The emergence of prosodic schwa in French

Julien Eychenne*
ERSS (Toulouse-Le Mirail & CNRS UMR 5610)

24 juin 2005
BIDE05

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*eychenn@univ-tlse2.fr. Parts of this work were presented at the 13th Manchester Phonology Meeting (with J. Durand) and at the RFP2005 in Aix. I received helpful comments and criticisms from Jacques Durand, Marc van Oostendorp, Yvan Rose and Gabor Turcsan. All remaining errors are mine.

1 Introduction

1.1 The problem

This paper is concerned with the interaction of lexical and "pre-pausal" schwas in word-final position. An optimality theoretic analysis is proposed, which accounts for the observed patterns.

1.2 Data gathering

The data was gathered within the project "Phonologie du français contemporain" (PFC, see Durand and Lyche (2003) for an overview).

(1) The corpora:

- Languedoc variety (LV, Southern French accent): survey in Douzens (Aude, in Languedoc; 10 speakers).
- Pays Basque variety (PBV, Southern French accent): survey in Biarritz/Saint-Jean-Pied-de-Port (13 speakers recorded, 12 transcribed and coded).

See Durand and Eychenne (2004) for a descriptive overview of the Languedoc and Pays Basque corpora, with special attention to the spelling/phonology correlation.

2 Setting the scene: basic facts about diachrony

2.1 Northern French

Schwa (spelled *e*) in final position comes from the merger of posttonic vowels ([a] and [ɛ]).

According to Fouché (1958), the deletion process of schwa began during the 15th century and "ended" at the end of the 17th century. Vaudelin (1713), in its proposal for a new spelling, suggests that final schwa should not be written, since it is not pronounced anymore.

Nowadays, schwa isn't pronounced anymore, except to break up complex clusters (Dell (1985)), as in *film* [ə] *tchèque* 'Czech film'

2.2 Southern French

Séguy (1951) : French was first learned on the basis of the spelling (as taught in schools).

3 Undoing the puzzle : the data

3.1 The Languedoc survey

3.1.1 Lexical schwa

The Languedoc corpus represents a conservative variety, in particular for old(er) speakers. There is a tendency to delete schwa among young(er) speakers (see also Durand et al. (1987), and even Borrell (1975) for similar remarks).

vowel	tokens	%
absent	208	11.9
present	1523	**86.8**
uncertain	23	1.3
total	1754	100

Table 1: Languedoc variety, graphic *e* (context XC_#{C;#})

vowel	tokens	%
absent	730	96.3
present	19	**2.5**
uncertain	9	1.2
total	758	100

Table 2: Languedoc variety, no graphic *e* (context XC_#{C;#})

(2) Preconsonantal schwas:

je le regrette pas (speaker AL1)	[ʒø lø røgrɛtə pa]	'I don't regret it'
la semaine dernière (JP1)	[la sømɛnə dɛrnjɛrə]	'last week'

(3) Deletion of schwa (young speakers):

comme si c'était (TG1)	[kɔm si sete]	'as if it were'
Je pense pas (JP1)	[ʒø paᴺs pa]	'I don't think (so)'

(4) Complex clusters

Marc Blanc	[mark blaᴺ] ∽ [mar blaᴺ]
Ouest Liberté	[wɛs libɛrte] ∽ [wɛst libɛrte]

3.1.2 Preconsonantal vs prepausal asymmetry

	deleted schwas	pronounced schwas	deletion rate (%)
XC_#C	160	896	15.2
XC_##	48	629	7.1

Table 3: XCe#C vs XCe## asymmetry in LV

3.2 The Pays Basque survey

3.2.1 Lexical schwa

The Pays Basque variety represents a Midi French accent (typical position law, salient nasal appendix) undergoing schwa erosion (especially in word-final contexts).

vowel	tokens	%
absent	1048	48.2
present	1023	**47.1**
uncertain	103	4.7
total	2174	100

Table 4: Pays Basque variety, graphic *e* (context XC_#{C;#})

vowel	tokens	%
absent	998	91.5
present	74	**6.8**
uncertain	19	1.7
total	1091	100

Table 5: Pays Basque variety, no graphic *e* (context XC_#{C;#})

(5) Complex clusters

Marc Blanc [mark blaᴺ] ∽ [markə blaᴺ]
Ouest Liberté [wɛs libɛrte] ∽ [wɛst libɛrte] ∽ [wɛstə libɛrte]

3.2.2 Preconsonantal vs prepausal asymmetry

	deleted schwas	pronounced schwas	deletion rate (%)
XC_#C	698	584	54.4
XC_##	301	437	40.1

Table 6: XCe#C vs XCe## asymmetry in PBV (graphic e)

	no schwa	epenthetic schwas	epenthesis rate (%)
XC_#C	712	27	3.6
XC_##	300	47	13.5

Table 7: XC#C vs XC## asymmetry in PBV (no graphic e)

(6) Epenthetic schwas before a pause

VOICELESS PLOSIVES		
en fait	[aᴺ fɛtə]	MA3, guided
vin blanc sec	[vɛᴺ blaᴺ sɛkə]	MA3, text
VOICED PLOSIVES		
à l'issue du DEUG	[a lisy dy dœgə]	ST1, guided
en Amérique du Sud	[an amerik dy sydə]	MA3, guided
FRICATIVES		
le plus	[lə plysə]	JC1, guided
trente-six	[traᴺtəsisə]	MA1, guided
L'Express	[lɛkspʀɛsə]	MA3, text
LIQUIDS		
au départ	[o deparə]	PL1, guided
cinq jours	[sɛᴺk ʒurə]	PI1, free
alors	[alɔrə]	PI1, free
du côté paternel	[dy kote patɛrnɛlə]	MA3, guided
en milieu rural	[aᴺ miljø ryralə]	PI1, guided
CC CLUSTERS		
Biarritz	[bjaritsə]	
ce film	[sə filmə]	(restructuring ?)

3.3 Parisian French

3.3.1 "Standard" French

In standard French, schwa isn't pronounced anymore at the end of the word.

mer	"sea"	[mɛʀ]	
mère	"mother"	[mɛʀ]	(Southern French [mɛʀə])
lac	"lake"	[lak])	
laque	"lacquer"	[lak])	(Southern French [lakə])

This is the way French is taught to foreign learners (Tranel (1987) for instance).

3.3.2 Young Parisians' French

A new phenomenon has been observed in (young) Parisians' French, namely the surfacing of a schwa before a pause (dubbed "prepausal" schwa by Hansen, see Hansen (1997), Hansen (2003)).

According to Hansen (1997, p173), this "prepausal" schwa is a new kind of schwa, which has no etymological basis, and which appears before a pause. A typical case is *Bonjour* [bõʒurə].

(7) Fagyal (2000, annex)

Est-ce que vous êtes payée au pull **e** ?

"Do you get paid per jumper?"

Vous avez été proj'té par un aut' véhicul**e** ?

"Were you ejected by another vehicle?"

4 Towards a unified account: prosodic schwa

(8) Generalization : the prepausal context triggers schwa realization (whether lexical or epenthetic).

Accounts in the litterature focus on prepausal schwa, and are phonetic (Fagyal (2000), Carton (1999)) or sociolinguistic (Hansen (1997)).

2 questions arise:

- what's going on in the *grammar*?
- How can phonological theory bridge those patterns altogether?

(9) H1: the phonological phrase (PPh) must end in a consonant. (possible formalization : ALIGN(V, R, PPH, R))

The problem is that there *are* postvocalic schwas : "*Tu vois qui c'est-e ?*", "*Ben, la nationalité, je m'en fous-e !*" (Hansen (1997, p186)).

(10) H2: the prosodic head of a PPh is not the last syllable (see NONFINALITY, Prince and Smolensky (1993, p42)).

Thus, a stress-less schwa is added, wherever needed, to satisfy this requirement (remember *vin blanc sec* [ə]).

This hypothesis is decriptively adequate, but *ad hoc*. Non finality ought to be the consequence, not the cause.

(11) H3: the head foot of a PPh must be heavy (i.e binary), and it coincides with the right edge of the PPh.

In other words, there is a *prosodic* requirement that the head of PPh be heavy. Schwas which satisfy this requirement shall be dubbed *prosodic schwas*.

5 Analysis

5.1 Framework

The analysis is framed in Optimality Theory (OT, Prince and Smolensky (1993), McCarthy and Prince (1993a), McCarthy and Prince (1993b), McCarthy and Prince (1995), McCarthy (2002)).

This analysis is not tight to any particular representational framework. However, I will assume a geometrical organization at the subsegmental level (Clements (1993), Clements and Hume (1995)). cf. figure 1 p9.

Moreover, I assume that schwa is a defective melody (see citetoostendorp1995, van Oostendorp (2003)), and that it should be represented as an empty V-Place.

5.2 Constraints

5.2.1 Pure markedness constraints

(12) V-PLACE : a V-PLACE is not empty (abridged as VP)

(13) HDFTBIN : the head foot of a phonological phrase (PPh) is binary.

5.2.2 Alignment constraint

(14) ALIGNHD (= ALIGN(HEADFOOT, R, PPh, R)) : the right edge of a PPh coincides with the right edge of its head foot.

5.2.3 Projection constraints

The foot pattern can be derived from a projection constraint (van Oostendorp (1995)), as shown in tableaux 9 and 10.

(15) CONNECT(ϑ, φ)

a. PROJECT(ϑ, φ) : if the nucleus N dominates a feature ϑ, then N is the head of a foot φ

b. PROJECT(φ, ϑ) : if N is the head of a foot φ, then N dominates a feature ϑ

with $\vartheta \in$ {vocalic features}.

A full vowel project its own foot and the head of a foot must be a full vowel.

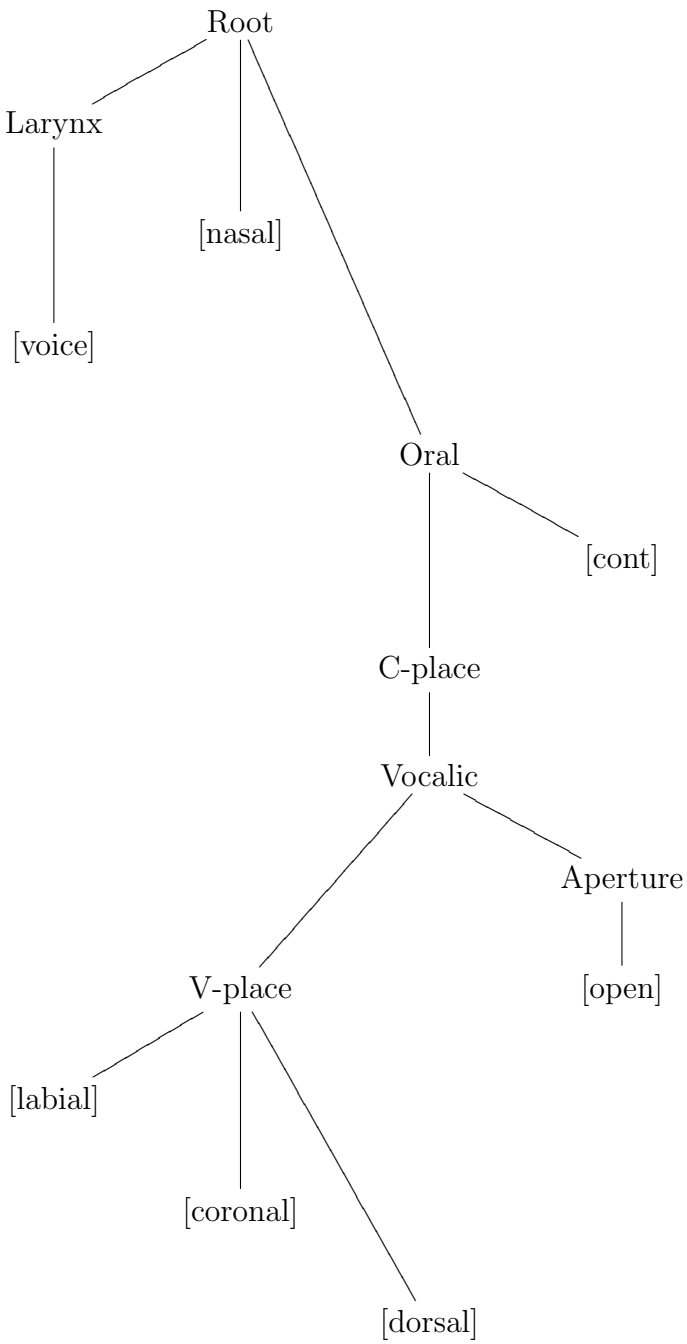

Figure 1: Simplified vowel geometry (adapted from Clements and Hume (1995))

5.2.4 Faithfulness constraints

(16) MAX(V-PLACE) : do not delete V-PLACE (= MAX(Schwa) for Tranel (1999), Tranel (2000), abridged as MAX(VP)).

(17) DEP(V-PLACE) do not insert a V-PLACE (= DEP(Schwa) chez Tranel, abridged as DEP(VP))

(18) DEP(ϑ) : do not insert a vocalic feature

5.3 The French foot

The existence of a trochaic foot in French is widely accepted : Durand (1976), Durand (1995) (Midi French), Selkirk (1978), van Oostendorp (1995), Montreuil (2002) among others. The constraint TROCHEE (cf. Montreuil (2002, p7, fn 4)) will be appealed to here.

Schwa cannot surface as a full vowel because DEP(ϑ) >> CONNECT(ϑ, φ).

/patə/	DEP(ϑ)	CONNECT(ϑ, φ)
a. (pa).(tə)		*!
☞ b. (pa.tə)		
c. (pa).(ti)	*!	

Table 8: DEP(ϑ) >> CONNECT(ϑ, φ)

DEP(ϑ), CONNECT(ϑ, φ) and TROCHEE are high-ranked, but not conflicting. They account for the French foot pattern.

/patŒ/	CONNECT(ϑ, φ)	TROCHEE
☞ a. (pa).(tø)		
b. (ˈpa.tø)	*!	
c. (pa.ˈtø)	*!	*

Table 9: Footing of (*pâteux*)

5.4 Right alignment

The constraint ALIGNHD is undominated in French : therefore, the head foot of a PPh is always the last one.

/patə/		Connect(ϑ, φ)	Trochee
	a. (pa).(tə)	*!	
☞	b. (ˈpa.tə)		
	c. (pa.ˈtə)	*!*	*

Table 10: Footing of (*patte*)

/bElə patə/		AlignHd	HdFtBin
	a. (bɛl.pa)$_{HdFt}$.(tə)	*!	
☞	b. (bɛl).(pa.tə)$_{HdFt}$		
	c. (bɛl).(pa)$_{HdFt}$.(tə)	*	*
	d. (bɛl).(pat)$_{HdFt}$		*!

Table 11: Right alignment of the head of the PPh

5.5 Typology

Grammars can be classified into 4 types, depending on whether they have an underlying schwa (U-schwa) and/or a prosodic schwa (P-schwa).

	- P-schwa	+ P-schwa
+ U-schwa	type I	type II
- U-schwa	type III	type IV

Table 12: Grammar typology

We'll use two examples, namely /bElə patə/ *belle patte* "nice leg" (with U-schwa) and /rOk sEk/ *roc sec* "dry rock" (without U-schwa) to illustrate the different patterns.

5.5.1 Type I (U-schwa only)

In this kind of grammar, only lexical schwa can surface. There is no prosodic schwa

Conservative Languedoc variety (CLV)

	/bElə patə/	Dep(VP)	Max(VP)	HdFtBin	VP
☞	a. (bɛ.lə).(pa.tə)]PPh				**
	b. (bɛl).(pa.tə)]PPh		*!		*
	c. (bɛ.lə).(pat)]PPh		*!	*	*
	d. (bɛl).(pat)]PPh		*!*	*	

Table 13: CLV grammar(*belle patte* with U-schwa)

	/rOk sEk/	Dep(VP)	Max(VP)	HdFtBin	VP
	a. (rɔ.kə).(sɛ.kə)]PPh	*!*			**
	b. (rɔk).(sɛ.kə)]PPh	*!			*
	c. (rɔ.kə).(sɛk)]PPh	*!		*	*
☞	d. (rɔk).(sɛk)]PPh			*	

Table 14: CLV grammar (*roc sec* without U-schwa)

Innovative Languedoc variety (ILV) Young(er) speakers tend to delete schwa. When this is the case, VP >> Max(VP).

	/bElə patə/	Dep(VP)	HdFtBin	VP	Max(VP)
	a. (bɛ.lə).(pa.tə)]PPh			**!	
☞	b. (bɛl).(pa.tə)]PPh			*	*
	c. (bɛ.lə).(pat)]PPh		*!	*	*
	d. (bɛl).(pat)]PPh		* !		**

Table 15: ILV grammar (*belle patte* with U-schwa)

	/rOk sEk/	Dep(VP)	HdFtBin	VP	Max(VP)
	a. (rɔ.kə).(sɛ.kə)]PPh	*!*		**	
	b. (rɔk).(sɛ.kə)]PPh	*!		*	
	c. (rɔ.kə).(sɛk)]PPh	*!	*	*	
☞	d. (rɔk).(sɛk)]PPh		*		

Table 16: ILV grammar (*roc sec* without U-schwa)

This grammar also corresponds to Pays Basque speakers who don't realize a prosodic schwa.

5.5.2 Type II (U-schwa and P-schwa)

This grammar arguably corresponds to that of the Pays Basque speakers who have a prosodic schwa.

	/bElə patə/	HdFtBin	Dep(VP)	VP	Max(VP)
	a. (bɛ.lə).(pa.tə)]PPh			**!	
☞	b. (bɛl).(pa.tə)]PPh			*	*
	c. (bɛ.lə).(pat)]PPh	*!		*	*
	d. (bɛl).(pat)]PPh	*!			**

Table 17: Pays Basque grammar (*belle patte* with U-schwa)

	/rOk sEk/	HdFtBin	Dep(VP)	VP	Max(VP)
	a. (rɔ.kə).(sɛ.kə)]PPh		**!	**	
☞	b. (rɔk).(sɛ.kə)]PPh		*	*	
	c. (rɔ.kə).(sɛk)]PPh	*!	*	*	
	d. (rɔk).(sɛk)]PPh	*!			

Table 18: Pays Basque grammar (*roc sec* without U-schwa)

5.5.3 Type III (neither U-schwa nor P-schwa)

In such grammars, final schwa has been eliminated by lexicon optimization (cf tableaux 19 et 20).

	/patə/	VP	Max(VP)
	a. patə	*!	
☞	b. pat		*

Table 19: Input with final schwa

☞	/pat/	VP	Max(VP)
	a. patə	*!	
☞	b. pat		

Table 20: Input without final schwa

The most harmonic grammar is (20): schwa is removed from the input.

An example of type III grammars would be that of Parisian French (as described by Dell (1985) for instance).

	/bEl pat/	Dep(VP)	VP	HdFtBin	Max(VP)
	a.(bɛ.lə).(pa.tə)]PPh	*!*	**		
	b. (bɛl).(pa.tə)]PPh	*!	*		
	c. (bɛ.lə).(pat)]PPh	*!	*	*	
☞	d. (bɛl).(pat)]PPh			*	

Table 21: Standard French grammar (*belle patte* without U-schwa)

5.5.4 Type IV (P-schwa only)

This grammar corresponds to that of "young Parisians" (as described by Hansen (1997)).

	/bEl pat/	HdFtBin	Dep(VP)	VP	Max(VP)
	a. (bɛ.lə).(pa.tə)]PPh		**!	**	
☞	b. (bɛl).(pa.tə)]PPh		*	*	
	c. (bɛ.lə).(pat)]PPh	*!	*	*	
	d. (bɛl).(pat)]PPh	*!			

Table 22: Young parisians' grammar (*belle patte* without U-schwa)

Faithfulness constraints are now crucially dominated. The erosion phenomenon has reached its end-point : schwa surfacing is only driven by prosodic requirements, and is not lexical anymore.

5.6 Factorial typology

The proposed partial grammar, with 4 constraints, predicts 4! = 24 possible rankings, but only 5 surface patterns with an underlying schwa and 2 patterns without.[1] . Here they are:

A. Patterns with U-schwa

1. /bElə patə/ → [bɛlə patə] and /rOk sEk/ → [rɔk sɛk] (CLV, Type I)

[1]This factorial typology was computed with the help of Hayes' OTSoft 2.1 (`http://www.linguistics.ucla.edu/people/hayes/otsoft/`) using the biaised demotion algorithm.

2. /bElə patə/ → [bɛl patə] and /rOk sEk/ → [rɔk sɛk] (ILV, Type I)

3. /bElə patə/ → [bɛl patə] and /rOk sEk/ → [rɔk sɛkə] (PB with P-schwa, Type II)

4. **/bElə patə/ → [bɛlə patə] and /rOk sEk/ → [rɔk sɛkə] (???, Type II)**

5. /bElə patə/ → [bɛl pat] and /rOk sEk/ → [rɔk sɛk] (Pays Basque without P-schwa, Type I)

B. Patterns without U-schwa

1. /bEl pat/ → [bɛl pat] ("Standard" French Type III)

2. /bEl pat/ → [bɛl patə] (young Parisians' French, Type IV)

I am not aware of a variety described so far that corresponds to pattern (A4). A closer examination of other corpora should bring evidence, or not, for the existence of such a pattern in French.

6 Conclusion

The purpose of this paper was twofold.

- I have presented data about Southern French that were new (Pays basque) or too often overlooked in the litterature (Languedoc).
- I have proposed to connect the patterns observed in the South to those observed in the North. The prepausal schwa observed in the North is, I argue, only one aspect of a more general phenomenon, namely the prosodic requirement that the head of a PPh be heavy (which I have dubbed "prosodic schwa").

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