Remarks on Schwa Deletion and Epenthesis in French

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1   Introduction

Virtually all the literature on French Schwa assumes that schwa deletion and epenthesis are categorical phenomena. This paper is an attempt to challenge this traditional view. After reviewing the evidence in favour of the non-categorical nature of (word-final) schwa, we propose a novel account framed within representational Optimality Theory (OT). It is argued that non-categorical schwa emerges as an optimal output configuration to resolve the conflict between markedness and vocalic faithfulness constraints.

2   The facts

Northern accents have lost lexical schwa word-finally, and two words like *seul* 'alone (masc.)' vs *seule* 'alone (fem.)' are homophonous ([sœl]). Southern accents, on the other hand, typically maintain a final vowel, and the masculine and feminine form a minimal pair ([sœl] vs [sœlə]).

In the wake of seminal work by Schane (1968) and Dell (1985), most of the literature in Generative Grammar has considered the deletion and epenthesis of schwa in French as a categorical phenomenon. Research has focussed on the underlying representation of this vowel and on how to formulate and predict its behaviour accurately.

To be sure, it has occasionally been mentioned that the phenomenon could somewhat gradient, but no formal account has ever been put forward. Thus, de Cornulier (1975: 105-6) points out about Northern French (NF) that

> entre les cas où e est réalisé et ceux où il ne l'est pas, il existe une foule de cas où l'intuition serait bien en peine de trancher au couteau – alors que d'un phénomène ordinaire on suppose, en général, qu'il est là ou qu'il n'y est pas.

The author concludes that one should not say that there is (or that there is not) *un e* (i.e. a schwa), but that there is *de l'e*, hence the name "miettes d'e", which we shall freely translate as 'schwa echoes' hereafter.

Interestingly, similar remarks have been made about Southern French (SF). Durand (1995: 41) notices that:

> Plus la prononciation du locuteur se rapproche d'un accent vernaculaire ou du terroir, plus la voyelle aura de 'couleur'. Plus au contraire l'accent s'élève en direction du français standard plus le schwa se rapproche sur la trajectoire de l'effacement d'une voyelle centrale, se réduisant parfois en une simple voyelle de détente (par exemple, [tɛtə]).

This remark suggests that schwa deletion is not a categorical phenomenon in SF and that it is sociolinguistically controlled; instead of being completely deleted, the vowel can still remain as a vocalic echo. In the same vein, Durand et al. (1987) notice about their corpus in Languedoc that "word-final consonants when released can be followed by a short schwa (for example in *sept*) that may be perceived as different from a full schwa, but not so unambiguously as not to put the analyst in a quandary in a few instances".

While these remarks are rather impressionistic, recent experimental work has shown that there *are* objective differences among speakers of SF. Coquillon (2005) compared the realisation of schwa at the end of intonational phrases in two groups of three speakers from Toulouse (South West) and Marseilles (South East). She showed that schwa was significantly longer in the Toulouse corpus: in a metrical foot like [pa.tə], the length of schwa represents on average 46.30% of the whole foot in Toulouse, against 38.09% in Marseilles (see Coquillon 2005: 277-9). Moreover, a measure of the absolute length of the vowel shows that it is also longer in the Toulouse corpus (93.17 ms on average in Toulouse, but 73.42 ms in Marseilles). It is clear that such findings need to be tested against a broader data base, but they indicate that objective differences do exist. In the area of Aix-Marseilles, schwa has a deletion rate which is surprisingly high for a Southern accent (Taylor 1996: 65), superior to what is usually found in the Toulouse area. It is certainly not a coincidence that the more schwa is likely to drop, the shorter it seems to be phonetically.

Our own work within the PFC project "Phonologie du français contemporain (PFC) : usages, variétés, structure" (Durand et al., 2002) affords us a rich comparative data base against which various hypotheses can be tested. Part of the work we do, reported at this conference by Chantal Lyche, is based on systematic codings for schwa presence/absence on an auditory basis. The Vendée accent in our survey turns out to be a clearly Northern accent in this respect. On the whole, the coders noted that, in the majority of cases, no final vowel was realised and words like *lac* and *laque* were homophonous. What is interesting however is that many instances of codings which were treated as schwas by Northern coders were considered as doubtful by Southern coders: for instance, the vocalic echo at the end of *Madrid* [madridᵊ], uttered by a Northern speaker, was perceived by Southerners as clearly different from the lexical schwa of a word like *solide* in their own accent (i.e. [solidə]). They are what we call schwa echoes, as in the following examples from the corpus:

(1)   *des communes voisinᵊes*
        juin deux-millᵖe
        à une phrasᵊe
        la campagne profondᵖe
        une crèche vivantᵊe
        l'éditeur était d' Madridᵊ

The reader may have noticed that most of these schwas occur after an <e> in the spelling. This is not due to a real difference between words ending in <e> vs a pronounced consonant, but is actually due to the structure of the French lexicon. As pointed out by Durand and Eychenne (2004), historically, almost 90% of final consonants come from a /Cə/ sequence, still represented as <Ce> in the spelling. Thus, schwa tokens are much more likely to appear after a graphical <e> than after a graphical consonant.

The question phonology has to address is whether these differences (both objective and perceptual) are relevant for the grammar. The most common position is to assume that such differences are only details of low-level phonetic implementation. However, we follow van Oostendorp (2006) who (rightfully) argues that non-categorical phenomena need to be taken seriously by phonologists. We thus propose that a schwa echo is a *bona fide* phonological object which represents a stage between full schwa and zero.

3   The representation of schwa

A substantial body of work has shown that major class features should be abandoned (Dogil (1993); Hume and Odden (1996); Scheer (1999) among others). In this paper, we assume the

classical feature geometric representations defended by Clements and Hume (1995), sometimes called 'V-Place theory'. While there is some debate about the proper representation for schwa, many specialists believe that it can be insightfully treated as a minimal or empty vowel (Anderson, 1982; Crosswhite, 2001; Harris and Lindsey, 1995). Following Durand (1986b), we also assume that it is an empty Vocalic node (see too Noske 1993).

One of the advantages of V-Place theory is that it offers a straightforward way of modelling secondary articulations. For instance, a palatalised $[d^j]$ (1-b) is a [d] (1-a) which has a feature [cor(onal)] as a dependent under the V-Place node.

If we accept that an empty vocalic node is the representation of schwa, the model offers a structural possibility which, to the best of our knowledge, has not been explored, that is to say a consonant whose secondary articulation is in fact a schwa (1-c). We argue that this structural possibility is not a gap but corresponds to a schwa echo.
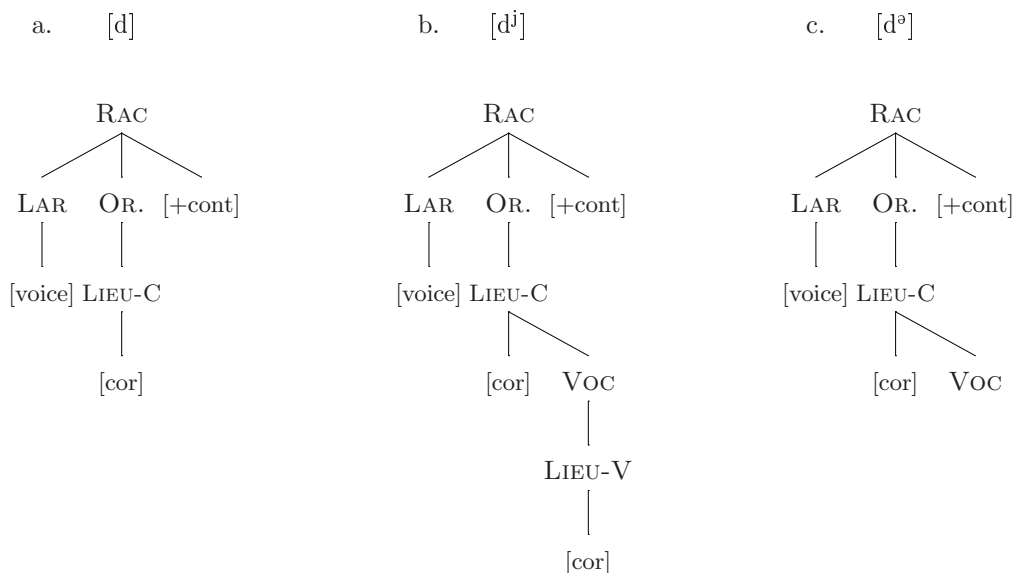

Figure 1: Consonants with a secondary articulation

4 OT Analysis

4.1 Reduction

If our hypothesis is correct, one puzzling question needs to be answered: since consonants with a secondary articulation are already marked objects, how can a consonant with an empty secondary articulation ever surface? We believe that OT (McCarthy and Prince, 1993, 1995; Prince and Smolensky, 1993) offers an adequate framework to model this phenomenon: the markedness of the output of the grammar is not intrinsic but comparative, i.e. any candidate is always compared to other potential winners with respect to a given hierarchy of constraints.

Regular schwa deletion occurs when faithfulness to an underlying schwa (expressed as Max(Voc)) is dominated by a markedness constraint, in this case Final-C which requires that a prosodic word end in a consonant (see McCarthy and Prince 1994: 22)[1].

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[1]Different solutions have been proposed to account for schwa deletion in OT. Lack of space prevents us from

The mechanism of schwa reduction involves 3 fundamental structures, which can be represented as [Cə] (full schwa) [Cᵊ] (schwa echo) and [C] (zero), where C stands for any consonant. Schwa echo in the output can correspond to a full schwa in the input. Before being fully deleted the vocalic node can be absorbed by the preceding consonant, which becomes a coda. This is illustrated in (3).
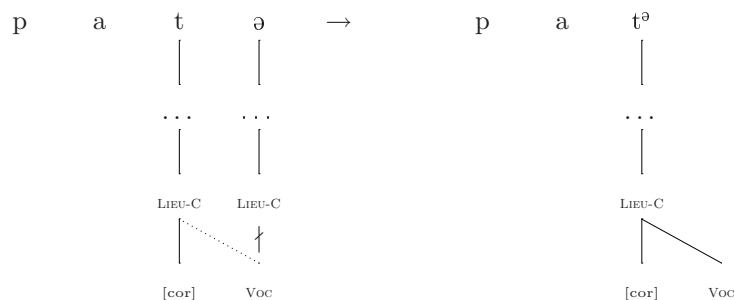
p   a   t   ə   →   p   a   tᵊ

| | |

. . .   .

| | |

Lieu-C Lieu-C   Lieu-C

[cor]   Voc   [cor]   Voc

Figure 2: Schwa reduction

/patə/		Max(Voc)	Final-C	Voc-𝒱	*C-Voc
a.	patə		*!	*	
b. ☞	patᵊ			*	*
c.	pat	*!			

Figure 3: Schwa echo as reduced schwa

4.2 Epenthesis

While it is clear why schwa epenthesis occurs in languages (e.g. to break heavy clusters), it is legitimate to wonder how schwa echo can ever surface as optimal. A consequence of OT's architecture is that faithfulness is always violated minimally; in other words, every faithfulness violation in a winning candidate improves markedness. This means that a candidate with an epenthetic schwa echo must be less marked than a fully faithful candidate vis-à-vis at least one constraint in the grammar.

To understand which constraint is at play, it is necessary to discuss another phenomenon which at first glance looks unrelated to schwa epenthesis. In most varieties of French, voiced fricatives [v, z, ʒ, ʁ] and the cluster [vr] lengthen the preceding vowel. Montreuil (2003) offers an account of this phenomenon in the regional French of Basse-Normandie. He posits that a constraint of mora sharing requires coda consonants to spread their mora onto the preceding vowel. While the idea of a consonant spreading its weight is quite appealing, its formulation as mora sharing is somewhat problematic. Besides its weak explanatory power, such a constraint ("consonantal moras must spread") is expressed in a procedural and not a declarative way[2]: constraints are usually understood as formal conditions on phonological structures, not as phonological processes (e.g. spread, delink). Moreover, it is not clear how this constraint fits in within a theory of markedness, since it considers an object which is representationally more complex (with a branching mora) as less marked. This constitutes a weakening of the grammar which could lead one to postulate constraints such as Ambisyllabic "a consonant must be ambisyllabic". However, a

discussing them fully, but the reader is referred to Eychenne (2006: 226-7,231-232) and references therein.

[2]We owe this remark to Christian Uffmann (voce).

slight reformulation of the constraint can yield a more explanatory solution. Montreuil's proposal, as we understand it, is that moras do not spread blindly, but tend to associate to vowels: association to a vowel represents the unmarked state of affairs for moras. The constraint of mora spreading can thus be reformulated as Voc-μ: "a mora must be associated to a vocalic node". Mora 'spreading' occurs when Voc-μ dominates the constraint requiring that moras be associated with one segment (Unary(μ), see Uffmann 2005).

Let us return to the epenthesis of schwa echoes. Within our framework, this results from the spreading to the right of the moraic weight of the consonant. The epenthesis of a vocalic node represents the least unfaithful way of satisfying the Voc-μ constraint. The tableau (4) summarises this state of affairs: the constraint which penalises consonants with a secondary articulation *C-Voc is crucially dominated by all the other relevant constraints.

/syd/		Unary(μ)	Voc-μ	Dep(Voc)	Final-C	*C-Voc
a.	syd		*!			
b.	sy˙d	*!				
c. ☞	syd^ə			*		*
d.	sydə			*	*!	

Figure 4: Epenthesis of a schwa echo

5 Conclusion

In this paper, we have tried to demonstrate how some gradient phenomena could be integrated to the grammar. We have proposed that schwa reduction and epenthesis are not categorical phenomena. A fully developed theory of segmental structure, without any new additional machinery, can account for final schwa variation within and across speakers and varieties.

It remains to be seen if this account can be extended to word-initial and word-internal contexts. We remain convinced that combining a rich representational theory with the constraint-based OT approach can help describe this most fleeting of French vowels: schwa and its echoes. Psycholinguistic and experimental phonetic investigations are next on our agenda.

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