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CLOSED SYLLABLE ADJUSTMENT AND THE REPRESENTATION OF SCHWA IN
FRENCH

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Introduction

Closed Syllable adjustment (CSA) commonly refers to a process of French neutralizing /ə e ε/ to [ɛ] under certain conditions, in particular in word-final closed syllables. (1a) illustrates the ə/ε alternation and (1b) the e/ε alternation.

(1) (a)	hôte <u>l</u> ier	[otœlje]	hôte <u>l</u>	[otɛl]
	gene <u>v</u> ois	[ʒœnvwa]	Gene <u>v</u> e	[ʒœnev]
	ach <u>è</u> ter	[aʃtɛ]	ach <u>è</u> te	[aʃɛt]
	cre <u>v</u> er	[krœve]	cr <u>è</u> ve	[krev]
(b)	agr <u>è</u> gation	[agregasjɔ̃]	agr <u>è</u> g	[agreg]
	b <u>é</u> néfice	[benɛfis]	b <u>é</u> ne <u>f</u>	[benɛf]
	él <u>é</u> mentaire	[elɛmɑ̃tɛr]	él <u>é</u> m	[elɛm]
	c <u>è</u> der	[sɛde]	c <u>è</u> de	[sɛd]

Much attention has been devoted to CSA recently, in particular with regard to the domain of application of the process.¹ Little has been said, however, about the focus of CSA, apart from assuming without discussion that schwa and the mid front unrounded vowels /e/ and /ɛ/ form a natural class and thus fulfill a necessary condition for viewing CSA as a single rule. The position advocated in this paper is that, given the special nature of French schwa, it is in fact impossible to unify the focus of CSA within a coherent theory of phonology, and that two separate processes must therefore be recognized: ə-adjustment and e-adjustment. Evidence of a functional nature from within the language is also adduced to suggest the separate existence of these two processes in the grammar, independently of formal considerations.

The focus of CSA and the representation of schwa

The proposal to collapse ə-adjustment and e-adjustment into CSA was originally made by Dell (1973, 1980) on the basis that the two rules yield the same output in identical environments and have the same ordering relations with the other rules of the grammar (1980: 194).² Assuming for the sake of discussion that these necessary conditions are indeed met, the challenge remains to group together into a natural class the focuses of the two rules (/ə/ and /e/). My general point in this section is that any such attempt is theoretically problematic.

Let us first review very briefly the well-known puzzle regarding French schwa.³ This mystery vowel can phonetically appear as [œ], [ɛ], or zero, as shown in the examples of (2):

- (2) (a) *geler* [zæle]
 il *gèle* [ilzɛl]
 il a *gelé* [ilaʒle]
- (b) *lever* [læve]
 il *lève* [illɛv]
 il a *levé* [ilalve]
- (c) il *secoue* [ilsœku]
 tu *secoues* [tysku]

Phonologically, however, it can be neither /æ/, nor /ɛ/, nor zero, because as the examples in (3) demonstrate, underlying /æ/ cannot surface as [ɛ] or be deleted (see 3a), underlying /ɛ/ cannot surface as [æ] or be deleted (see 3b), and the possible presence of a schwa between two consonants cannot be predicted (compare 3c with 2c):

- (3) (a) *gueuler* [gœle] (underlying /æ/)
 il *gueule* [ilgɛl] *[ilgɛl]
 il a *gueulé* [ilagœle] *[ilagle]
- (b) *rêver* [ræve] *[ræve] (underlying /ɛ/)
 il *rève* [ilrɛv]
 il a *rêvé* [ilarɛve] *[ilarve]
- (c) il *skie* [ilski] *[ilsœki] (underlying /ski/)
 tu *skies* [tyski]

In sum, it appears that schwa must be something underlyingly, but something different than any of the other vowel phonemes of French.

Against this background on the special nature of French schwa, let us now consider the types of underlying representations that have been proposed for it and discuss how they each fare with respect to the issue of the existence of a single rule of CSA. In *Les règles et les sons* (1973), Dell did not attempt to propose a precise underlying representation for schwa; he simply used the cover symbol "E" to represent the conjunction of /ə/ and /e/, thereby bypassing the problem at hand. In the English version of his book (1980), however, he adopted Dell and Selkirk's (1978) proposal to have schwa specified as the unrounded back counterpart of closed /o/, as shown in (4):⁴

- (4) i y u
 e ø ə o i.e. /ə/ = -high
-low
-round
+back
 ɛ œ ɑ ɔ

This move allows /ə/ and /e/ to form a natural class by themselves, as shown in (5):

- (5) /ə e/ = [-high, -low, -round]

but only at the expense of setting up a purely imaginary

underlying segment for which the feature specification [+back] in particular represents the archetypal arbitrary use of phonological features denounced by Kiparsky 1968.

A conceivable alternative is to represent schwa with the features of a regular phoneme of French, but with an additional overt diacritic mark providing the required distinction. The standard proposal along these lines has been to assume that schwa is a specially marked low mid front rounded vowel underlyingly, as shown in (6) (see for instance Morin 1978):

(6) schwa = /œ̹/

The basic reason for this particular choice is that [œ̹] seems to be the normal surface realization of schwa when nothing untoward happens to it, such as deletion or CSA. This representation of schwa may therefore be viewed as less arbitrary than the previous one, even though it resorts to the unsatisfactory use of diacritic features also criticized by Kiparsky 1968. For our immediate purposes, the important point here is that the representation of schwa as /œ̹/ automatically excludes any possibility of grouping /ə/ and /e/ into an appropriately exclusive natural class.⁵

More recently, with the development of nonlinear phonology, it has become possible to view French schwa under a totally different light by regarding it as some sort of underlying empty vowel. Thus Anderson (1982: 550-2) considers schwa to be an empty syllabic nucleus, and Withgott (1982: 87) defines it as a V-position on the skeleton tier with no associated features on the melody tier. What I would like to argue next is that although the concept of schwa as an empty vowel brings genuine insights into the phonology of this odd vowel, it still does not allow ə-adjustment and e-adjustment to be collapsed into one rule, contrary to Anderson's recent proposal.

To begin with, let us outline how essential properties of French schwa may fall out naturally within the general framework of nonlinear phonology. First, in any analysis, schwa must be somehow set apart from all the other vowels in the system. This is accomplished here not by resorting to arbitrary phonological or diacritic features, but by exploiting an already available property of the theory, namely the relative independence of the various tiers found in phonological representations. Thus, schwa corresponds to an unfilled V-node. Second, this type of representation makes it possible to capture at once that the presence of a schwa is not necessarily predictable, but that its ultimate phonetic realizations are all always rule-governed. The unpredictability of the presence of a schwa is encoded in the underlying presence of a V-position on the skeleton tier. The predictability of the phonetics of schwa can be captured by means of context-sensitive realization rules specifying the features of V on the melody tier. If no rules apply, then empty V can perhaps be automatically assumed to be unrealized phonetically.⁶ Third, an explanation seems available for why instances of vowel insertion

in French, such as those illustrated in (7) (see Tranel 1981: 286-91), are schwas rather than some other vowel or vowels:

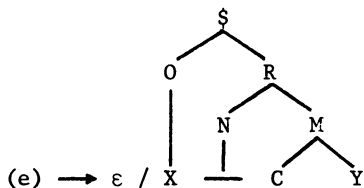
(7) film noir	[film(œ)nwar]
contact pénible	[kõtakt(œ)penibl]
avec rien	[avɛk(œ)rjɛ̃]
quel hasard	[kɛl(œ)azar]

Assuming that the unmarked insertion rule simply places a V on the skeleton tier in the appropriate position, nothing can distinguish a derived empty V from an underlying empty V, and the same realization rules are predicted to operate in both cases.⁷

Fourth, the fact that schwa never occurs in word-initial position can be readily explained. It follows from the form of French grammar and a universal principle independently proposed by both Dell 1980 and Kiparsky 1982. The realization rules for empty V always involve the presence of preceding or following consonants. Thus, the phonetic realization [œ] is governed by the presence of at least one preceding consonant, and the phonetic realization [ɛ̃] is governed by the presence of at least one consonant closing the syllable. Suppose we had words beginning with an empty V. If this empty V were in an open syllable, it would never be realized phonetically. If it were in a closed syllable, it would always surface as [ɛ̃]. In the first case, there would be no reason to postulate an empty V word-initially, and in the second case there would be no reason to postulate anything but an underlying initial mid front unrounded vowel. In effect, the postulation of word-initial empty vowels would unnecessarily increase the overall complexity of French grammar, by making lexical representations of words longer and derivations less direct, with no compensatory gain. Given the realization rules for French schwa, universal considerations of simplicity rule out word-initial empty V, in accord with Dell's "principle of the simplest representation" (1980: 178-80) or Kiparsky's "Derivational Simplicity Criterion" (1982: 57-8).⁸

Let us now return to the question of CSA. Taking maximum advantage of the representation of French schwa as an empty vowel, Anderson 1982 proposes that ə-adjustment and e-adjustment be collapsed into CSA by means of the parenthesis notation, as shown in (8):

(8) (a)



(b) (i) e → ε / ...

(ii) ∅ → ε / ...

(8a) is interpreted by Anderson "as a schema abbreviating two rules, one in which the parenthesized material is present, as in [8bi], and one in which it is absent, as in [8bii]" (553). Although Anderson's schema seemingly resolves ingeniously and elegantly the problem of the conflation of ə-adjustment and e-adjustment, closer inspection of his proposal reveals that it actually involves the problematic use of an unnecessary abbreviatory device.

Observe that in principle the concept of an empty node in phonology serves to distinguish a node whose phonetic realizations are totally predictable, from all other nodes of the same category, which must receive at least some idiosyncratic feature specifications. But Anderson's use of the parenthesis notation in effect permits an empty segment to be collapsed with any segment or set of segments dominated by the same node. Thus, in the case at hand, it actually allows schwa to be collapsed with any vowel or set of vowels of French, when the initial intent of the empty representation is precisely to set schwa apart.⁹ The notion of empty node and Anderson's use of the parenthesis notation thus function at cross-purposes in the theory, since their conjunction results in the contradictory claims that schwa is at the same time distinct and non-distinct from any other French vowel or set of French vowels. The simplest way to eliminate this basic incompatibility is to exclude from the theory one of the two formalisms: empty nodes or the parenthesis notation. The prohibition of empty nodes would presumably require a special statement complicating the theory; it would also seem to prevent the possibility of an incisive treatment of French schwa. On the other hand, Anderson's parenthesis notation, inherited from linear phonology, is precisely of the type made unnecessary by metrical phonology on independent grounds. As "a device for abbreviating a set of elementary rules" (Kenstowicz and Kisseberth 1979: 352), the parenthesis notation was essentially motivated by stress phenomena (Chomsky and Halle 1968). As Hayes 1981 showed, however, its *raison d'être*, together with inherent problems, disappears completely under a metrical approach to stress rules.¹⁰ This outcome is particularly welcome in the case under discussion, because the unavailability of the parenthesis notation in the theory automatically rules out the potential for a theory-internal contradiction among formal devices. Also ruled out, however, is the possibility to collapse ə-adjustment and e-adjustment into a single rule of CSA.

Whether one adopts a linear or a nonlinear framework, the formal unification of the focus of CSA seems prohibited by well-motivated theoretical considerations. Given the maverick character of French schwa, it should come as no surprise that it fiercely resists formal attempts to lump it together with other vowels. I believe that one should in principle be rather suspicious of apparently successful ways of collapsing schwa with other vowels in the system.

Even if ə-adjustment and e-adjustment must consequently be kept separate in the grammar, this does not mean that they should be regarded as completely non-interacting. In fact, ə-adjustment can be viewed as a process feeding e-adjustment.¹¹ That is, in the appropriate contexts, ə-adjustment will specify empty V as a mid front unrounded vowel undetermined between /e/ and /ɛ/. Then, e-adjustment will take both underlying and derived mid front unrounded vowels and turn them into [ɛ], most transparently in word-final closed syllables, and perhaps in other environments as well. Elsewhere, mid front unrounded vowels will be specified as [e], unless they were already lexically marked as /ɛ/.¹²

Other clues to the separation of ə-adjustment and e-adjustment

Given the formal separation of ə-adjustment and e-adjustment, one would expect to be able to find in the language some tangible signs of autonomy on the part of the two processes.¹³ My goal in this section is to assemble a few clues of this nature.

Observe that under the two-process analysis, the application of ə-adjustment has the potential to lead phonetically either to [ɛ] (if e-adjustment subsequently applies) or to [e] (if the elsewhere rule applies instead). Are there any cases in the language where we do find phonetic [e] from underlying /ə/? The examples given in (9) may be relevant:

(9) (a)	élever	[elve]	(b)	élévation	[elevasjõ]
	rebelle	[røbɛl]		rébellion	[rebeljõ]
	remédier	[rømedje]		irremédiable	[iremedjabl]
	secréter	[søkrete]		secrétion	[sekresjõ]
	tenace	[tønas]		ténacité	[tenasite]

We see here that in the words of (9b), the addition of an affix from a specific class often referred to as "learned"¹⁴ apparently triggers the application of the process of ə-adjustment. Because the environment for e-adjustment is not met, [e] rather than [ɛ] surfaces phonetically. The context for the application of ə-adjustment in (9) seems of course quite different than the context for the application of ə-adjustment in (1a), and it might therefore be argued, as was indeed done by Dell (1980: 183), that two altogether different rules operate in (9) and (1a). What this view fails to capture, however, is the fact that both cases of ə-adjustment result in the surface occurrence of a mid front unrounded vowel. By saying, on the other hand, that there is in the phonology of French a single process of ə-adjustment (which may occur in a variety of contexts), one accounts for what would otherwise be a purely accidental state of affairs. If valid, this generalization would reinforce our contention that ə-adjustment and e-adjustment are separate entities in the grammar, since it would show that ə-adjustment may operate independently of e-adjustment.

The autonomy of ə-adjustment and e-adjustment is also revealed, perhaps less controversially, by the drastically different

functions which the two processes perform in the grammar of French. ə-adjustment is one of the rules determining whether schwa is going to be realized phonetically. e-adjustment, on the other hand, is one of the rules governing height values for mid vowels; other rules of this type include for instance the raising of the mid rounded vowels /œ/ and /ɔ/ in word-final position, examples of which are given in (10):

- (10) (a) dégueulasse [degœlas] dégueu [degø]
 éboueur [ebwœr] boueux [bwø]
- (b) automobile [ɔtomobil] auto [oto]
 idiote [idjot] idiot [idjo]

e-adjustment thus has a phonotactic function which clearly separates it from ə-adjustment. This difference may be made more obvious by considering the different types of ungrammaticality which result when failure to apply one or the other rule occurs. The non-application of ə-adjustment does not in itself yield phonotactically ungrammatical strings: for instance, instead of [aʃet] for achète, one would get [aʃæt] or [aʃt], which are phonetically possible words in French.¹⁵ However, if e-adjustment fails to be applied, then the outputs are phonotactically ungrammatical; in particular, any word ending in a closed syllable containing [e] is actually an impossible word in the type of French considered here.¹⁶ Thus, in a sense, ə-adjustment can be bypassed, but not e-adjustment. A related indication of this difference between the two rules is the fact that children often fail to apply ə-adjustment (see 11a), whereas to my knowledge they never fail to apply e-adjustment (see 11b).¹⁷

- (11) (a) je jete [ʒæʒet] (instead of je jette [ʒæʒet])
 on la leve [ɔlaœv] (instead of on la lève [ɔlaœv])
- (b) je cède *[ʒæsed] [ʒæsed]
 on la règle *[ɔlaregl] [ɔlaregl]

These phonotactic and developmental observations find a natural source of explanation in the separate existence of ə-adjustment and e-adjustment. Under the CSA solution, they would remain completely mysterious.

Conclusion

Recent studies in French phonology have generally taken CSA to be a single rule affecting both /ə/ and /e/. My purpose in this paper has been to argue that two separate processes must in fact be recognized: ə-adjustment and e-adjustment. The evidence in favor of this analysis comes from two different quarters. First and foremost, formal and theoretical considerations appear to show that it is impossible to collapse the focuses of ə-adjustment and e-adjustment. Substantively, this finding relates to the well-known unique nature of schwa among French vowels. Secondly, internal to the language, telltale signs do seem to indicate that the two

processes each have an autonomous existence in the grammar; in particular, they may apply independently of each other and they fulfill thoroughly different roles in the language.

Notes

1. See Tranel 1983 for references and discussion.
2. In Dell's account, which is couched in a linear framework, the environments for ə-adjustment and e-adjustment are not only identical, they are also extremely complex, which increases the desirability of the one-rule hypothesis. Given a nonlinear framework, however, it has been argued that Dell's complex environments can be stated succinctly (see for instance Anderson 1982, Bashøll 1978, Selkirk 1978). The one-rule hypothesis is correspondingly less compelling, since it is expected that separate processes will share natural contexts.
3. See Anderson (1982: 537-44) for a recent comprehensive overview of the properties of French schwa.
4. At the expense of observational adequacy, only one type of /a/ is recognized in this system, in order to avoid the problem of having to account for four degrees of height with the two features [high] and [low]. See Walker 1975a for a discussion of this question.
5. Note that if schwa were represented as /ê/, ə-adjustment and e-adjustment could then be collapsed, since /ə/ and /e/ would presumably form a natural class (namely /e/). However, I do not believe that there is any substantive motivation for representing schwa as /ê/; to my knowledge, such a representation has in fact never been proposed.
6. See Withgott (1982: Chapter 3) for an incisive detailed account of this sort within the framework of Lexical Phonology.
7. Actually, it seems that a derived empty V will only surface as [œ], and never as [ɛ]. This follows from the fact that V-insertion can never take place in the proper environment for [ɛ] to be generated. Specifically, V-insertion is an intermorphemic process and the generation of [ɛ] is fundamentally intramorphemic. Also, V-insertion necessarily creates an open syllable and the generation of [ɛ] requires a closed syllable. There is perhaps one case which might be interpreted, at least historically, as an instance of V-insertion surfacing as [ɛ], namely when in the present tense the first person singular subject clitic *je* is postposed to a first group verb whose stem ends in a consonant (e.g. *chanté-je* [ʃãteʒ]). This surface phonetic representation might be derived from /ʃãt+z/ by V-insertion followed by the formation of [ɛ] in a closed syllable. The evidence indicates, however, that this construction has long been restructured with a final /ɛz/ (see for instance Harmer 1979: 52-4; Morin 1978: 123).
8. Dell proposed his principle to eliminate cases of "systematic ambiguity" in phonological representations: "in the case where several phonological representations of the same morpheme are possible, all things being equal, the one closest to the phonetic

representations of the morpheme in question is chosen" (179). This principle in effect allows the phonological rules to constrain phonological representations ("induced restrictions"), and thus avoids "having to represent the same generalization in two different parts of the grammar: first in the form of a phonological rule and secondly in the form of a morpheme structure rule" (180). Kiparsky's principle states that "Among alternative maximally simple grammars select that which has the shortest derivations" (57). Introduced in order to account for "the favored status of lexical phonological rules", this principle accomplishes the same work as Dell's in eliminating unnecessarily complex phonological representations. Both principles are the expression of a very basic simplicity criterion and do not seem to be subject to the type of controversy that has surrounded the implementation of generative phonology's traditional evaluation measure.

9. Naturally, schwa belongs to the set of all French vowels. This is recognized at the skeleton tier, where like all the other French vowels, schwa is V.

10. As Kenstowicz and Kisseberth 1979 also point out, a second function of the parenthesis notation is as "a means of indicating irrelevant intervening material" (352). It is clear that in the case of CSA, the material placed in parentheses in Anderson's schema is not "irrelevant", since it defines one of the instances of application of the process. At any rate, nonlinear phonology in principle renders this type of parenthesis notation otiose as well, since irrelevant material presumably does not belong to the same autosegmental tier or to the same projection as the relevant material.

11. This proposal follows a brief suggestion made by Cornulier (1977: 156-7, note 6) and is consonant with the spirit, if not the letter, of Withgott's 1982 approach. Withgott assumes that by the time her rule of CSA applies, schwa (i.e. empty V) has been specified as [-high, -back] (119-20). However, the rule responsible for this partial specification ("Penultimate Schwa Specification") applies "before a final foot and following at least two consonants" (94); it will therefore not specify all the schwas that need to be specified in order to undergo Withgott's CSA (e.g. the stem schwa of /aʃvt+V/ for *achète* [aʃɛt]).

12. I follow here Kiparsky's 1982 approach to phonological lexical matrices, i.e. "Predictable feature specifications are left unspecified in lexical entries and are filled in by the system of universal and language-particular rules of lexical phonology" (53).

13. Note that the absence of such evidence would not necessarily be an argument against the distinctness of ə-adjustment and e-adjustment, at least as long as the general argument presented in the previous section holds.

14. See in particular Dell and Selkirk 1978 and Walker 1975b.

15. When the non-application of ə-adjustment does yield phonotactically ungrammatical words, it is for independent reasons

having to do with possible vowel distributions and possible consonant clusters. For example, some speakers might object to [aʃœt] because one normally finds [ø] rather than [œ] before word-final [t] (meute [møt] *[mœt]); no speaker would allow [ʒt] as a word (cf. [ʒæt] jette) because there would be no vowel in the word; and no speaker would accept [ʃãsl] as a word (cf. [ʃãsɛl] chancelle) since words cannot end in such a consonant cluster.

16. Word-internally, [e] may appear in a closed syllable, but for independent reasons (see Tranel 1982).

17. The sources for (11a) are personal data and Damourette & Pichon (page 78).

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