed

Some remaining challenges

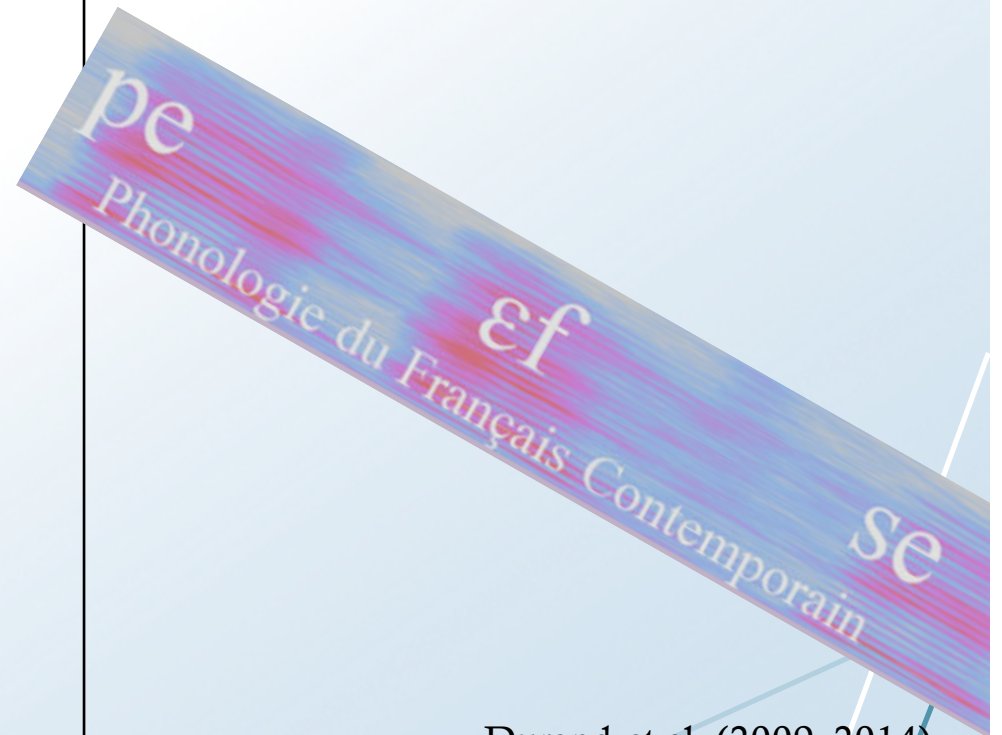
- **Representation**
 1. Schwa in the underlying representation
 2. The lexical representation of schwa words
- **Alternation**
 1. The gradience in deletability across schwa words
 2. The gradience in deletability across speakers
- **Realisation**
 1. The featural composition of the segment representing schwa
 2. The spectral and temporal characteristics of the segment
- **Orthography**
 1. Structure first, orthography second
 2. Orthography first, structure second

**Going beyond
L1 intuitions**

Now's the time to be
creative in selection of
empirical approaches

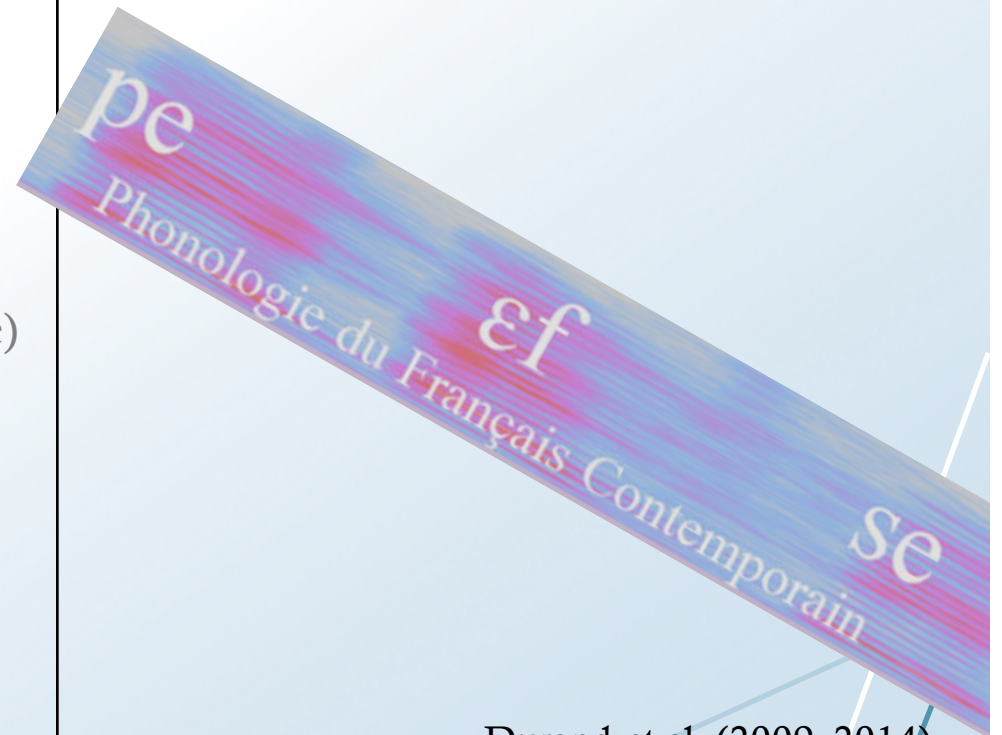
The PFC research programme

- **Collaborative programme**
 - Launched in the late 90s
 - Around 60 researchers involved
 - Current direction: M.-H. Côté (Laval), J. Durand (Toulouse), B. Laks (Paris), and C. Lyche (Oslo)
 - Annual 5-day meeting in Paris
- **Main objectives**
 - Map contemporary spoken French across the Francophone world
 - Allow testing of phonological and phonetic models
 - Provide data to improve tools for automatic treatment of language
 - Allow better exposure to authentic speech in the L1 and L2 classroom



The PFC research programme

- **Results, database (Feb. 2016)**
 - Investigation points: 38
 - Informants: 418
 - Potential schwas coded: 217 709
- **Complementary projects**
 - L2 acquisition: IPFC (Detey & Kawaguchi 2008, Racine et al. 2012)
 - L1 acquisition: Andreassen (2013)
 - LVTI (Langue, Ville, Travail, Identité)
 - Didactics: PFC-EF



Challenge 1: Schwa in the underlying representation

The distorting effect of orthographic criteria in schwa analysis

- Southern French: Varieties in which <e> in the word-medial and –final syllable corresponds to schwa, e.g. *bêtement* [bɛtəmã] and *bête* [bɛtə], but which in the initial syllable corresponds to a stable vowel
cheval [ʃəval] vs. *[val]
- Determining the category of the word-initial vowel in Southern French: Pilot study, Figeac (Eychenne 2015)
 - Schwa in the word-initial syllable cannot be recovered neither on the basis of phonological, nor morphological grounds
 - Acoustic analysis reveals absolute neutralisation, to [ø]
 - Assumed restructuring schwa → /œ/

Challenge 1: Schwa in the underlying representation

Interpreting changing behaviour

- 5 PFC investigation points (Durand & Eychenne 2004, Durand 2011)
 - Tendency for deletion in word-medial and -final syllables, levelling towards the Northern “standard” system
 - Variables: region and age
- Word-initial syllable: some instability, change in structure?
 - Deletion in highly frequent words, *petit, semaine* (cf. *déjà* with u.l. /E/)
 - Favours a usage-based change, no restructuring of /œ/ → schwa

	VCeC Douc•ment Schwa présent	VCe#C bell•table Schwa présent
Douzens	94.9% (94/99)	78.7% (420/533)
Lacaune	97% (63/65)	78.8% (328/416)
Aix-Marseille	74.5% (44/59)	19% (44/232)
Marseille-centre	65.2% (62/95)	17.3% (62/357)
Biarritz	71.8% (97/135)	26.4% (168/636)

	V#Ce#Ce dans le•vent Schwa présent	V#CeC à d•emain Schwa présent
Douzens	94.5% (533/564)	98.2% (91/98)
Lacaune	95.1% (488/513)	95.4% (83/87)
Aix-Marseille	83.1% (440/529)	94.2% (66/70)
Marseille-centre	79.2% (392/495)	84.5% (104/123)
Biarritz	76.6% (519/677)	85% (102/120)

Challenge 1: Schwa in the underlying representation

Observations challenging an initial one-category approach, where schwa = /ɛ/

Swiss French child language

petit [p(œ)ti] → [pyti] (Kim 2;08.29)

cheval [ʃ(œ)val] → [vovaj] (Henri 2;04.01)

petit [p(œ)ti] → [paki] (Henri 2;06.24)

fenêtre [f(œ)netʁ] → [tʌnet] (Adèle 2;08.29)

bleu 'blue' [blø] → [pəle] (Adele 2;07.08)

(Andreassen 2013)

Louisiana French, illiterate

venir [v(œ)niʁ] → [viniʁ] (elaem1)

chevaliers [ʃ(œ)valje] → [ʃavalje] (LC1)

(Klingler & Lyche 2012, Blainey 2013)

The importance of oral feedback, strengthened through the acquisition of literacy skills
(Andreassen & Lyche 2015)

Challenge 1: Schwa in the underlying representation

Word-final schwas: or the lack thereof

- Southern varieties: Assumed presence
 - Morphological motivation
bêtement [bɛtəmã], *bête* [bɛtə], *bête et ...* [bɛte] (Eychenne 2006)
 - Phonological motivation (extended Loi de position)
meule [mœ.1ə] vs. *meulage* [mø.1aʒ] (Eychenne 2014)
- Northern varieties: Assumed absence, various strategies for CC#
 - Parisian French: Phonetic lubricant
 - Canadian French: Cluster reduction, even in pre-vocalic context
prend(re) une année (Eychenne 2006)
 - Swiss French: Cluster reduction, liquid devoicing
vivre notre [vivnɔtʁ], *livre de* [livʁdœ] (Andreassen 2004)

Challenge 2: Gradiance in deletability

- Frequently observed: “System in line with Dell (1985[1973])” ...
- Word-initial syllable: Variation on (at least) 3 levels

- Cross-regional variation
 - Ongoing, but understudied
 - Analytic tools available
 - Coding system (e.g. Durand & Lyche 2003)
 - Software (e.g. Dolmen, cf. Eychenne & Paternostro in press)

Tableau 2 : Schwa en syllabe initiale de mots non clitiques (informel)
codes 0212 et 0222 *vs* codes 1212 et 1222

Point d'enquête	Dijon ^a		Brécey		Brunoy		Paris		Treize-Vents		Total
	V	C	V	C	V	C	V	C	V	C	
Absent	55	0	110	3	104	10	74	3	76	2	437
%	68,8	0	71	6,7	64,2	14,3	63,8	8,6	86,4	4,3	54,3
Présent	25	7	45	42	57	60	42	32	12	45	367
%	31,3	100	29	93,3	35,2	85,7	36,2	91,4	13,6	95,7	45,6
Incertain	0	0	0	0	0	0	0	0	0	0	0
Total	80	7	155	45	162	70	116	35	88	47	805

Challenge 2: Gradience in deletability

- Lexical variation
 - Challenge: retrieve all lexical items under scrutiny
 - Combine with judgment data?
- Example: Racine (2008)
 - Judgment data, word-initial syllable: Neuchâtel vs. Nantes

Scale 6 (absence) to -6 (presence)

secret [s(œ)kβɛ] -0.50 (NE) -3.58 (NA)

secrétaire [s(œ)kβɛtɛɐ̃] 0.83 (NE) -3.42 (NA)

- Phonotactic variation
 - Disentangle from lexical variation, e.g. focus on frequency
- Example: Côté (2009)
 - Production and judgment data: Québec vs. Montréal
 - Montréal: near-categorical effect of initial consonant on behaviour of schwa (complete absence vs. alternation)

	Fricative initiale		Occlusive initiale	
	A	V	A	V
RéFQA	25 % (10)	75 % (30)	29 % (19)	71 % (46)
Québec (âgée)	44 % (7)	56 % (9)	19 % (3)	81 % (13)
Québec (jeunes)	46 % (12)	54 % (14)	4 % (1)	96 % (25)
Montréal	88 % (36)	12 % (5)	8 % (3)	92 % (35)

Challenge 3: Realisation of schwa

Schwa realised differently across varieties
Most frequent: Schwa similar to [ø] and [œ]

- Bürki et al. (2008)
 - Comparison of schwa, [ø] and [œ] across three varieties
 - Brunoy (France)
 - Nyon (Switzerland)
 - Quebec (Canada)
- **Level of control in analysis**
 - segmental context YES
 - prosodic position NO
 - schwa unstressed, [ø/œ] mostly stressed
 - less dispersion in unstressed syllables, with [ø/œ] = schwa? (cf. Andreassen 2013)

Schwa does not overlap completely with [ø] or [œ], in none of the varieties

Région	Formant	Effet principal	Tests post-hoc
Brunoy	F1	F(2,81)=43.3, p<.0001	[œ] > [ø], [ə]
	F2	F(2,81)=7.7, p<.001	[œ] < [ø], [ə]
	F3	F(2,81)=2.8, N.S	[ø] < [œ], [ə]
Nyon	F1	F(2,104)=132 p<.0001	[œ] > [ə] > [ø]
	F2	F(2,104)=251, p<..0001	[ə] > [ø], [œ]
	F3	F(2,104)=7,3 p<.001	[ø] < [œ], [ə]
Québec	F1	F(2,60)=71,4, p<.0001	[œ] > [ø], [ə]
	F2	F(2,60)=7,4, p<..01	[ø] < [œ], [ə]
	F3	F(2,60)=33,5, p<.0001	[ø] < [œ], [ə]

(Bürki et al. 2008:3)

Challenge 3: Realisation of schwa

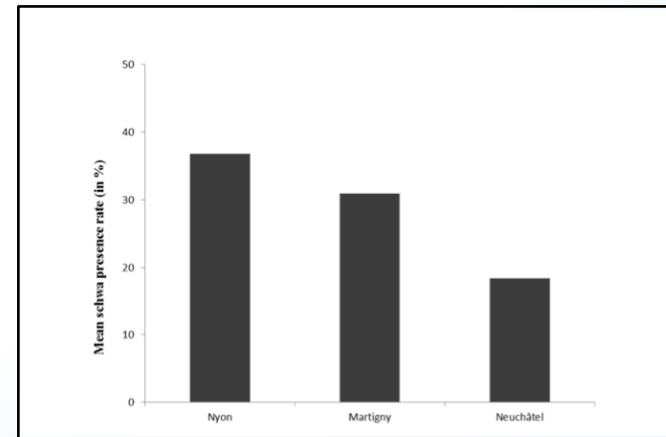
Schwa, subject to temporal and spectral variation (Bürki et al. 2011)

Insignificant, or does it play a role for the phonological analysis?

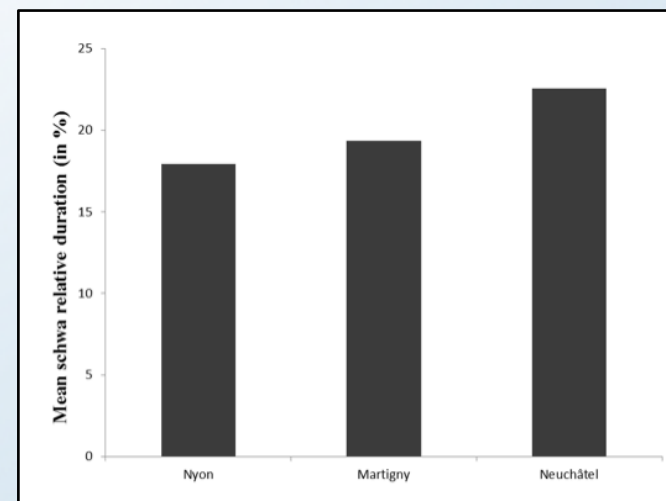
Andreassen & Racine (in press)

- 3 investigations points, Switzerland, spontaneous speech
 - Presence vs. absence (29.02%)
 - Higher rate of schwa presence in Martigny and Nyon (38.76 & 30.91% vs. 18.39%)
 - Relative schwa duration (5.02 – 37.17%)
 - Shorter schwas in Martigny and Nyon (19.37 & 17.96% vs. 22.55%)
- Cross-regional variation, two dimensions
- presence/absence
 - vowel duration
- Observed variability: free or systematic?

Mean rates of schwa presence



Mean relative schwa duration

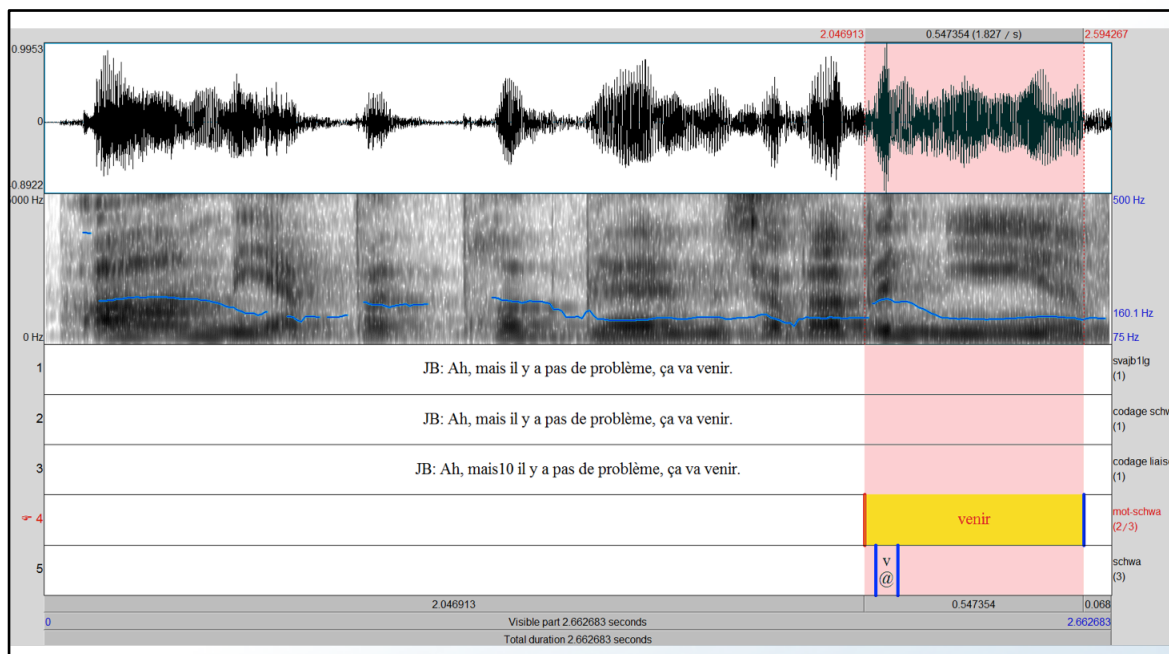


Challenge 3: Realisation of schwa

- Temporal manipulation as a means to reduce, but preserve structure CVCV
 - External argument for disyllabic structure: melodic rise on schwa (cf. Avanzi et. al, 2012; Schwab et al., 2012)

- **Proposition**

- Nyon/Martigny: stronger resistance toward modifying the syllable structure, compared to Neuchâtel



- **For schwa behaviour in general**

- Schwa presence not necessarily a means to break consonant clusters, but rather (or in addition) a means to maintain the syllable count?



Schwa relative duration: 10.47%, example from Nyon (Andreassen & Racine 2013)

Challenge 3: Realisation of schwa

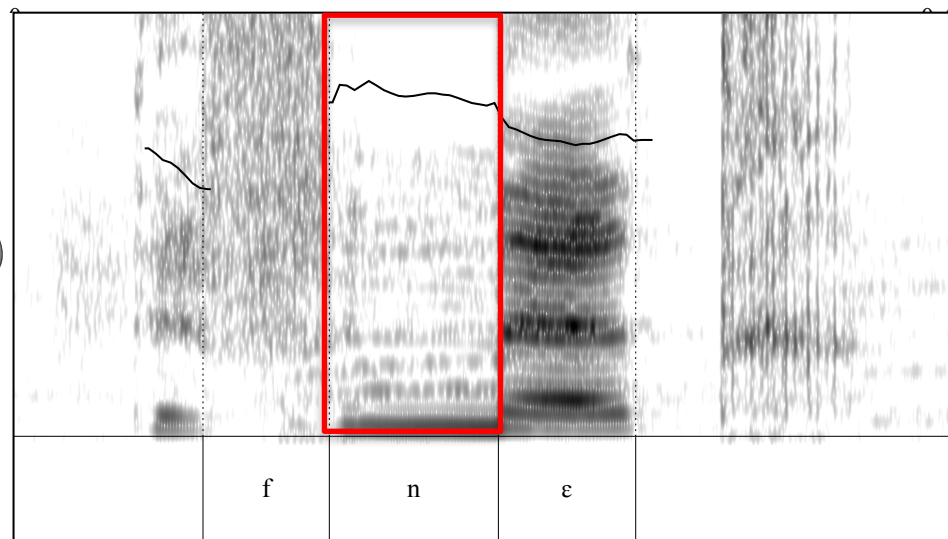
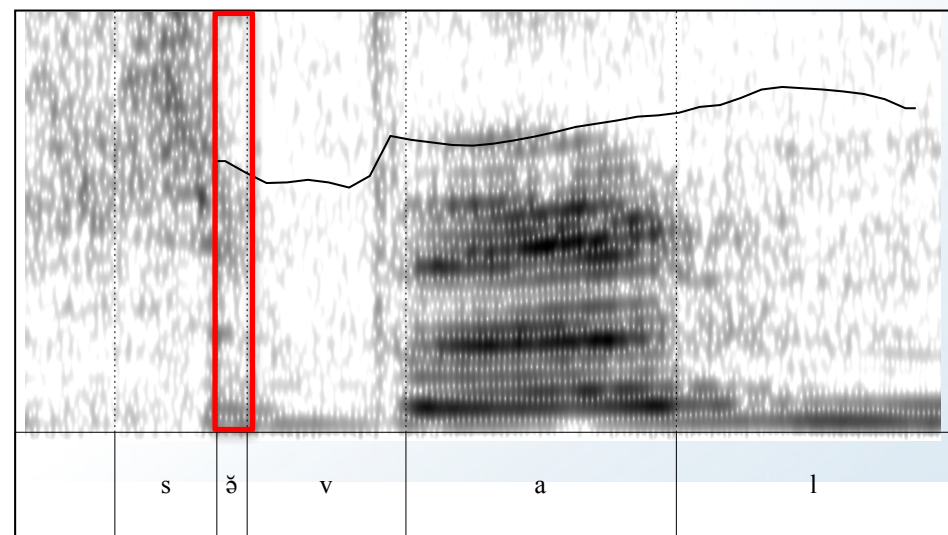
- Swiss French child language
 - Strong preference for the variant with schwa
 - Reduced schwas attested

(il va attraper le) cheval (et heureusement X court très vite). Tom (3;05.17)

- Syllabic sonorants attested

des fenêtres [fn:ɛtʁ] 'windows' Tom (3;03.29)

- **Strategies employed as a means to preserve the syllable count?**



0

Time (s)

0.957

Challenge 4: The impact of orthography

Acquisition of literacy skills influences the treatment of schwa

- Readers vs. pre-readers: recognition of words with schwa (Racine et al. 2013)
 - Schwa in the word-initial syllable, which normally comes with alternation in the oral input
 - Variant with schwa recognized faster, and equally fast by pre-readers and readers
 - Schwa in word-medial syllable, which normally comes with absence in the oral input
 - The two variants recognized equally fast by the readers (access to oral input & orthographic information)
 - The pre-readers use more time recognizing the variant with schwa (access to oral input only)
- **Gradual change in production?**
 - According to Goudaillier (1985), comparing the production in children at two times (Northern France), the acquisition of literacy skills entails hesitation around which <e> to produce.

Challenge 4: The impact of orthography

French L2 in African countries

- [e] or [ø]
 - L1 vocalic system
- Vowel stability in word-initial syllable
 - Orthography?
 - Little exposure to French varieties with alternation
 - Tonal language, equally prominent syllables
- Schwa in the phonological representation? NO

(Bordal 2012, Lyche & Skattum 2012)

French L3 (IPFC-Norvégien: Tromsø, Oslo)

- [œ] in monosyllables, [e] in polysyllables
- Vowel stability in both positions
 - Orthography?
 - Little focus in teaching material (“*schwa is too difficult for the students*”)
 - Little exposure to authentic French
 - L1 prosodic system (lexical accent)
- Schwa in the phonological representation?

(Andreassen 2015, Racine et al. 2015, Detey et al., forthc.)

Concluding remarks

- Is *French schwa* a “non-unitary phenomenon”
 - Depends on your definition of schwa (orthography is a poor indicator!)
 - Depends on the focus and scope of your query
 - If we begin the work guided by the idea that schwa is a **vowel that alternates**, we can have fun searching for patterns, similarities and dissimilarities, observed at various levels of analysis, in various types of speakers, within and across the many French-speaking regions.

Concluding remarks

- Where we are now: Analysing the odd parts
 - Gradually building up corpora and datasets of different types, we start to get a better overview of schwa in all its diversity and unity.
- Where we want to go: Conducting a “schwa meta-analysis”
 - **Obs obs!** This demands meticulous treatment of the data at all levels (and the sharing thereof*)

*Cf. the TROLLing archive, www.opendata.uit.no)

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Thank you for your attention!

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