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## Segmental and Suprasegmental Structure in Southern French

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### 1. Introduction

In the present work, I am concerned with the interaction between syllable structure and the phonetic realizations of vowels in the Provence variety of Southern French as spoken in Marseille.

Most phonologists now agree that phonological representations do not consist of linear strings of segments and boundaries. However, despite widespread agreement on the basic tenets of non-linear phonology, several issues have given rise to considerable theoretical discussion. Opinions diverge on the following questions, among others:

- the number and the nature of prosodic units
- binary branching vs. n-ary branching.

Moreover, linguists who adopt exactly the same theoretical principles are liable to disagree on the proper interpretation of the same set of data.

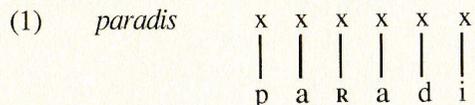
In the present work, following Nespor & Vogel (1986), who give convincing evidence against binary branching, I assume that prosodic constituents are n-ary branching; furthermore, I postulate only one prosodic category: S. The symbol S stands for 'syllable', and prosodic units above the level of the syllable are regarded as projections of S (S', S'', etc.). This extension of some of the principles of X-bar syntax (see Jackendoff 1977) to the field of prosodic phonology allows us to dispense with such labels as 'foot', 'superfoot', 'group', 'phrase' etc. (some of which are obviously *ad hoc*: see Anderson & Ewen (1987:100-101)). In the same spirit, I propose a set of multi-valued features. The application of this non-binary and multi-linear model to the treatment of three fundamental problems in Provençal French reveals some interesting properties of suprasegmental structures. These problems are:

- the phonological status of mid vowels
- the phonological status of schwa
- the correct interpretation of nasalized vowels.

2. Theoretical principles

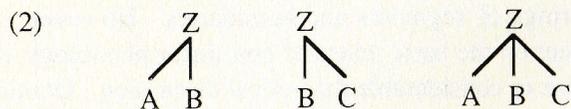
2.1. Segmental and prosodic units

The 'skeleton' consists of a sequence of 'x's. Each occurrence of this symbol represents a phoneme, as in the following example (*paradis* 'paradise':



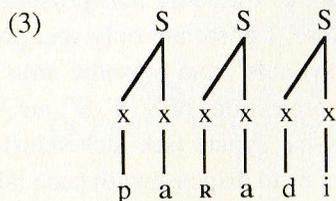
'x' is therefore a segmental unit. The basic suprasegmental unit is S (= syllable).

In the following structures, which illustrate my notational conventions, B is the 'head' or 'governor':

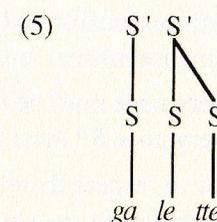
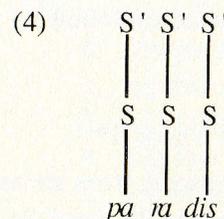


A vertical line links the head of the structure to the higher node, while oblique lines link the subordinate elements to this node. Dependency relations are thus expressed in the simplest manner, without recourse to such labels as 'strong' and 'weak' (see Anderson & Ewen 1987:101).

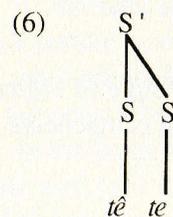
In the word *paradis*, each syllable consists of a consonant plus vowel sequence, and the vowel is the head of the syllable:



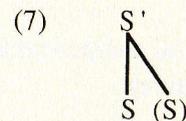
For the moment I shall assume that every S' dominates only one S, except in the case of polysyllabic words with a final schwa (*galette* 'flat cake'):



The final syllable in (5) forms a constituent with the preceding syllable. The word *tête* 'head', for example, will therefore consist of only one S':



The structure of S' is always:

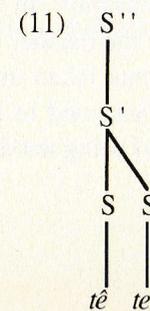
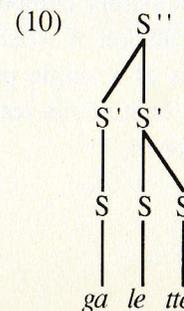
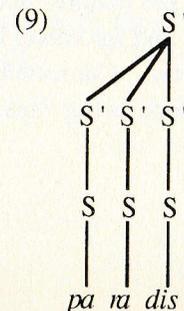


where (S) is an optional constituent, and the first S is the head.

As in the French of other regions, the last syllable of the citation form of a word is stressed, except if its nucleus is schwa (in which case it is the penultimate syllable which is stressed). In my framework, the word-stress rule (for lexical stress) is very simple:

(8) Stress the rightmost S'.

According to my notational conventions, a vertical line links the rightmost S' to a node S'':



Note that it seems reasonable and natural to postulate the following formal constraints on suprasegmental representations:

- (12) Every node must be labelled.  
 (13) Every node  $S^n$  must be dominated by a node  $S^{n+1}$ .

It is much easier to respect these constraints if prosodic trees are assumed to be n-ary branching. Moreover, the highest node in the word (in lexical representations) is always labelled  $S^n$ ; if trees were binary branching, there would be no limit to the value of the exponent of the highest node.

## 2.2. Components and features

I shall now sketch my conception of the internal structure of segments. I posit submatrices, called 'components'. There are four components:

- (14) a. initiatory component  
 b. phonatory component  
 c. nasal component  
 d. articulatory component

In the present work, I am concerned only with the nasal component and the articulatory component. I postulate the following features:

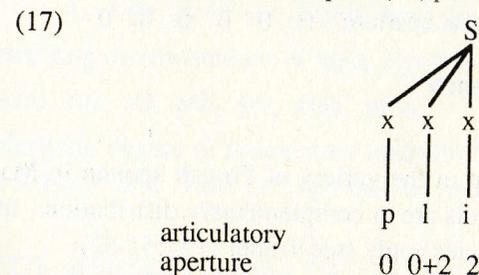
- (15) a. aperture  
 b. place

The feature 'place' will not concern me here (for a full discussion, the reader is referred to Watbled & Autesserre 1989). The feature 'aperture' is a multi-valued parameter and plays a role both in the nasal component and in the articulatory component. In the nasal component, two underlying values are possible: '0' and '2'. '0' means that the velum is raised (the degree of opening being null), and '2' means that it is lowered (the degree of opening being maximal). The value '1', which means 'narrowing', is not relevant to nasality. In the articulatory component, the feature 'aperture' accounts for the manner of articulation of consonants and for vowel height, which are thus taken as values of a single parameter. Consonants and vowels are assumed to form a continuous series, stops being maximally close, and [a] being maximally open:

- (16) a. stops: 0  
 b. fricatives: 1  
 c. approximants, high vowels: 2  
 d. mid-high vowels: 3  
 e. mid-low vowels: 4  
 f. low vowels: 5

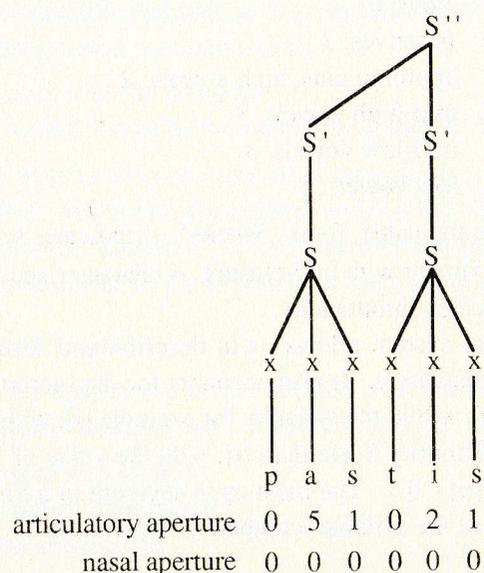
Affricates have the value '0→1', where '→' indicates sequentiality, and [l], a lateral approximant with mid-closure, is characterized by the value '0+2', where '+' indicates simultaneity.

This feature system allows us to describe and formalize natural processes more adequately. It also accounts for the hierarchical relations between segments within the syllable: for example [i], with the value of '2', is higher on the Sonority Scale than [l], with the value of '0+2'; similarly [l] is higher than [p] ('0'). The most open segment in a French syllable is always the head of the syllable (compare (17) *pli* 'fold'):



The degree of articulatory aperture takes priority over velic opening. Thus, the lateral consonant [l] ('0+2') is higher on the Sonority Scale than both [p] and [m] ('0'); but [m] is higher than [p], because of its greater degree of aperture in the nasal component ('2', as opposed to '0'). Note that the degree of aperture in this approach plays the same role as the labels 'strong' and 'weak' in the binary branching structures. We are therefore able to dispense with these labels at all structural levels (compare (18) *pastis* 'pastis'):

(18)



### 3. Vowels in Southern French

#### 3.1. Mid vowels

It is a well known fact that in the variety of French spoken in Marseille mid-high and mid-low vowels are in complementary distribution. In Standard French the following rules apply (see Tranel 1987:51-62):

(19) mid unrounded vowels are mid-low in closed syllables:

*sept*: 'seven' [sɛt], not \*[set]

(20) mid rounded vowels are mid-high in word-final position:

*sot*: 'silly' [so], not \*[sɔ].

However, the following contrasts are possible in Standard French:

(21) mid-high and mid-low unrounded vowels contrast in word-final position:

*thé* 'tea' [tɛ]; *taie* 'pillow case' [tɛ]

(22) mid-high and mid-low rounded vowels contrast in word-final closed syllables:

*rauque* 'hoarse' [rɔk]; *roc* 'rock' [rɔk].

In Southern French, one rule accounts for the distribution of all mid vowels, whether they are rounded or not:

(23) mid vowels are mid-high in open syllables, and mid-low in closed syllables.

Rules (21) and (22) do not apply in Southern French. The consequence is that it is not legitimate to postulate an underlying opposition between the following triplets:

- (24) a. /e ø o/  
b. /ɛ œ ɔ/

This opposition characterizes varieties other than Southern French. In the dialect of Marseille, we find only three mid vowels in underlying representations: /E, Œ, O/; these underlying vowels are partially specified, inasmuch as it would be arbitrary to regard them as mid-high, or mid-low: they simply constitute the set of mid vowels (their degree of articulatory aperture is neither '2' nor '5'). Rule (23) accounts for their realizations:

- (25) a. *thé* [tɛ]; *sot* [so]; *peu* 'little' [pø]  
b. *sept* [sɛt]; *roc* [rɔk]; *peur* 'fear' [pœr]

The underlying representations of these words are:

- (26) /tE, sO, pŒ, sEt, rOk, pŒr/

The underlying degree of articulatory aperture of these vowels can be defined as 3/4 (/ = 'or'). Rule (23) can then be reinterpreted in a more formal manner:

- (27) articulatory aperture 3/4 → 3 (= 'elsewhere context')  
→ 4 if the vowel governs a segment on its right within the same constituent (S or S')

In (25a), the vowel governs nothing on its right; in (25b), it governs the final consonant, since the vowel is the head of the syllable (its degree of aperture is greater).

#### 3.2. Schwa in Southern French

##### 3.2.1. A stable phoneme

I follow Durand, Slater & Wise (1988:74) in defining schwa as the segment corresponding to any graphic 'E' which is not liable to be interpreted as [e] or [ɛ]. A similar definition is given by Walter (1990:27). This graphic

criterion is of course provisional, and we are concerned with the phonological status of the segment in question in the Provence variety of French.

Schwa is not a stable phoneme in Standard French:

- (28) *Tu redemandes*. 'You are asking for more.'  
[ʀødømä:d]/[ʀødmäd]/[rdømäd]

But in the French of Provence graphic 'E' corresponds to a stable vowel in most cases:

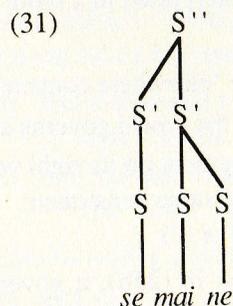
- (29) *Tu redemandes*. [ʀødø'mädə]

and is pronounced even in prepausal context; my transcription shows that schwa is realized as [ø], like graphic 'EU', except when it ends a polysyllabic word; in this case it is more centralized, less labialized, and shorter (see Durand, Slater & Wise (1988:82-83)). Moreover, in polysyllabic words, final schwa is never stressed, and it is regularly 'weaker' than the preceding nucleus; it is also elided before a vowel:

- (30) *Cette fille est belle*. 'This girl is beautiful.' [setəfije'bələ]

### 3.2.2. Word-final schwa

The suprasegmental structure accounts for the dependency relations (*semaine* 'week'):

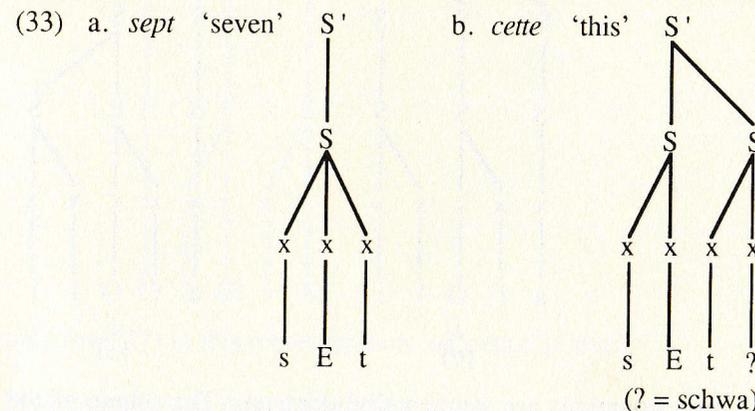


In this configuration, the word-final schwa is governed by the preceding nucleus, as discussed above. It is interesting to note that, whenever the penultimate syllabic nucleus is a mid vowel governing a final schwa, its degree of aperture in the phonetic representation is '4' (= mid-low), although it stands in an open syllable:

- (32) *semaine* 'week' [ɛ]; *faute* 'fault' [ɔ]; *meute* 'pack' [œ].

Rule (27) accounts for this fact, since the penultimate nucleus governs a segment on its right within the same constituent; in *semaine*, for example,

the stressed vowel /E/ governs the final schwa, because the S node which dominates /E/ governs the S node which dominates schwa in the constituent S'. Compare:



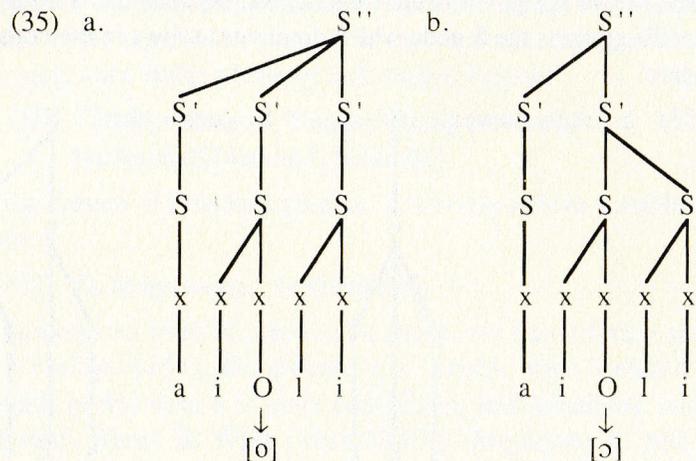
In *sept*, /E/ governs /t/ within the constituent S; in *cette*, /E/ governs schwa within the constituent S'. More precisely, in *sept* the x node which dominates /E/ governs the x node which dominates /t/, and in *cette* the S node which dominates /E/ governs the S node which dominates schwa. In both cases rule (27) yields '3'; we therefore need only one rule for two apparently different contexts.

The validity of rule (27) is confirmed by the two variants of a word like *aïoli* 'garlic mayonnaise':

- (34) *aïoli*: a. [ajo'li]  
b. [a'jɔli]

*Aïoli* is one of a small number of paroxytones (other examples are *raspi* 'stingy', *garri* 'rat') which have been borrowed into Provence French from the Provençal dialect of Occitan with their stress-pattern intact. (34a) represents a 'standard' French pronunciation, with stress on the final syllable (the result of analogical restructuring), which is adopted by some Southern speakers; (34b) represents the 'original' pronunciation, which is still in widespread use. I assume that this small number of items have the same structure as the other paroxytones of Southern French, all of which end in schwa; that is, that their final syllable forms a constituent with the preceding syllable.

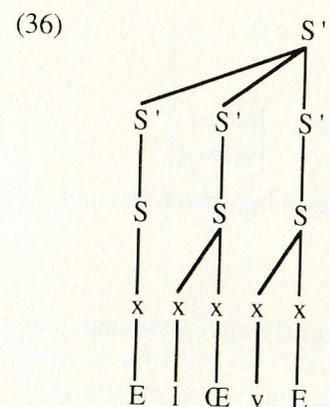
It is noteworthy that the two variants conform to rule (27):



Both representations are segmentally identical. The source of the difference is simply the status of the final vowel: the final nucleus is governed by the penultimate nucleus in (35b), but not in (35a).

### 3.2.3. Schwa in word-internal position and in monosyllables

It is noticeable that schwa (graphic 'E') in word-internal position is often phonetically identical to the mid-high variant of / $\text{E}$ /, i.e., [ $\text{ø}$ ] (see below): *melon* 'melon' and *meulon* 'haystack' are strictly homophonous, and so are *médecin* 'doctor' and *mes deux seins* 'my two breasts'. The phonetic representation of *crever* 'to burst' is [ $\text{krøve}$ ], as though it were spelt \**creuver* (the only difference between *crever* and *creuser* 'to dig' is that between the consonants [v] and [z]). Durand, Slater & Wise (1988:84) write that the schwa in *genêts* 'is indistinguishable from the / $\text{ø}$ / which occurs in e.g. *jeune*'. Regarding the phonetic realization of schwa in monosyllables, Durand, Slater & Wise (1988:83) note that 'it is always identical to that of the mid-high vowel [ $\text{ø}$ ]: *je dis* and *jeudi* are homophonous [...]'. If we add that schwa is a stable vowel in Southern French, only one conclusion can be drawn: in such cases graphic 'E' and 'EU' both correspond to the phoneme / $\text{E}$ /, whose realization is [ $\text{ø}$ ] in open syllables. The underlying representation of *élever* 'to bring up', for example, is:



If we apply rule (27) to this representation, we obtain [ $\text{eløve}$ ].

### 3.2.4. Strong and weak internal schwas

This neat pattern is unfortunately marred by the existence of words whose behaviour is different from that outlined above. Compare *élever* with *ennemi* 'enemy':

(37) *élever* [ $\text{eløve}$ ]      *ennemi* [ $\text{ɛnəmi}$ ]

In both items, the first nucleus is a mid vowel, the second nucleus is a word-internal schwa, and all syllables are open. It is true that the realizations of schwa in the two words are slightly different: the schwa of *ennemi* is very similar to a word-final schwa (as in *tête*, *cette*), hence the symbol [ $\text{ə}$ ]. Moreover, according to my initial hypothesis (see §3.1.), [e] and [ɛ] are realizations of one phoneme: / $\text{E}$ /. The rejection of this hypothesis would produce a paradox: [e] and [ɛ] would contrast only in unstressed syllables, and only when the following nucleus is schwa; in all other contexts, and more particularly in stressed syllables, the contrast would be neutralized. This view is, of course, highly implausible, and I shall not adopt it. A second solution would consist in postulating the following representations:

(38) *élever* / $\text{E}|\text{E}v\text{E}$ /      *ennemi* / $\text{E}n\text{əmi}$ /

This solution is adopted by Durand, Slater & Wise (1988). Graphic schwa would correspond to two different phonemes. In this view, only / $\text{ə}$ / would cause lowering of the preceding mid vowel. However, in the next section I put forward some arguments in favour of an alternative analysis.

## 3.2.5. A suprasegmental solution

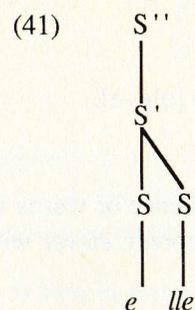
Let us compare the following examples:

- (39) a. *elle rit* 'she is laughing' [ɛlɔ̃ri]  
 b. *céleri* 'celery' [sɛlɔ̃ri]

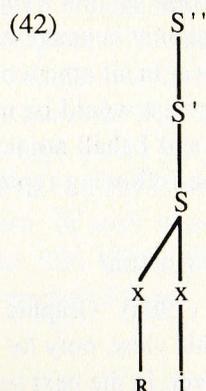
All informants agree that the only difference between (39a) and (39b) is the initial [s] in *céleri*:

- (40) *elle rit* = (c)*éleri*

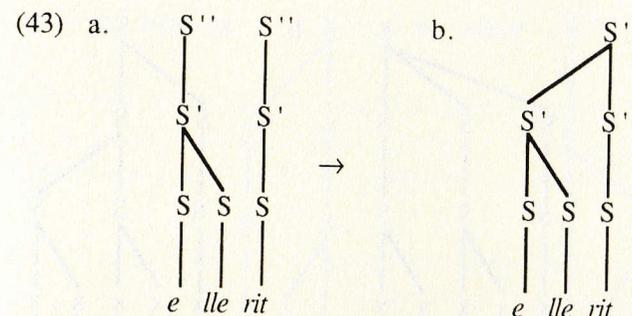
If we ignore the segmental aspect, the underlying representation of *elle* is:



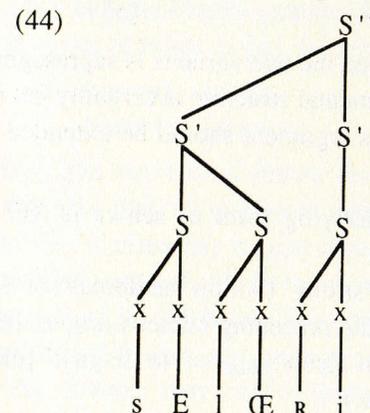
In (41), the first syllable governs the second. My informants unanimously declare that they regard the first syllable as 'stronger' in the citation form of *elle*. Their intuitions therefore accord with the structure postulated in (41). When the same speakers are confronted with (39a), they regularly respond as follows: the strongest syllable is [ri], but [ɛ] is still regarded as stronger than [lɔ̃]. The underlying representation of *rit* is:



When the two words are chained together, only *rit* can keep its stress, and the first S'' node must be deleted:



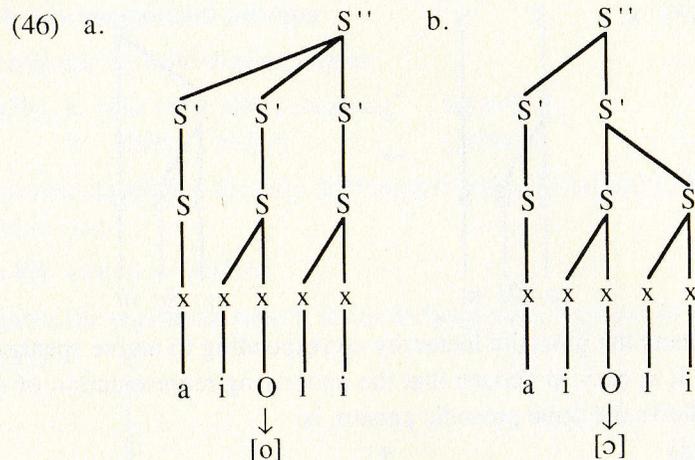
(43b) reflects the prosodic hierarchy corresponding to native speakers' intuitions. It is easy to deduce that the underlying representation of *céleri*, which follows the same prosodic pattern, is:



It is clear, then, that some internal schwas behave exactly like word-final schwas, and others do not: compare (44) with (36). The internal schwa in (44) is governed by the preceding nucleus, while the internal schwa in (36) is not. The distribution of the two types is unpredictable. In (44), rule (27) yields the mid-low variant of /E/ ([œ]), and in (36) it yields the mid-high variant ([e]).

Let us now return to the problem of *aïoli* in (34) and (35), which I repeat here for convenience as (45) and (46):

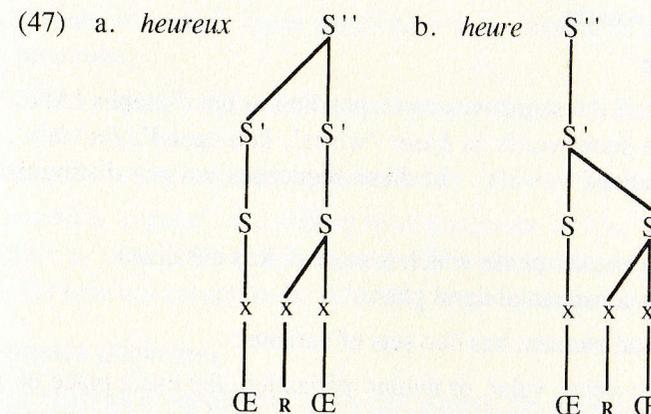
- (45) *aïoli*:: a. [aʝo'li] b. [a'ʝoli]



The only underlying difference between the two variants is suprasegmental; moreover, this difference in suprasegmental structure is certainly not conditioned by any segmental factor. This argument should be extended to the problem of schwa:

- In Southern French, the underlying form of schwa is /œ/ in all cases.
- Some occurrences of /œ/ are 'strong' (within the domain of S'); that is, they are not governed by the preceding nucleus (*élever* [eløvə], *médecin* [medøsɛ̃], etc...), but also *écœurer* 'to disgust' [ekøʁe], *esœulé* 'forsaken' [esøle], etc.).
- Other occurrences of /œ/, in non-initial syllables, are 'weak' — that is, they are governed by the preceding nucleus (*ennemi* [ɛnəmi], *céleri* [seləri], etc.). In such cases /œ/ is always spelt 'E'. /œ/ may be weak either in final or in non-final syllables.
- The distribution of strong or weak schwa in internal open syllables is unpredictable.

The consequence of this view is that the only difference between *heureux* 'happy' and *heure* 'hour' is prosodic:



Rule (27) yields the correct outputs: the first vowel of *heureux* is [ø], while the first vowel of *heure* is [œ], in phonetic representations:

(48) *heureux* [øʁø]  
*heure* [œʁø]

Regarding the word-final schwa (as in *heure*), Durand, Slater & Wise (1988:83) note that 'its quality in this context is distinguishable from both (Ø) and (ø): it often has a centralized quality, less labialization than the front rounded vowels [...]'. In my view, these phonetic differences between the strong final /œ/ of *heureux* and the weak final /œ/ of *heure* are due to suprasegmental factors, and more precisely to the dependency relations between the vowels; they cannot therefore be taken as arguments against identical segmental representations for *heureux* and *heure* at underlying level.

### 3.2.6. The oral vowel system of Southern French

My analysis reveals that schwa is not a separate phoneme in Southern French, and there is no underlying contrast between mid-high and mid-low vowels. I therefore posit the following system of oral vowels:

(49)  $\begin{matrix} i & y & u \\ E & \text{œ} & O \\ & & a \end{matrix}$

#### 4. Nasalized vowels

##### 4.1. The data

I tentatively call the sequences corresponding to the digraphs 'AN', 'ON', 'IN', 'UN' in such words as *blanc* 'white', *bon* 'good', *fin* 'thin', *brun* 'brown' 'nasalized vowels'. In these sequences we can distinguish two phases:

- (i) a vocalic phase which is more or less nasalized
- (ii) a consonantal nasal phase.

The consonantal element has two sets of variants:

- a palato-velar, velar, or uvular realization, the exact place of articulation depending on the quality of the initial vocalic phase; these variants occur in word-final position when no consonant follows: *il est grand* 'he is tall' (see Watbled & Autesserre (1988:218-219) for details).
- a realization where the consonantal element is homorganic with that of the following consonant, both in word-internal position (*encore* 'again') and across word boundaries (*bon pain* 'good bread').

Moreover, the consonantal element is an audible nasal stop when a stop follows, and a practically inaudible nasal fricative before a fricative. In short, this element shares the manner of articulation with the following segment:

- (50) *planter* 'to plant' [plānte]  
*penser* 'to think' [pāsse]

Durand (1988) analyses the same sequences in the Languedoc French of Pézenas, which is closely related to the Provence variety, and derives them from underlying sequences of vowel plus underspecified nasal (N). The nasal element is assumed to undergo velarization and assimilation in the proper contexts; in other cases, the underspecified N is realized as [n] by a default rule.

However, in this approach, we are left with a set of exceptions. Examples of such exceptions are *boum* 'party', *rhum* 'rum', *FEN* (*Fédération Education Nationale* = 'Teachers' Union'):

- (51) *une boum* ([bum]) *superbe* 'a superb party'  
*un rhum* ([ʀɔm]) *très corsé* 'strong rum'  
*la FEN* ([fɛn]) *pense que...* 'the FEN thinks that ...'

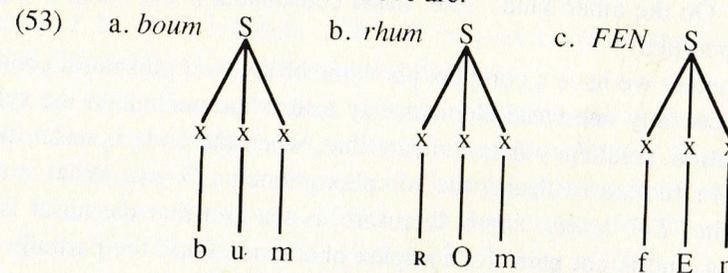
In the diphonemic analysis these words have to be marked as exceptions to several processes:

- (52) a. nasalization of the vocalic element  
 b. velarization  
 c. place and manner assimilation

Either a word is 'regular', and subject to all processes, or it is 'exceptional', and subject to none. This curious property leads me to suspect that the items in (51) are not exceptions to rules, but to phonotactic constraints.

##### 4.2. Complex phonemes

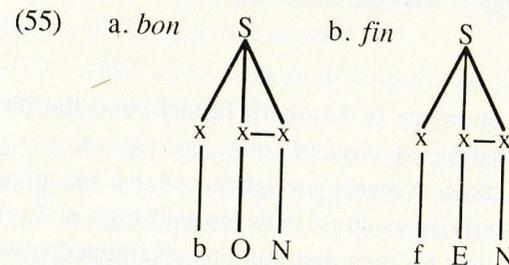
Whatever analysis of nasalized vowels one adopts, the underlying representations of the exceptions referred to above are:



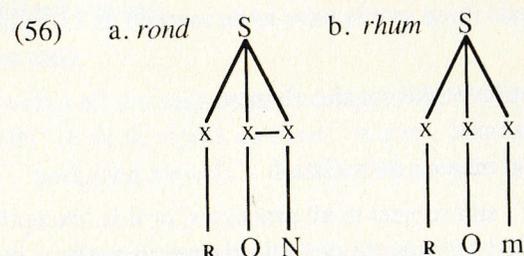
I shall regard the nasalized vowels of the 'regular' sequences (*bon* 'good', *banc* 'bench', *pain* 'bread', *un* 'one') as complex phonemes. In my view, complex phonemes are similar to diphonemic sequences, except for the fact that — from a functional point of view — they must be interpreted as monophonemic. I adopt the following notational convention:

- (54) x-x = complex (monophonemic) phoneme

The underlying representations of *bon* and *fin* are:

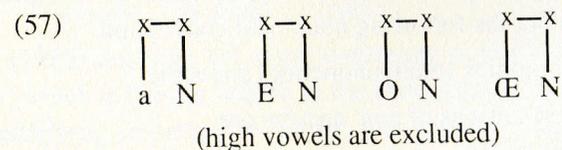


Compare *rond* 'round' and *rhum* 'rum':



Note that the second part of the complex phoneme is necessarily partially specified (N is simply nasal). More precisely, the degree of aperture (see §2.2 above) is specified in the articulatory component only for the first part of the phoneme ( $\underline{x}$ - $x$ ), and in the nasal component only for the second part ( $x$ - $\underline{x}$ ). On the other hand, 'true' nasal consonants (*FEN rhum boum*) are fully specified.

Whether we have a complex phoneme or a vowel plus nasal consonant sequence, only one nasal element may follow the nucleus in the syllable. In addition, frequency data indicate that, when the coda is nasal, the unmarked structure is clearly the complex phoneme ( $x$ - $x$ ). What is exceptional in *FEN*, *boum*, *rhum*, therefore, is the fact that the nasal is autonomous, and is not part of a complex phoneme. Only the partially specified nasal is subject to velarization and assimilation, and triggers nasalization of the nucleus (see 52). The autonomous nasal consonants in (53) are regularly immune to these processes, which are therefore exceptionless. It is also noteworthy that the only possible complex phonemes are:

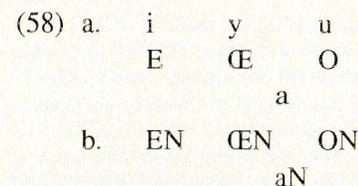


## 5. Conclusion

Schwa is not a separate phoneme in Southern French, and the phonetic quality of word-final unstressed vowels (*tête*, *galette*, etc.) is due to suprasegmental factors: these vowels are governed by the preceding nucleus. There is no underlying contrast between mid-high and mid-low vowels, and rule (27) accounts for their distributions. Nasalized vowels are interpreted as complex monophonemic segments at underlying level, and these segments are distinct from sequences of oral vowel plus nasal conso-

nant. Several rules account for the various realizations of the complex vowels.

The Southern French system includes seven oral vowels and four complex vowels with a partially specified nasal element:



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