L3 acquisition of phonological variation

Schwa and (non) sensitivity to phonotactic constraints in Norwegian learners of French

Helene N. Andreassen
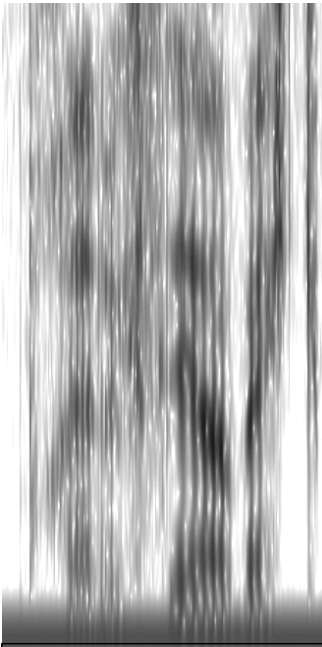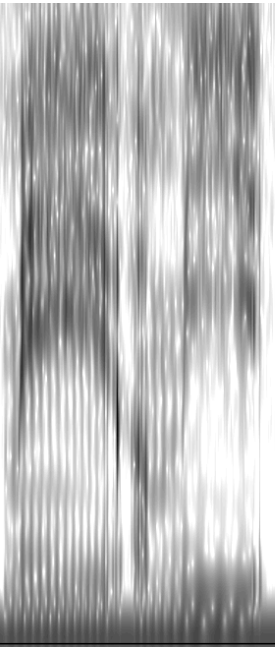
UiT The Arctic University of Norway

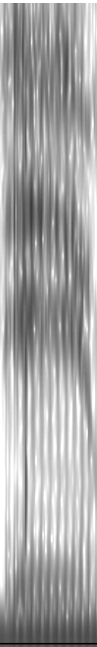Chantal Lyche

University of Oslo

Fonologi i Norden (FiNo), February 9-10, 2018
University of Lund

When Norwegian meets French

relaxer avec	mes / amis	et	mon p@tit / ami

(notrah1, semi-formal conversation)

Acquisition of phonological variation

- Liaison and schwa alternation
  - Two highly frequent phenomena in European French.

- "Knowledge of variation is part of speaker competence."
  - Are learner patterns and target patterns similar?
  - Which processes are involved in the acquisition?
  - What is the role of the input? (Bayley & Regan, 2004, p. 325)

- For a learner of French, this includes
  - Obligatorily realising the liaison consonant in a given set of contexts (and optionally in others), and linking it to the onset position of the initial syllable in Word-2 (enchainement).
  - Optionally deleting the schwa vowel in a given set of contexts, and realising the remaining consonant sequence.

Acquisition of schwa alternation

what do we know and what do we want?

Previous studies

- (Even) immersion students delete only around half as often as L1 speakers.

- Learners are sensitive to the phonetic constraints guiding schwa alternation in the target language, e.g. position in the rhythmic group.

- Exposure to colloquial French has a favourable effect. (Mougeon et al., 2004; Thomas, 2004; Uritescu et al., 2004)

Why problematise non-target-like schwa retention?

- "There are cases where speaking French too well amounts to speaking it badly." (Pohl, 1975, p. 23, referred to by Thomas, 2004, p. 380).

- "One should be able to expect from advanced students that they add a stylistic dimension to their linguistic competence" (Thomas, 2004, p. 380).

What needs to be in place for target schwa alternation to kick in?

Outline

- Liaison and schwa: Differences, shared properties, and L2/L3 challenges
- A note on prosody
- The problem with consonant sequencing in the case of schwa absence
- Learning strategies and hypotheses
- IPFC: Corpus and methods
- The first results
- Discussion
- Future perspectives

Liaison

properties

External sandhi phenomenon

- Realisation of the liaison consonant (LC) in the initial position of Word-2.

- Heavily conditioned (see Eychenne & Laks, 2017, for an overview).

Output: V#V → V#CV

- Obligatory
  pro+   *on est* [õ.**n**ɛ]
  det+   *un été* [ɛ̃.**n**e.te]

- Optional
  ver+   *est allé* [ɛ.**t**a.le] 'go_{PAS.COMP.}'

---

*O**n** est allé u**n** été en vacances.*

(PFC, 2011, scacm1, semi-formal conversation)

Liaison

distribution and challenges

L1 adult French

- PFC data (Durand et al., 2002, 2014) show diatopic and diastratic variation, though with a core of stability across regions and levels of style (Côté, 2017).

L1 child French

- Erroneous segmentation, liaison consonant in the onset of Word-2.

- Multiple lexical representations /arbr/, /zarbr/, /narbr/, /tarbr/ (Chevrot et al., 2013; Wauquier & Shoemaker, 2013).

L2 learner French

- Production of a liaison consonant that corresponds to the orthographic form.

- Absence of enchainement (Racine, 2015; Tennant, 2015; Thomas, 2004).

Schwa

properties

Definition

- Alternation between ∅ and vowel in the same lexical and morphological context (Côté, 2000; see also Dell, 1985).

- Two contexts with variation: Initial syllable of polysyllables and monosyllables, post-vocalically.

- In word-medial and -final position: Stable, predictable presence and absence.

Output: #CV(#)C → CC

- Creation of secondary cluster in polysyllables (Bazylko, 1976)
  petit ami [pti.ta.mi].

- Positioning of C in monosyllables
  tout le monde [tul.mɔ̃d]
  tout ce que [tu.skœ]

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

(PFC, 2004, svarv1, free conversation)

Schwa

distribution and challenges

L1 adult French

• PFC data show similar behaviour of schwa in monosyllables and initial syllables of polysyllables across European French varieties, Southern France being an exception (Lyche, 2016, and references therein).

• Similar rates of schwa alternation in the two contexts.

L1 child French

• Initial syllable of polysyllables: High degree of schwa presence, one variant always strongly preferred in a given speaker. Secondary clusters modified in line with current phonotactic knowledge (Andreassen, 2013).

• Monosyllables: Gradual decrease in schwa presence, in particular in constructions frequently subject to schwa absence in CDS (Liégeois, 2014).

L2 learner French

• Transfer to French of strong letter/sound correspondence in L1.

• Comprehension complicated by the existence of variants and resyllabificiation in the case of schwa absence.

• Overgeneralisation of schwa deletion when conscious of alternation. (Nouveau & Detey, 2007)

Liaison and schwa

similarities

Properties

- Highly frequent, highly variable.

- Apply across word boundaries.

- Domain of application: the rhythmic group (= prosodic phrase).

French prosody
stress patterns

Stress

- Not assigned in the lexicon but at the phrasal level.
- Primary stress falls on the last syllable of the rhythmic group.
- Has a demarcative function and signals a lexical/prosodic boundary.

The rhythmic group

- The size may vary according to speech rate.

  [J'écoute] [de la musique] or [j'écoute de la musique]

- Minimally contains a lexical word and the functional words governed by it.

Obligatory liaison	*Mes amis*	[mezami]
Schwa monosyllable	*Tu le dis*	[tyl(œ)di]
Schwa initial syllable	*La demande*	[lad(œ)mɑ̃d]

Norwegian prosody

stress patterns

Lexical stress

- Falls within the last two-syllable window of the word.

- Falls on the final syllable if this is heavy, and on the penultimate syllable if the former is light. (Kristoffersen, 2015)

The accent phrase

- The stressed syllable appears at its left boundary.

- Includes all unstressed syllables following the stressed syllable.

- Since stress is not systematically word initial, the accent phrase does not systematically respect lexical boundaries. (Kristoffersen, 2000).

Tasks for the Norwegian learner of French

- Not to stress individual lexical items.

- Link several lexical items as if they were one word, with stress on the final syllable of the rhythmic group → Create the conditioning context for enchainement, liaison and schwa alternation.

Liaison and schwa

similarities

Properties

- Highly frequent, highly variable.

- Apply across word boundaries.

- Domain of application: the rhythmic group.

Both affect perception

- Liaison (and forward linking/enchainement) facilitates recognition of Word-2, but the liaison consonant harder to detect than the fixed consonants → might reflect a different representation. (Nguyen et al., 2007)

- Schwa: Recognition of variants is driven by variant frequency, not variant type (Bürki & Frauenfelder, 2012; Bürki et al., 2017). Orthographic effect even in the case of no phonological correspondent (Racine et al., 2014).

Perception of phonological variation

Swedish learners of French

Speaker 1

Speaker 2

(Stridfeldt, 2005, p. 121)

Schwa vs. liaison

Schwa absence complicates perception, different from liaison.
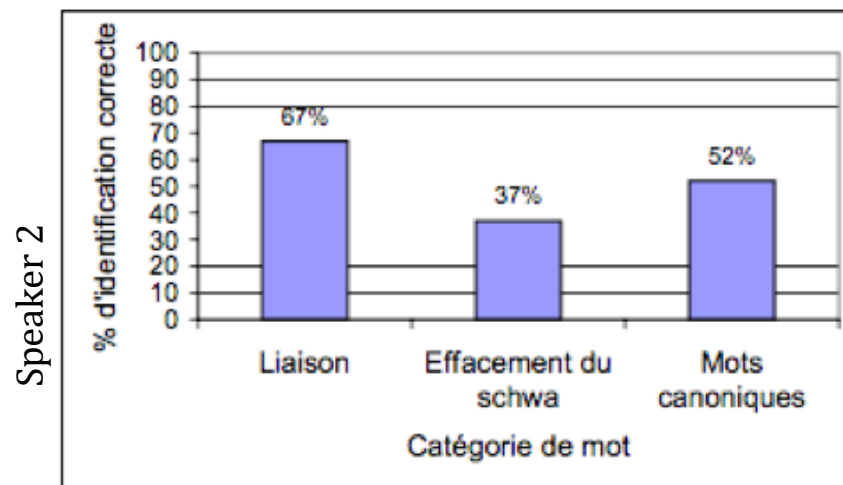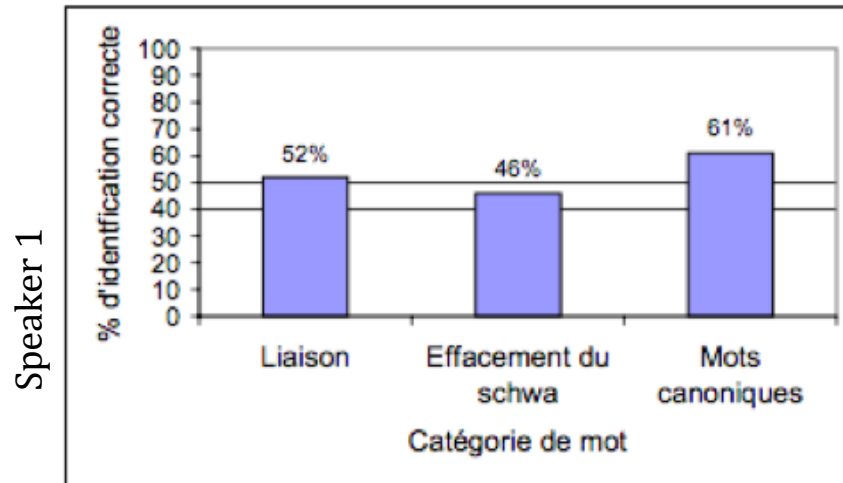
Perception of phonological variation

Swedish learners of French

Repetition task, schwa absence in input

Higher degree of schwa presence in familiar words → Reconstruction based on lexical representation with schwa?

(see Spinelli & Gros-Balthazard, 2007, on the operation of phonotactic constraints in the processing of variants without schwa.)

Target variant frequency not reflected.

Prononciation de la locutrice	Prononciation des apprenants			
	Mots familiers		Mots moins familiers	
	SE	AE	SE	AE
AE et RD	71	29	50	50
AE et RG	62,5	37,5	45	55

(Stridfeldt, 2005, p. 149)

Liaison and schwa

similarities

Properties

- Highly frequent, highly variable.

- Apply across word boundaries.

- Domain of application: the rhythmic group.

Both affect perception

- Liaison (and forward linking/enchainement) facilitates recognition of Word-2, but LC harder to detect than fixed consonants → might reflect a different representation. (Nguyen et al., 2007)

- Recognition of variants is driven by variant frequency, not variant type (Bürki & Frauenfelder, 2012; Bürki et al., 2017). Orthographic effect even in the case of no phonological correspondent (Racine et al., 2014).

Both affect production

- Liaison facilitates by creating a CVCV structure.

- Schwa complicates by creating a consonant cluster.

Prevocalic clusters

Norwegian vs. French

<div style="border: 2px solid red;">

French primary clusters
Plosive + Liquid
/f, v/ + Liquid
/s/ + Plosive

(Dell, 1995, p. 10-11)

</div>

<div style="border: 2px solid red;">

Norwegian primary clusters
Obstruent + Sonorant
Nasal + (j)
/s/+ Plosive

(Kristoffersen, 2015, p. 32)

</div>

	Secondary clusters
Primary clusters	pt **pl** sp ʃn **sm** sl mn
Not primary clusters	db dd dg dv **ds dm** sg ʃm sʁ ʒl mz nv lk ʁp ʁb ʁt ʁd ʁg lv ls ʁf ʁv ʁʃ ʁʒ ʁm ʁn

(Andreassen, 2013, p. 54)

Some secondary clusters overlap with primary clusters, both in French and Norwegian: [pl, sm …]. The only true secondary cluster observed with a similar counterpart in Norwegian: [fn]

Challenge for the learner: Organisation and production of the sequence in the case of schwa absence.

Learning strategies

the Ontogeny model (Major, 1987, 1994)

Interference dominates in the initial phases; then this decreases and developmental factors increase (and later gradually decrease).

Acquisition of a predictable L2 prosodic pattern (like French) is less simple than expected: if prosodic structure projected at a lower level in L1, this is transferred to the L2 system (Özçelik, 2017).

Hypothesis 1

The less advanced learner maintains the Norwegian stress system.

Predictions

- Absence of enchainement within target rhythmic groups.

- Absence of liaison and schwa deletion.

Learning strategies

the Ontogeny model (Major, 1987, 1994)

There is no fundamental difference between the mechanism of repair strategies in L1 and L2, though with different starting points.

In L1 acquisition: 1) primary clusters acquired before secondary clusters, 2) schwa alternation does not take place if secondary clusters are not in place, 3) /r/-initial clusters highly problematic, 4) near-categorical selection of the schwaless variant in early stages in words with very high input frequency. (Andreassen, 2013)

L2 learners already master the primary clusters of their L1.

Hypothesis 2

Norwegian learners of French display similar strategies to L1 learners in the production of schwa items.

Predictions

- The variant with schwa is preferred to the variant without schwa, even when high frequency of the reduced variant in the input.

- Schwa alternation first appears with the least marked secondary clusters.

- The variant without schwa may appear in words with high input frequency.

Learning strategies

the Ontogeny model (Major, 1987, 1994)

There is no fundamental difference between the mechanism of repair strategies in L1 and L2, though with _different starting points_.

In L1 acquisition: With exposure to the variant without schwa in the immediate input, this may appear with modifications in the secondary cluster: Simplifications, substitutions (Andreassen, 2013).

Hypothesis 3

Access to the orthographic representation influences the production of schwa items.

Predictions

- No sensitivity to schwa absence in the immediate input.
- Faithfulness to the secondary cluster elements (or their orthographic counterpart).

Predicted path of acquisition

putting it all together

**Lexical stress
No enchainement
No liaison
Schwa presence**

**L2 prosodic phrasing
Enchainement
Obligatory liaison
Schwa presence**

**L2 prosodic phrasing
Enchainement
Obligatory liaison
Schwa alternation
(target CC)**

(system ready for stylistically
conditioned variation)

IPFC

Interphonologie du français contemporain

International research programme

- Coordinated by Sylvain Detey (Waseda University), Isabelle Racine (University of Geneva), Yuji Kawaguchi (Tokyo University of Foreign Studies).

- Around 20 active research groups around the world, e.g. Canada, Greece, Japan.

Objective

- Study of phonetic/phonological systems of non-native speakers of French, for theoretical and didactic purposes.

Data

- Database under construction: Open samples, main corpora subject to log-in.

- IPFC-Norvège, three corpora under treatment: Tromsø, Oslo, Caen (immersion).

- IPFC-Norvège: All publication-related datasets published in the Tromsø Repository of Language and Linguistics (TROLLing: opendata/uit.no/dataverse/trolling).

(Detey et al., 2016)

Data for the present study

Informants

- Oslo: 6 speakers (proficiency level B1/B2), 1 not having had a longer stay in a European French speaking country.

- Tromsø: 6 speakers (proficiency level A2).

Tasks

- Semi-formal conversation, with French native speaker.

- Free conversation, with peer.

Methods

- Transcription in Praat.

- Application of IPFC coding systems for schwa and liaison (Racine et al., 2015; Racine & Detey, 2015).

- Evaluation of (non-) enchainement: Visual and auditory inspection.

Results

target enchainement in spontaneous speech

	Total	Enchainement		No enchainement		Pause	
Tromsø	185	68,6%	127	22,7%	42	8,6%	16
Oslo	112	71,4%	80	19,6%	22	8,9%	10

No difference between Tromsø and Oslo.

Tromsø: Enchainement much limited to frequent constructions with strong relation between the elements, often with a light Word-1.

il + est/a (39), *quel + âge/est* (13), *dix-sept ans* (10)

Il_est onze / ans

(notrah1, semi-formal conversation)

Même si je suis allée la première fois quand j'avais seize_ans.

(noosm1, free conversation)

Results

target obligatory liaison in spontaneous speech

Det + Pro +	Liaison Enchainement		Liaison No enchainem.		No liaison No enchainem.		No liaison Pause		Liaison Pause	
Tromsø	57,7%	26/45	10,5%	4/45	22,2%	10/45	13%	5/45		
Oslo	86,8%	66/76	4,5%	2/76	4,5%	2/76	5,4%	4/76	2,6%	2/76

Oslo more target-like productions than Tromsø, and better performance than with fixed consonants.

In Tromsø, instances of no enchainement and of no liaison consonant, indicating that neither is fully in place, not even for word combinations which in all styles belong to the same rhythmic group.

Individual differences? Absence of liaison consonant + enchainement: notrah1

Quel est ton / artiste préféré?

(notrah1, semi-formal)

Results

schwa in spontaneous speech: global numbers

Corpus	Total	Polysyllables		Monosyllables	
		Absence	Occurrences	Absence	Occurrences
Tromsø	978	1,6%	1/61	2%	18/917
Oslo	793	9,8%	6/61	6,6%	48/732

Higher rate of schwa deletion in Oslo, for both positions.

Tromsø, the laborious selection and organisation of content, discourse planning, affects the target prosody in a negative way → pauses → removal of condition for schwa alternation.

Parce que euh fait la vélo … de Nordkapp
(notrla1, free conversation)

Results

left context: polysyllables

Corpus	Total	V#		C#		###		##	
		A	Occ	A	Occ	A	Occ	A	Occ
Tromsø	61	2,9%	1/35	0%	0/7	0%	0/1	0%	0/18
Oslo	61	15,8%	6/38	0%	0/12	0%	0/2	0%	0/1
Paris		62,7%	74/118						

Schwa absence only post-vocalically, though with a much lower rate than in L1 adult French (Lyche & Østby, 2009, p. 216).

Oslo: Frequency effect? *p'tit peu, p'tit* (noosch1)

Tromsø: Orthography effect? More than 50% produced [e].

Stability also when schwa absence in the immediate input (needs to be verified across the corpus).

T'es resté là-bas euh deux s'maines, un mois?
Trois s[e]maines
Trois s'maines, ok d'accord.

(notrbf1, semi-formal)

Results

left context: monosyllables

Corpus	Total	V#		C#		###		##	
		A	Occ	A	Occ	A	Occ	A	Occ
Tromsø	917	1,1%	3/266	1%	1/104	0,4%	10/247	1,3%	4/300
Oslo	732	7,3%	34/462	1,6%	2/127	8,3%	4/48	8,4%	8/95
Paris	1059	64,%	680/1059	13%	291/1059	39,8%	88/1059		

Oslo: More deletion after vowel than after consonant, in line with the target system.

Tromsø: Deletion in phrase-initial position primarily in one speaker (notrik1).

J' pense que le, le tout le monde, euh

(notrik1, semi-formal)

Results

schwa absence in light of leftward segmental context

Tromsø

- *je,* frequent constructions *je pense, je crois*: [ʃp, ʃk]

Oslo

- Fricative > Nasal > Liquid > Plosive
- *je,* frequent constructions *je pense, je crois*: [ʃk, ʃp]
- *ne*, non-colloquial *je ne*, [n] in coda: [ʒœn]
- *le*, [l] in coda
- *de*, in front of liquid: [dl], no deletion in *que*

Schwa absence in monosyllables, after vowel,
PFC investigation points Switzerland
(Andreassen, 2003, p. 110)

Type	Absence	Occ.
ce	89%	104/117
te	84%	26/31
se	79%	55/70
je	72%	239/332
me	69%	69/100
de	69%	343/495
le	66%	225/339
que	62%	120/194
ne	52%	12/23

Schwa in monosyllables

the special case of plosives

Parce qu'il y a si beaucoup de touristes

(nooshi1, free conversation)

Schwa in monosyllables

the special case of plosives

Côté (2008): Relation between the perceptibility scale of consonants and the likelihood to block schwa deletion.

Stridfeldt (2005): Swedish learners of French have difficulties perceiving reduced *de* [d].

Effect of exposure to colloquial French: L1 Allemanic speakers in immersion have a higher deletion rate, but only for monosyllables in a postvocalic context (Isely et al., 2017).

Ex: nooseh1and nooskf1, with more than 1 year in French school

Informant	deletion V#	plosive left
others	7,3% (32/462)	2,2% (3/138)
nooseh1	15,7% (30/79)	20,4% (10/49)
nooskf1	27,5% (20/127)	2,5% (1/41)

Results
summary

Tromsø

Enchainement much limited to strong syntactic relations

Obligatory liaison not fully in place

Schwa near-categorically present

Emerging absence in line with the target, after fricative

Oslo

Enchainement in a variety of contexts

Obligatory liaison in place, with ench.

Schwa presence dominates

Emerging absence in line with the target, after fricative, after vowel

Schwa deletion does not happen before L2 prosodic phrasing is mastered
Monosyllables, with no lexical accent in L1 and more free to move, show deletion first
Deletion sensitive to segmental and syllabic context

Discussion

hypotheses

Hypothesis 1: The less advanced learner maintains the Norwegian stress system.

> PARTIAL: schwa presence as expected, but enchainement (and liaison) more or less in place for constructions with strong relation between elements.

The Ontogeny model promising

- The more advanced learners in Oslo show some sensitivity to the preceding context of schwa, which indicate rhythmic group formation.

Discussion

hypotheses

Hypothesis 2: Norwegian learners of French display similar strategies to L1 learners in the production of schwa items.

PARTIAL, the full variant is preferred. L2 learners do not attempt schwa deletion with modifications in the cluster.

Discussion

hypotheses

Hypothesis 2: Norwegian learners of French display similar strategies to L1 learners in the production of schwa items.

PARTIAL, the full variant is preferred. L2 learners do not attempt schwa deletion with modifications in the cluster.

Hypothesis 3: Access to the orthographic representation influences the production of schwa items.

YES, the less advanced learners produce schwa as [e] in the initial syllable of polysyllable, which might indicate little awareness of the relation between the two contexts when it comes to variation in the target language.

Markedness Differential Hypothesis

"The areas of **difficulty that a language learner will have** can be predicted on the basis of a systematic comparison of the grammars of the native language, the target language and the markedness relations stated in universal grammar, such that,

(a) Those areas of the target language which differ from the native language and are **more marked than the native language will be difficult**.

(b) The relative degree of difficulty of the areas of the target language which are more marked than the native language will correspond to the **relative degree of markedness**;

(c) Those areas of the target language which are different from the native language, but are **not more marked than the native language will not be difficult**."

(Eckman 1977, p. 321)

Future perspectives

some of them

Theory

- Examine data from IPFC corpora where L1 do/do not authorise primary clusters to see the relation between these, secondary clusters, and schwa alternation.

Methods

- Do a prosodic study of learner production (e.g. perception/detection of prominences) to determine the true impact of the Norwegian accentual system on schwa alternation in the course of acquisition.

- Apply the revised IPFC coding system for schwa (Isely et al., 2017) and the IPFC coding system for prosody (Tennant et al., 2016).

- Extend the corpus to more speakers (including Caen) and search group profiles in light of degree of exposure to colloquial French.

Didactics

- Bringing the "study abroad"-effect for the monosyllables home to the classroom: How to better integrate authentic speech in teaching material?

- The initial syllable of polysyllables: A mystery we shouldn't ignore.

- Being aware of target prosody and intra-language differences: Increased attention to pronunciation improves retention and performance in L2 learning (Sturm, 2013).

Thank you for your attention!

References

Andreassen, H. N. (2013). *Schwa: Distribution and acquisition in light of Swiss French data.* (PhD), University of Tromsø. Retrieved from http://hdl.handle.net/10037/5193

Andreassen, H. N. & Lyche, C. (to appear). Tromsø, Norvège. *IPFC: Interphonologie du français contemporain.* http://cblle.tufs.ac.jp/ipfc/

Bayley, R., & Regan, V. (2004). Introduction: The acquisition of sociolinguistic competence. *Journal of Sociolinguistics, 8*(3), 323-338.

Bazylko, S. (1976). Groupes consonantiques primaires et secondaires à l'initiale du mot dans le français contemporain. *La Linguistique, 12*(1), 63-80.

Bürki, A., & Frauenfelder, U. H. (2012). Producing and recognizing words with two pronunciation variants: Evidence from novel schwa words. *Quarterly Journal of Experimental Psychology, 65*(4), 796-824

Bürki, A., Viebahn, M. C., Racine, I., Mabut, C., & Spinelli, E. (2017). Intrinsic advantage for canonical forms in spoken word recognition: myth or reality? *Language, Cognition and Neuroscience,* 1-18. doi:10.1080/23273798.2017.1388412

Chevrot, J.-P., Dugua, C., Harnois-Delpiano, M., Siccardi, A., & Spinelli, E. (2013). Liaison acquisition: debates, critical issues, future research. *Language Sciences, 39,* 83-94.

References

Côté, M.-H. (2008). Empty elements in schwa, liaison and h-aspiré: The French Holy Trinity revisited. In J. Hartmann, V. Hegedüs, & H. van Riemsdijk (Eds.), *Sounds of silence: Empty elements in syntax and phonology* (pp. 61-103). Amsterdam: Elsevier.

Côté, M.-H. (2017). La liaison en diatopie: esquisse d'une typologie. *Journal of French Language Studies, 27*(1), 13-25.

Côté, M.-H. (2000). *Consonant cluster phonotactics: A perceptual approach*. (PhD), MIT, Cambridge, Mass.

Dell, F. (1995). Consonant clusters and phonological syllables in French. *Lingua, 95*(1-3), 5-26.

Dell, F. (1985). *Les règles et les sons: Introduction à la grammaire générative* (2 ed.). Paris: Hermann.

Detey, S., Racine, I., Kawaguchi, Y., & Zay, F. (2016). Variation among non-native speakers: the InterPhonology of Contemporary French. In S. Detey, J. Durand, B. Laks, & C. Lyche (Eds.), *Varieties of Spoken French* (pp. 491-502). Oxford: Oxford University Press.

Durand, J., Laks, B., & Lyche, C. (2014). French phonology from a corpus perspective: The PFC Programme. In J. Durand, G. Kristoffersen, & U. Gut (Eds.), *The Oxford Handbook of Corpus Phonology* (pp. 486-497). Oxford: Oxford University Press.

Durand, J., Laks, B., & Lyche, C. (2002). La phonologie du français contemporain: Usages, variétés et structure. In C. D. Pusch & W. Raible (Eds.), *Romanistische Korpuslinguistik - Korpora und gesprochene Sprache/Romance Corpus Linguistics - Corpora and Spoken Language* (pp. 93-106). Tübingen: Gunter Narr Verlag.

Eckman, F. R. (1977). Markedness and the Contrastive Analysis Hypothesis. *Language Learning, 27*(2), 315-330.

References

Eychenne, J., & Laks, B. (2017). La liaison en français contemporain: normes, usages, acquisitions. *Journal of French Language Studies, 27*(1), 1-12.

Isely, R., Racine, I., Detey, S., Andreassen, H. N., & Eychenne, J. (2017). Paper presented at the Journées FLOraL-IPFC 2017, Paris, France. Presentation retrieved from http://hdl.handle.net/10037/11864

Kristoffersen, G. (2015). *Kort innføring i norsk fonologi* (4 ed.). Bergen: Universitetet i Bergen

Kristoffersen, G. (2000). *The phonology of Norwegian.* Oxford: Oxford University Press.

Liégeois, L. (2014). *Usage des variables phonologiques dans un corpus d'interactions naturelles parents-enfant: impact du bain linguistique et dispositifs cognitifs d'apprentissage.* (PhD), Université Blaise Pascal - Clermont Université.

Liégeois, L. (2014). *Usage des variables phonologiques dans un corpus d'interactions naturelles parents-enfant: impact du bain linguistique et dispositifs cognitifs d'apprentissage.* (PhD), Université Blaise Pascal - Clermont Université.

Lyche, C. (2016). Approaching variation in PFC: the schwa level. In S. Detey, J. Durand, B. Laks, & C. Lyche (Eds.), *Varieties of Spoken French* (pp. 352-362). Oxford: Oxford University Press.

Lyche, C., & Andreassen, H. N. (to appear). Oslo, Norvège. *IPFC: Interphonologie du français contemporain.* http://cblle.tufs.ac.jp/ipfc/

Lyche, C., & Østby, K. A. (2009). Le français de la haute bourgeoisie parisienne: Une variété conservatrice? In J. Durand, B. Laks, & C. Lyche (Eds.), *Phonologie, variation et accents du français* (pp. 203-230). Paris: Hermès.

Major, R. C. (1994). Chronological and stylistic aspects of second language acquisition of consonant clusters. *Language Learning: A Journal of Applied Linguistics, 44*(4), 655-680.

References

Major, R. C. (1987). A model for interlanguage phonology. In G. Ioup & H. Weinberger (Eds.), *Interlanguage phonology: The acquisition of a second language sound system* (pp. 101-125). New York: Newbury House/Harper&Row.

Mougeon, R., Rehner, K., & Nadasdi, T. (2004). The learning of spoken French variation by immersion students from Toronto, Canada. *Journal of Sociolinguistics, 8*(3), 408-432.

Nguyen, N., Wauquier, S., Lancia, L., & Tuller, B. (2007). Detection of liaison consonants in speech processing in French: Experimental data and theoretical implications. In P. Prieto, J. Mascaró, & M.-J. Solé (Eds.), *Segmental and Prosodic Issues in Romance Phonology* (pp. 3-23). Amsterdam: John Benjamins.

Nouveau, D., & Detey, S. (2007). Enseignement/apprentissage du schwa et apprenants néerlandais: des données de la base PFC à l'espace-ressource en ligne du projet PFC-EF. *Bulletin PFC, 7*, 87-106.

Özçelik, Ö. (2017). Universal Grammar and second language phonology: Full transfer / prevalent access in the L2 acquisition of Turkish "stress" by English and French speakers. *Language Acquisition*, 1-37.

PFC: Phonologie du français contemporain. (2011). *Neuchâtel.* https://research.projet-pfc.net/enquetes.php?id=144

Pohl, Jacques. (1975). L'omission de *ne* dans le français parlé contemporain. *Le Français dans le monde, 111*, 17-23.

Racine, I. (2015). La liaison chez apprenants les hispanophones avancés de FLE. *Bulletin VALS-ASLA, 102*, 147-167.

Racine, I., Bürki, A., & Spinelli, E. (2014). The implication of spelling and frequency in the recognition of phonological variants: evidence from pre-readers and readers. *Journal of Language and Cognitive Processes, 29*(7), 893-898.

References

Racine, I., & Detey, S. (2015). Corpus oraux, liaison et locuteurs non natifs: de la recherche en phonologie à l'enseignement du français langue étrangère. *Bulletin VALS-ASLA, 102,* 1-25.

Racine, I., Detey, S., & Andreassen, H. N. (2015). *Le schwa chez les non natifs: Perspectives de codage.* Paper presented at the Journée IPFC 2015: Evaluation de la parole non native et corpus d'apprenants, Paris, France. Presentation retrieved from http://hdl.handle.net/10037/8885

Spinelli, E., & Gros-Balthazard, F. (2007). Phonotactic constraints help to overcome effects of schwa deletion in French. *Cognition, 104*(2), 397-406.

Stridfeldt, M. (2005). *La perception du français oral par des apprenants suédois.* Umeå: Institutionen för moderna språk, Umeå universitet.

Sturm, J. L. (2013). Attention, awareness, and accent marks in L2 French. *Language Awareness, 22*(2), 146-160.

Tennant, J. (2015). Canadian anglophone learners' realization of French liaison. *Bulletin VALS-ASLA, 102*, 65-85.

Tennant, J., Paternostro, R., & Herry, N. (2016). *Raffinement des systèmes de codage prosodique pour les corpus d'apprenants IPFC et ICE-PAC.* Paper presented at Journée IPFC 2016, Paris, France.

Thomas, A. (2004). Phonetic norm versus usage in advanced French as a second language. *IRAL, 42*(4), 365-382.

Uritescu, D., Mougeon, R., Rehner, K., & Nadasdi, T. (2004). Acquisition of the internal and external constraints of variable schwa deletion by French immersion students. *IRAL, 42*(4), 349-364.

Wauquier, S., & Shoemaker, E. (2013). Convergence and divergence in the acquisition of French liaison by native and non-native speakers: A review of existing data and avenues for future research. *Language, Interaction and Acquisition, 4*(2), 161-189.

Informants

Investigation point	Informant code	Sex
Tromsø	notrah1	F
	notrbf1	M
	notrda1	F
	notrew1	M
	notrhh1	M
	notrik1	F
Oslo	noosaf1	M
	noosch1	F
	nooshi1	F
	noosjb1	M
	noosmh1	F
	noosms1	F